

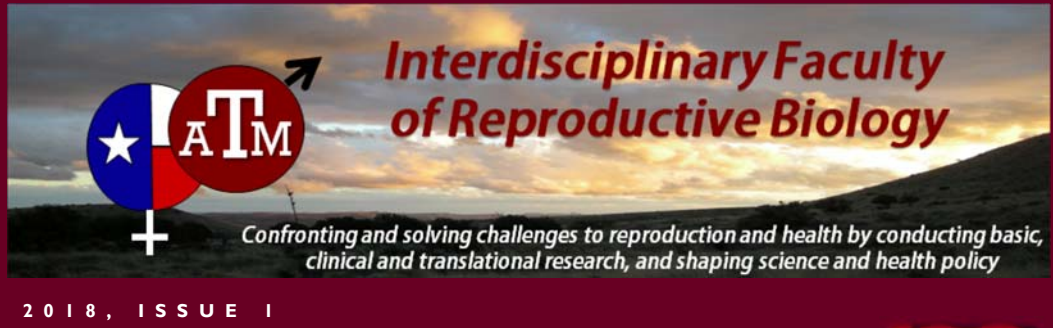
IFRB 2018

POINTS OF INTEREST:

- The IFRB was organized in 1992 and is one of the largest Reproductive Biology Programs in the US
- Membership includes 39 faculty from 9 departments, 4 colleges and 2 system components
- IFRB sponsored activities: 24th Annual R.O. Berry Lecture, 25 year old IFRB Repro Forum Seminar Series, 24th Texas Forum on Reproductive Sciences, Annual IFRB Retreat

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New IFRB Faculty Spotlight



***Dr. Ky G. Pohler** is an Assistant Professor and member of the graduate faculty in the Physiology of Reproduction group in the Department of Animal Science and a new faculty member of the Interdisciplinary Faculty of Reproductive Biology.

Dr. Pohler grew up on a diversified livestock operation in Shiner, TX and received a B.S. in Animal Science from Texas A&M University. He then received a M.S. and Ph.D. from University of Missouri under the mentorship of Dr. Michael Smith. During his time at University of Missouri, Dr. Pohler spent time working at USDA-ARS in Miles City Montana with Dr. Tom Geary as well as Sao Paulo State University in Brazil with Dr. Jose Vasconcelos. Prior to returning to Texas A&M, Dr. Pohler was on faculty at the University of Tennessee in the Department of Animal Science for 3 years. He is honored and excited to be back at Texas A&M University and is looking forward to interacting and working with others in IFRB.

Dr. Pohler's research program focuses on understanding the physiological and molecular mechanisms that control reproductive efficiency in cattle adapted to tropical or subtropical environments. More specifically his lab is interested in the mechanisms that lead to embryonic and fetal mortality in cattle and development of management strategies to overcome these losses in cattle. Embryonic mortality can be classified into early (< d 28 of gestation) or late (> d 28 of gestation) depending on the exact timing at which it occurs during gestation.



Reports of high fertilization rates after a single insemination (~90%), followed by pregnancy rates of 60 to 70% on d 28 in cows indicate that early embryonic mortality may be 20 to 30% in beef cows. Documented causes of early embryonic mortality range from genetic abnormalities to uterine-embryo asynchrony to failure of maternal recognition of pregnancy and this has been an area of intense investigation. Late embryonic mortality (> d 28 of gestation) has been reported in both beef and dairy cattle and may vary from 3.2 to 42.7%.

Currently, there is very little known about the causes of late embryonic mortality. However, the economic consequences of each unit of late embryonic mortality are greater than that of early mortality. Along with the increased economic consequences, late embryonic mortality is becoming more evident in both the beef and dairy industries based on the shift to early pregnancy diagnosis (~d28 - 35 of gestation).

To gain a better understanding of late embryonic mortality in cattle, Dr. Pohler's group has been successful in the development of predictive tests to determine pregnancy success in order to understand mechanisms leading to pregnancy loss using pregnancy associated glycoproteins, small non-coding RNAs and advanced imaging techniques including 3D ultrasound (Figure 1). More specifically, they have demonstrated that cows undergoing late embryonic mortality have decreased PAG secretion (Figure 2) from the developing conceptus as well as specific small non-coding RNAs being released (continued on page 2)

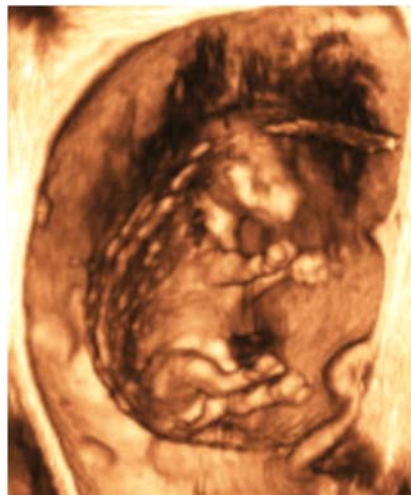


Figure 1. 3D ultrasound image of a day 60 bovine fetus.



New Faculty, Ky Pohler (cont'd from page 1)



Texas Forum for Reproductive Sciences (TFRS)

SAVE THE DATE

The Twenty-Fifth TFRS meeting will be held on April 11-12, 2019 at the College of Veterinary Medicine & Biomedical Sciences, Texas A&M University, College Station, TX

Thursday Plenary Speaker, Dr. Fuller Bazer

Friday Plenary Speaker Dr. Tracy Clement, Assistant Professor, Department of Veterinary Physiology and Pharmacology

2018 TFRS Meeting Chairpersons

2018 TFRS Meeting Organizers Drs. Greg Johnson and Qinglei Li

from the uterus. These biomarkers are currently being used to understand the physiological, cellular, and molecular mechanisms associated with late embryonic mortality and pregnancy loss in cattle.

Another important line of research in his laboratory focuses on determining the underlying affect the paternal genome has on embryonic mortality and pregnancy success in cattle. In large field studies phenotyping pregnancy loss, a major contributing factor has been the sire. Animals mated to high pregnancy loss sires had double the chance to undergo pregnancy loss and had decreased PAG secretion from the developing conceptus. Dr. Pohler's research team is currently investigating the role the paternal genome has in PAG production/secretion and genotypes of high pregnancy loss versus low pregnancy loss sires.

In addition, Dr. Pohler serves as the co-coordinator for the International Beef Cattle Academy at Texas A&M. He also serves on the Applied Reproductive Strategies for Beef Cattle task force as well as on the editorial boards for the *Journal of Animal Science* and *Biology of Reproduction*.

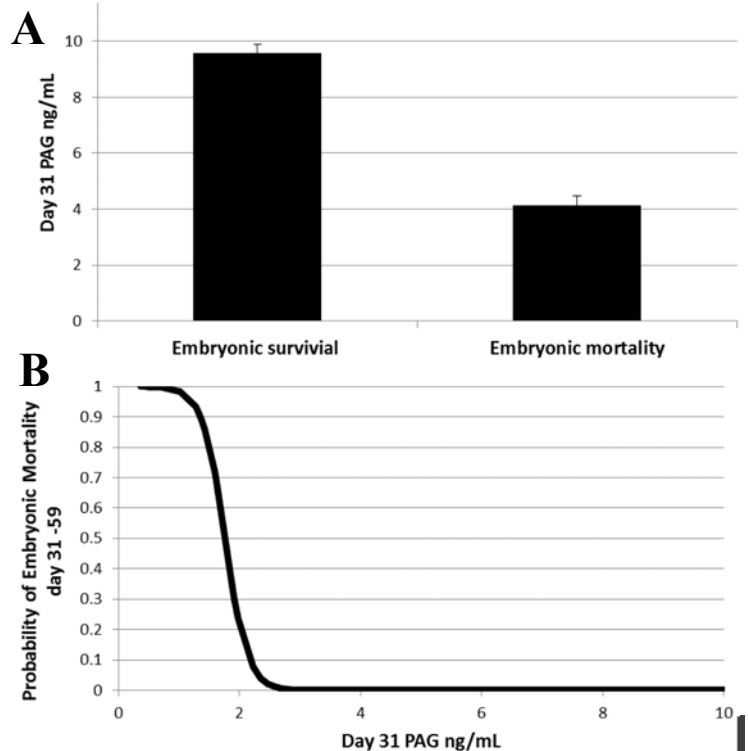


Figure 2. (A) Serum concentrations of pregnancy-associated glycoproteins in lactating cows that received timed AI (TAI) on d 0 and had a viable embryo on d 31 of gestation (n = 413) and either maintained (embryonic survival; n = 364) or experienced embryonic mortality (n = 49). (B) Probability of late embryonic mortality following TAI between d 31 and 59 of gestation based on d-31 serum concentrations of PAG (n = 413). Adapted from Pohler et al., 2016.

IFRB Postdoctoral Trainee Spotlight



*Dr. Claire Stenhouse joined Dr. Fuller Bazer's research group in October 2018. She received her BSc in Reproductive Biology from the University of Edinburgh in 2013, where she worked with Drs. Cheryl Ashworth and Denis Headon to investigate the influence of prenatal stress and early post-natal pain on porcine hair and skin development. Following this, she pursued her MSc degree in Reproductive Sciences at the University of Edinburgh. During this, she worked with Dr. Evelyn Telfer to investigate how the stromal cell environment of the human ovary influences follicular activation, and Dr. Mike McGrew where she performed gene editing to selectively ablate the germ cell lineage in developing chick embryos.



Dr. Stenhouse completed her PhD in Developmental Biology in 2018 at the Roslin Institute, University of Edinburgh, under the supervision of Dr. Cheryl Ashworth and Dr. Xavier Donadeu. Her PhD research was focused on improving the understanding of the fetomaternal interface of intrauterine growth-restricted (IUGR) porcine fetuses throughout gestation. During her PhD, Dr. Stenhouse's research investigated angiogenesis, apoptosis, proliferation and integrin expression in placental and endometrial samples associated with growth restricted and normally-grown fetuses throughout gestation. While performing this research, she developed an interest in sexual dimorphism at the fetomaternal interface.

(continued on page 4)

IFRB Faculty Spotlight: Dr. Gary R. Newton



***Gary R. Newton, Ph.D.** is a Research Scientist Leader and Director of the International Goat Research Center at Prairie View A&M University (PVAMU). He began his career at PVAMU in 1989 after three years as a Postdoctoral Research Associate in the Department of Dairy Science at the University of Florida. He received a B.S. in Biology from the State University of New York at Geneseo. He spent 30 months as a Peace Corps Volunteer in Malaysia before enrolling in graduate school at the University of Kentucky, where he received a Ph.D. in Animal Science. He has been a member of the IFRB since its inception.

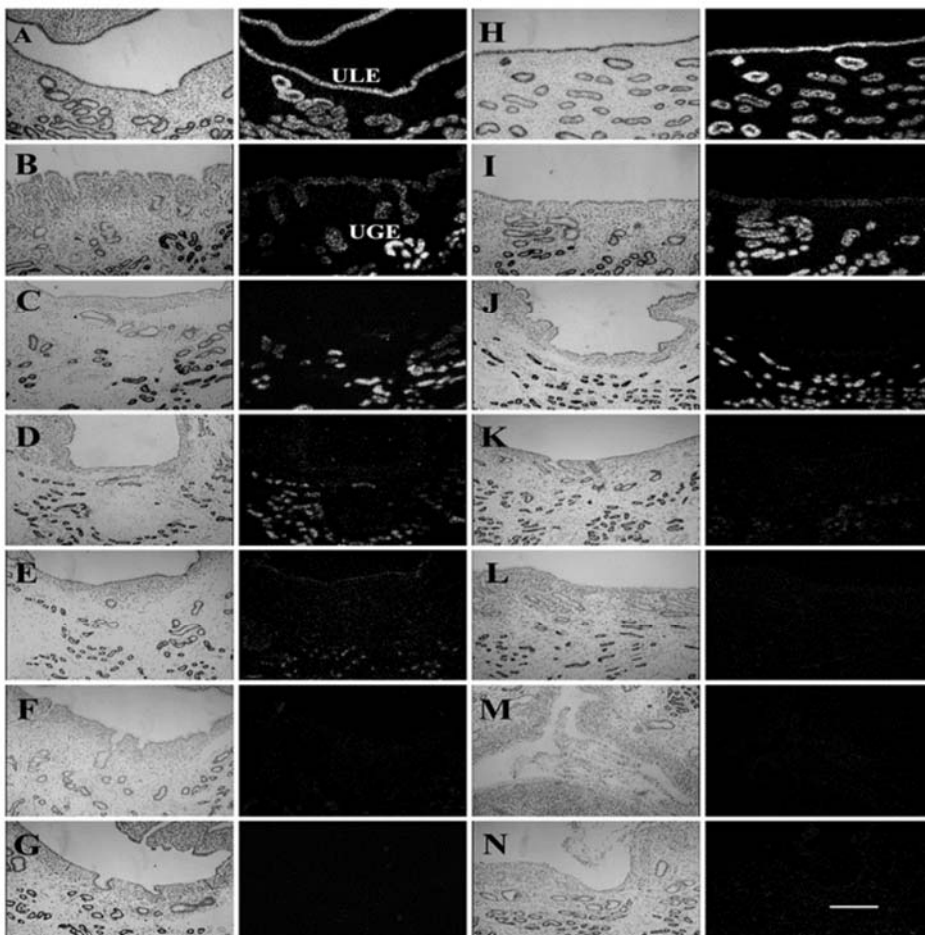
His laboratory studies the process of pregnancy recognition and maintenance in goats. He collaborated with Dr. Fuller Bazer's lab to demonstrate that interferon tau (IFN τ), secreted by the peri-implantation sheep and cow conceptus, is also responsible for pregnancy recognition in the goat. Infusion of IFN τ from Day 14 -18 of the estrous cycle resulted in luteal extension until approximately Day 28, while goats receiving carrier serum proteins recycled after a normal 21-day estrous cycle. This observation was followed by studies designed to better understand the mechanisms that govern developmentally regulated changes in the apical plas-



ma membranes of uterine epithelial (UE) cells that lead to trophoblast (Tr) attachment and initiation of placentation. His laboratory focused on the family of A, B, H (O) histo- and Lewis-blood group antigens, since these glycans undergo changes in expression during cellular differentiation and development and serve as useful markers of UE cell remodeling during early pregnancy in several species, including the goat. Working with Dr. Robert Burghardt and the CVM Image Analysis Lab, it was demonstrated that endometrial H-Type 1 (HT1) antigen is a marker for uterine receptivity during pregnancy recognition in the goat. During apposition and adhesion of fetal and maternal tissues, endometrial expression of the $\alpha(1,2)$ fucosylated HT1 antigen changes dramatically. Intense HT1 immunoreactivity of luminal UE cells, observed on Day 5 of pregnancy, is reduced between Days 11 -13 before uniform strong reactivity returns on Day 15 of pregnancy. Putative receptors for the HT1 antigen were also identified on caprine Tr, where temporal changes in expression of these lectin receptors mirror observed changes in endometrial HT1 antigen.

The enzyme that catalyzes the final step in the formation of the HT1 antigen is α 1-2 fucosyltransferase [FUT]. Working in collaboration with Dr. Nancy Ing's lab, changes in endometrial FUT gene expression in tissues obtained on various days of the estrous cycle and pregnancy were evaluated (**Figure 1**). (continued, page 8)

Figure 1 (left). Alpha(1-2)-fucosyltransferase gene expression within uterine cells. Cross sections of uterine tissues are shown in brightfield (columns one and three) and darkfield (columns two and four) views. White silver grains in dark-field views depicts in situ hybridization of antisense cRNA for $\alpha(1-2)$ -fucosyltransferase in uterine luminal (ULE) and glandular (UGE) epithelial cells. In situ hybridization did not detect any difference in FUT expression patterns between equivalent days of the estrous cycle or pregnancy. Signals in ULE cells were strong on Days 5 of the estrous cycle (A) and pregnancy (H), moderate on Days 11 of the estrous cycle (B) and pregnancy (I) and weak or non-existent on subsequent days. Hybridization signals in UGE cells remained high between Day 5 - Day 13 of the estrous cycle (A-C) and pregnancy (H-J) with weaker staining thereafter. No signal was detected within uterine stroma on any day examined. A tissue sample collected on Day 5 of the estrous cycle and hybridized with the sense $\alpha(1-2)$ -fucosyltransferase cRNA was used as a negative control.





Her research found associations between fetal sex and placental angiogenesis, integrin expression, apoptosis and proliferation which were dependent on the gestational day investigated.

Another research interest of Dr Stenhouse is the impact of IUGR on porcine fetal muscle development. This ongoing research project, in collaboration with Dr Xavier Donadeu (Roslin Institute) has investigated several aspects of muscle development in growth restricted porcine fetuses and neonatal piglets.

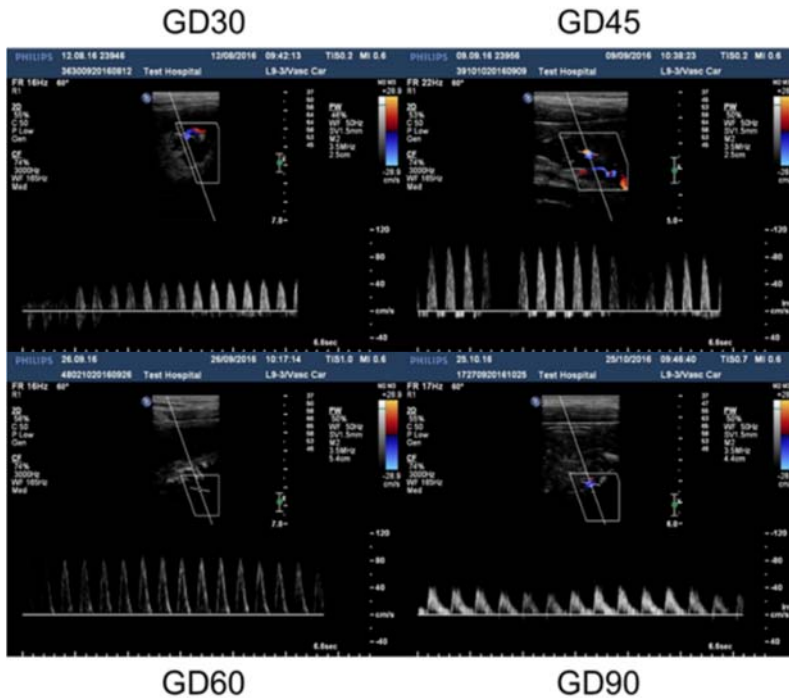


Figure 1. A method was developed to perform non-invasive Doppler ultrasound on lightly sedated pregnant gilts at multiple gestational days (GD) to measure umbilical blood flow.

More intriguingly, her research suggests associations exist between fetal sex and endometrial structure and function, which are not necessarily observed in the placenta. The idea that conceptuses of different sex may communicate differently with the endometrium in early development is of interest to Dr Stenhouse and is an area she intends to research further.

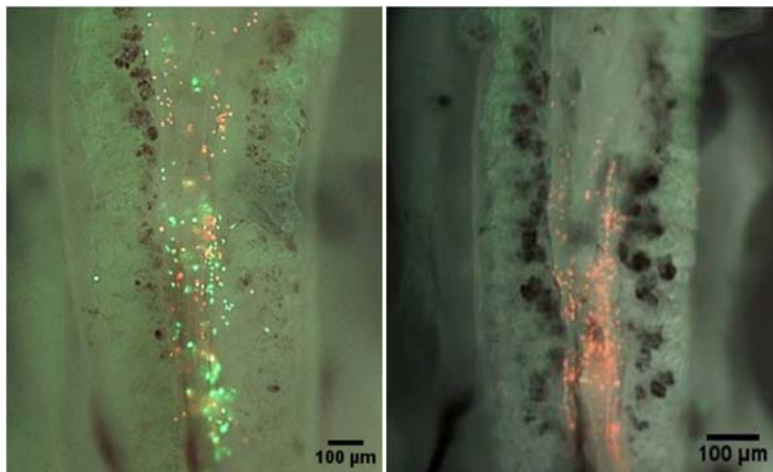


Figure 2. Primordial germ cells can be edited to include a nitroreductase gene (green cells) or control plasmid (red cells). They can be injected into the developing chick embryo and colonize the gonadal ridge. Following treatment with either of the nitroreductase substrates (CB1954 or metronidazole), germ cells edited to express nitroreductase (green) are selectively ablated, leaving only the control (red) cells.

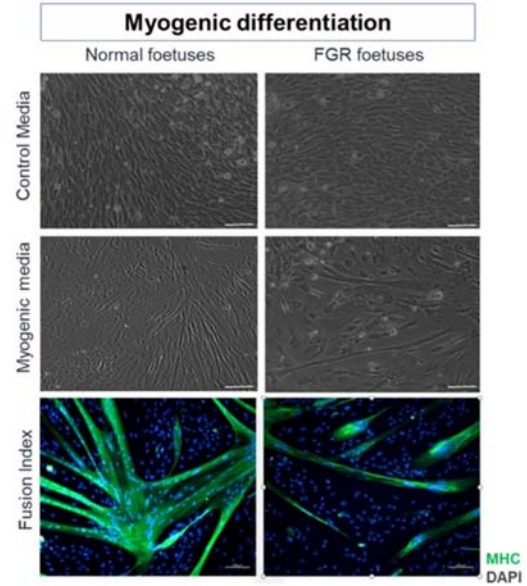
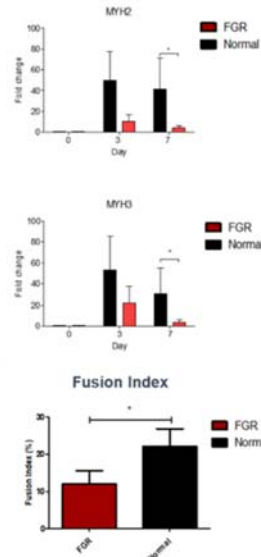


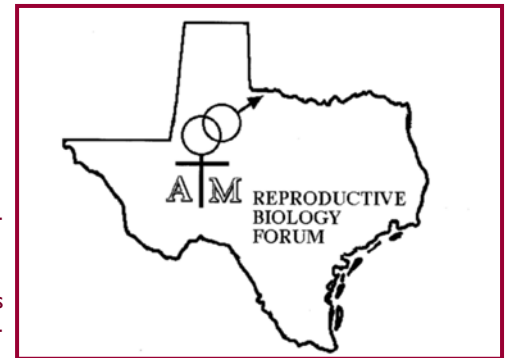
Figure 3. Mesenchymal stem cells from foetal growth restricted (FGR) porcine fetuses have reduce myogenic capacity in vitro.



RNA and miRNA sequencing have highlighted many novel targets which are currently being investigated further in vitro with siRNA knockdowns. Importantly, they were able to isolate mesenchymal stem cells from foetal and neonatal muscle samples and demonstrated that they recapitulate the whole muscle post-natal IUGR phenotype during in vitro differentiation experiments.

Dr. Stenhouse's research at Texas A&M will investigate how the protein uteroferrin (also known as acid phosphatase type 5, tartrate-resistant (ACP5) and tartrate-resistant acid phosphatase (TRAP) acts in concert with secreted phosphoprotein 1 (SPP1) to induce hematopoiesis. This research will also involve **Drs. Larry Suva, Dana Gaddy and Greg Johnson.** ***

IFRB Seminar Series, 2018



The IFRB Seminar Series, Reproductive Biology Forum, has been held weekly during the Fall and Spring Semesters since 1990. The IFRB Seminar Series is coordinated by **Dr. Sakhila Banu**. Spring Semester Speakers Included:

January 19, **Dr. Kent Thornburg**, the M.

Lowell Edwards Chair of Cardiovascular Research, Professor of Medicine, in the Knight Cardiovascular Institute, Director, Bob and Charlee Moore Institute for Nutrition and Wellness, School of Medicine, Oregon Health and Science University, Portland, OR, "The Placenta and Heart Disease: The Big Picture."



January 26, **Dr. Heewon Seo**, Postdoctoral Research Associate, Department of Veterinary Integrative Biosciences, "Implantation and Early Placentation within a Hypoxic Uterine Environment in Sheep and Pigs."

February 9, **Dr. Jae-Wook Jeong**,

Associate Professor Department of Obstetrics, Gynecology & Reproductive Biology Michigan State University College of Human Medicine, Progesterone Action in Endometrium."



February 16, **Dr. Brandie Taylor**, Assistant Professor and Director of Program on Reproductive and Child Health Epidemiology & Biostatistics, Texas A&M University, "Sexual Dimorphism in Pregnancy Complication: Biological or Bias."

February 23, **Dr. Guoyao Wu**, Distinguished Professor, Department of Animal Science, Texas A&M University, "Roles of Functional Amino Acids in Porcine Conceptus Survival and Growth."

March 2, **Dr. Courtney Daigle**, Assistant Professor, Animal Welfare, Department of Animal Science, Texas A&M University, Environmental and Occupational Health, Husbandry and Management Practices that Influence the Welfare of Reproductive Herds."

March 9, **Dr. Bruce Riley**, Professor, Department of Biology, Texas A&M University, "Sensory Development in Zebrafish: Repurposing Glycolysis to Generate Lactate as a Cell-Signaling Molecule."



March 23, **Dr. Rodney Geisert**, Professor, Department of Animal Sciences, University of Missouri, "Conceptus Gene Editing Provides New Perspectives of Development and Establishment of Pregnancy in the Pig."

April 13, **Dr. David H. Abbott**, Professor, Department of Obstetrics & Gynecology and Wisconsin National Primate Research Center, University of Wisconsin, "Pathogenic Insight Into Polycystic Ovary Syndrome From Nonhuman Primate Models."



April 20, **Dr. Reinaldo Cooke**, Associate Professor, Department of Animal Science, Texas A&M University, "Supplementing Omega-6 Fatty Acids To Enhance Early Embryonic Development and Pregnancy Establishment in Bos indicus and B. Taurus Beef Cows."

August 31, **Dr. Greg Johnson**, Professor, Department of Veterinary Integrative Biosciences, Texas A&M University, "Cellular Events that Impact the Establishment of Pregnancy in Pigs and Sheep."

September 7, **Dr. Ky Pohler**, Assistant Professor, Department of Animal Science, Texas A&M University, "Mechanisms Associated with Late Embryonic Mortality in Cattle."



September 14, **Dr. Onkar Sawant**, Research Associate, Department of Ophthalmic Research, Cole Eye Institute, Cleveland Clinic, "Role of Circadian Clock Genes and Thyroid Hormones in Fetal Visual System Development."

September 21, **Dr. Dan Dumesic**, Department of Obstetrics and Gynecology, Ronald Reagan UCLA Medical Center, University of California- Los Angeles Medical Center Santa Monica, CA, "PCOS: At the Crossroads of Metabolic and Reproductive Dysfunction."



September 28, **Dr. John Stallone**, Professor, Department of Veterinary Physiology & Pharmacology, Texas A&M University, "Cardiovascular Effects of Androgens in Health and Disease: Challenging the Dogma."

October 5, **Dr. Yanan Tian**, Professor, Department of Veterinary Physiology & Pharmacology, Texas A&M University, "The Molecular and Physiological Functions of lncRNA MALAT1: the Long and Short of it."

October 12, **Dr. Andrea S. Cupp**, Irvin T. and Wanda R. Omtvedt Professor of Animal Science, University of Nebraska-Lincoln, "An Intriguing Tale of Folliculogenesis Gone Wrong: A Cow Model to Understand Polycystic Ovary Syndrome in Women."



October 19, **Dr. Adrian Erlebacher**, Dr. R.O. Berry Memorial Lecture, "Immunology of the Maternal-Fetal Interface."



October 26, **Dr. Indra K. Reddy**, Professor and Founding Dean, Irma Lerma Rangel College of Pharmacy, Texas A&M University, "Design and Development of Novel Drug Delivery Systems for the Eye."

November 2, 2018, **Dr. Annie Newell-Fugate**, Assistant Professor, Department of Veterinary Physiology & Pharmacology, Texas A&M University, "The Role of Sex and Nutrition in White Adipose Tissue Function, Metabolic Homeostasis, and Reproduction"

November 16, **Dr. Zeileann Craig**, Assistant Professor, Animal and Comparative Biomedical Sciences, University of Arizona, Tucson, AZ, Environmentally Relevant Exposures to Phthalates and Female Reproduction."



November 23, **Dr. John Bromfield**, Department of Animal Science, University of Florida, Infection, Inflammation and Fertility in Dairy Cows – The Enduring Mark of Uterine Disease on the Female Germline."

IFRB Trainee News

RECENT GRADUATES

***Katherine (Kitty) Halloran** (pictured below left) completed the M.S. in Physiology of Reproduction in August 2018 working with **Dr. Fuller Bazer**. The title of her thesis is "Effects of progesterone supplementation on growth and development of the fetal-placental unit." Kitty is continuing graduate studies toward the Ph.D. in the laboratory of Dr. Bazer to further understand pathways for synthesis of polyamines by uterine and placental tissues in sheep and regulation of expression of key genes by progesterone and/or interferon tau. Katherine is currently the IFRB Trainee Representative and is teaching a laboratory section for ANSC 333 Reproduction in Farm Animals course. Her future plans involve continuing research in mammalian pregnancy as a postdoc.

***Emily Hoskins** (pictured on the far right) completed the M.S. in Physiology of Reproduction in August 2018 working with **Dr. Fuller Bazer**. She is currently in her first year of veterinary school at TAMU.



***Brittini P. Littlejohn** received her Ph.D. in Physiology of Reproduction in May 2018 working in the laboratories of **Drs. Tom Welsh and Ron Randel**. The title of her dissertation was "Epigenetic Programming of Physiological Functions by a Prenatal Stressor and Genetic Parameters of Temperament in Cattle." She accepted a collaborative postdoctorate position with Mississippi State University and the USDA Research Service in Lubbock where she will apply biophotonics for animal health research.

***Ashley Padgett** completed her M.S. in Biomedical Sciences working in the laboratory of Dr. Shannon Washburn. Her thesis work focused on the maternal-fetal implications and effects of anesthesia and analgesia during pregnancy, as well as determining concentrations of oxytetracycline in the fetal compartment after maternal administration. She graduated in August 2018 and is now employed as a Phase I Clinical Research Coordinator at Pharmaceutical Product Development, LLC in Austin, Texas.



***Marianna E. Mund** completed the requirements for her M.S. in Physiology of Reproduction in September 2018 working in the laboratories of **Drs. Tom Welsh and Ron Randel**. The title of her thesis was "The Influence of Cell Mediated Immune Response of Brahman Cows on Calving Interval, Postpartum Interval, Colostral Immunoglobulin Concentration, Serum Immunoglobulin Concentration, and Growth of Their Calves."



***Kirthiram Sivakumar**, who worked in the laboratory of **Dr. Sakhila Banu**, completed his Ph.D. degree in Toxicology in August 2018. His dissertation was "Molecular Mechanisms of Hexavalent Chromium-Induced Premature Ovarian Failure." He recently joined the Food and Drug Administration's National Center for Toxicological Research in Jefferson AR as a postdoctoral scientist where his research will be focused primarily on drug-related hepatotoxicity and cardiotoxicity.

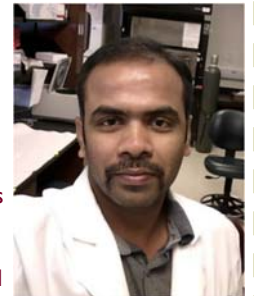
NEW TRAINEES & STAFF

***Pedro L. P. Fontes** is a Ph.D. student in Physiology of Reproduction under **Dr. Cliff Lamb** in the Animal Science Department. **Pedro** received his D.V.M. from Sao Paulo State University in Brazil, and his M.S. degree from University of Florida. Pedro's current research focuses on the differences in early fetal development between *Bos indicus* and *Bos taurus* cattle, and its impacts on postnatal performance.



***Claire Stenhouse, Ph.D.** is a new postdoctoral fellow in the laboratory **Dr. Fuller Bazer**. Claire completed her doctoral studies at the University of Edinburgh working with Dr. Cheryl Ashworth.

***Kathiresk Kumar Mani**, Ph.D. joined the laboratories of **Drs. Joe Arosh and Sakhila Banu** as a Postdoctoral Research Associate in May 2018. Dr. Mani received his Ph.D. in Endocrinology from the University of Madras, Chennai, India. His dissertation was on the 'Chromium VI-induced male reproductive toxicity.' His current project in Dr. Arosh's lab is focused on the role of prostaglandins on the uterine function using a sheep model. His research in Dr. Banu's laboratory will focus on chromium VI toxicity on sex differentiation and fetal testis development.



***Robyn Moses** joined the laboratory as a graduate student of **Dr. Fuller W. Bazer** in August 2018 to pursue her M.S. in Physiology of Reproduction. She received her B.S. in Biology from Texas A&M University in May 2018. Her interest in reproductive biology grew while working and volunteering in a labor and delivery hospital. As an undergraduate, she worked in Dr. Bazer's



(continued on page 10)



Frontiers in
Reproduction
Course:
Molecular and
Cellular Concepts and Applications

<http://www.mbl.edu/fir/>

April 27 to June 9, 2019.

Application deadline January 17, 2019



A Snapshot of IFRB Research, 2018

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 2018:

- Chiasson VL, Bounds KR, Chatterjee P, Manandhar L, Pakanati AR, Hernandez M, Aziz B, Mitchell BM. Myeloid-derived suppressor cells ameliorate cyclosporine A-induced hypertension in mice. *Hypertension*. 2018 Jan;71(1):199-207.
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Faculty Spotlight, Dr. Newton (cont'd from page 3)

FUT1 gene expression by luminal and glandular UE cells precedes the reappearance of HTI on endometrial epithelial cells during pregnancy recognition (Day 15) in the goat. But FUT gene expression does not parallel the temporal changes in HTI antigen expression by goat luminal UE cells, which returns during pregnancy recognition. The disconnect between the biphasic pattern of HTI antigen expression by goat endometrial epithelial cells in utero and FUT expression indicates active remodeling of the apical surface glycocalyx of the UE cells may be occurring prior to initiation of placentation in the goat. The HTI antigen serves as a substrate for synthesis of other Histo- and Lewis Blood group antigens that are involved in placentation in other species. Using RNAseq, additional endometrial glycosylation enzymes capable of modifying HTI antigen were identified in the goat. Therefore, even though HTI may be an important marker for endometrial receptivity on Day 15, addition and subsequent removal of

other sugar structures prior to Day 15 may play a role in establishing and maintaining pregnancy (Figure 2 a,b).

A functional consequence of this remodeling would be an increased availability of fucose and other sugars at the feto-maternal interface during early pregnancy. Dr. Newton recently proposed a synergistic model that may operate in conjunction with remodeling of UE cells during pregnancy recognition (Figure 2 c,d). Commensal bacteria that reside in the upper female reproductive tract utilize fucose released from UE cells during pregnancy recognition. This provides commensal bacteria with a metabolic substrate to maintain a competitive edge and inhibit colonization by pathogenic bacteria that may have infiltrated the upper female reproductive tract during breeding. Alternatively, commensal bacteria utilize fucose as an energy source and contribute to the metabolome that supports ...

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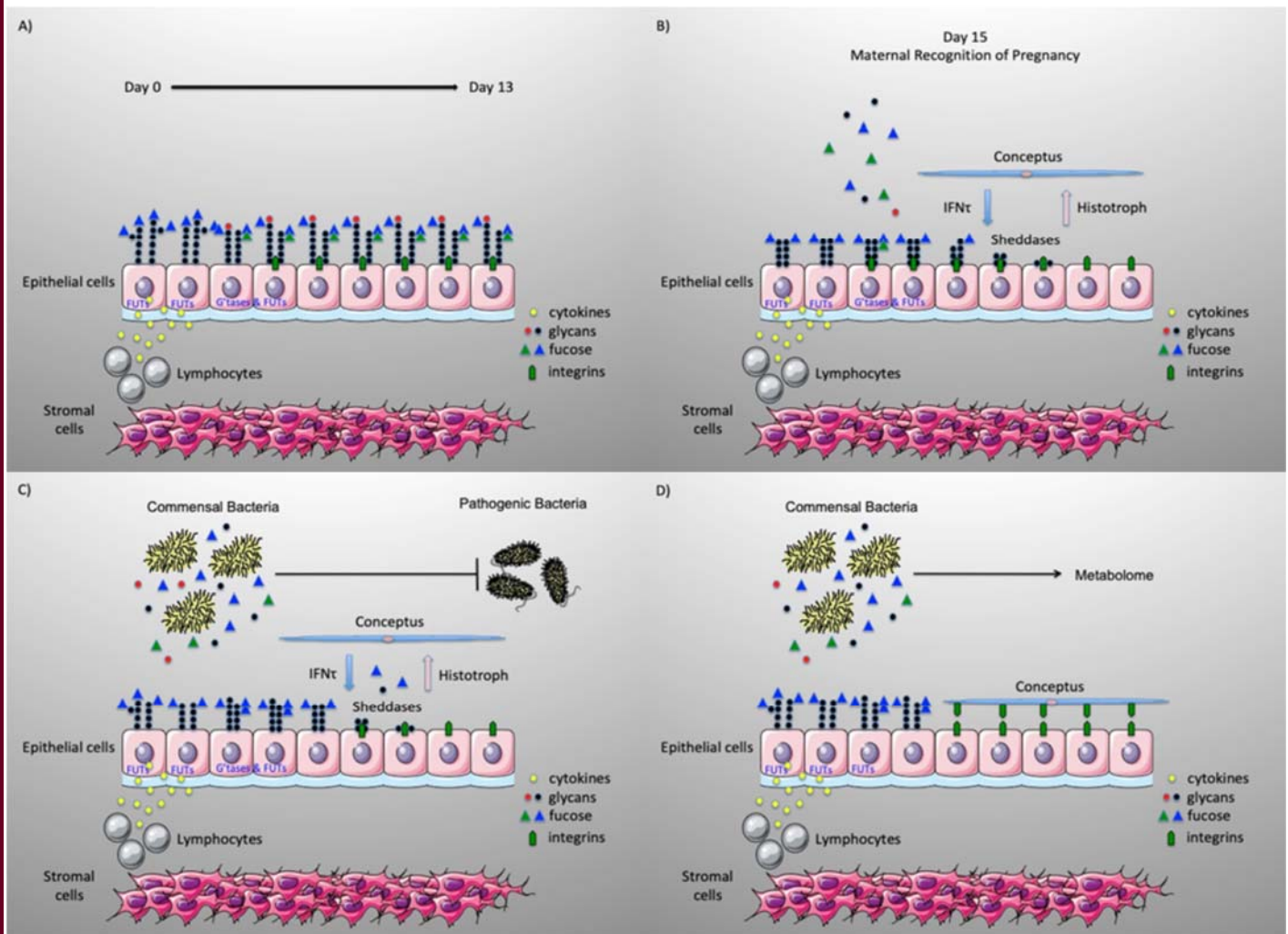


Fig. 2. Working model describing two synergistic mechanisms that may operate during early pregnancy. Lymphocytes infiltrate the endometrium at breeding and stimulate uterine epithelial cell FUT activity (A). Subsequent remodeling of the apical plasma membrane of uterine epithelial cells drives adhesion between fetal and maternal tissues (B). Fucose, released into the uterine lumen during remodeling, provides nutritional support to commensal bacteria (C). This provides them with a competitive advantage to inhibit pathogenic bacteria that may have infiltrated the upper female reproductive tract during breeding (C). Commensal bacteria may also contribute small molecules (metabolome) to the uterine environment (D) that support uterine epithelial and/or trophoblast functions.

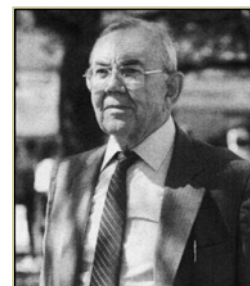
24th Annual Dr. Raymond O. Berry Memorial Lecture

The Twenty-Fourth Annual Dr. Raymond O. Berry Memorial Lecture, sponsored and organized by the Interdisciplinary Faculty of Reproductive Biology, was held at the Navasota Civic Center, Navasota, TX on October 19, 2018. Adrian Erlebacher, M.D., Ph.D., Professor, Department of Laboratory Medicine, Member, Biomedical Sciences Graduate School, Program in Immunology and Center for Reproductive Sciences, University of California, San Francisco, was selected by a vote of IFRB faculty to present the Lecture entitled, "Immunology of the Maternal-Fetal Interface."



tial Session of the American Society of Reproductive Immunology annual meeting, Baltimore, MD. He has trained several postdoctoral fellows and graduate students.

Dr. Erlebacher's laboratory has historically focused on mechanisms of fetomaternal tolerance, i.e. how the fetus and placenta avoid rejection by the maternal immune system during pregnancy. His laboratory developed the first mouse model to visualize maternal T cell responses to the fetal allograft and to show that the process is constrained by the lack of contributions from fetus-derived dendritic cells and the entrapment of maternal dendritic cells within the pregnant uterus. His laboratory also found that activated T cells cannot gain access to the maternal/fetal interface because of an epigenetic program activated in decidual stromal cells that silences the expression of key T cell chemoattractant chemokine genes through promoter accrual of H3K27me3 repressive histone marks. Extending this discovery, Dr. Erlebacher's laboratory found that the silencing program actually affects about 800 target genes to ensure uterine quiescence prior to labor onset, and that scheduled relief from this program presages parturition. These findings have implications for understanding the pathogenesis of preterm labor, preeclampsia, and other disorders of maternal/fetal health. His laboratory also works on a mouse model of uterine cancer and the role of neutrophils in combating tumorigenesis. Dr. Erlebacher has published more than 40 papers in high impact scientific journals and his research has been funded by NIH, the March of Dimes and American Cancer Society.



Above: Dr. Duane C. Kraemer, who worked with Dr. Berry during his early years as a graduate student, led off the Lecture by providing an entertaining presentation that included memories of Dr. Berry.

Professor Adrian Erlebacher received his B.S. in Molecular Biology and Biochemistry from Yale University. He then earned Ph.D. and M.D. degrees from the University of California San Francisco before beginning postdoctoral studies at the Harvard School of Public Health in Immunology. His academic career path has included research, teaching and service at New York University School of Medicine and the University of California San Francisco, where he is now Professor in the Department of Laboratory Medicine, and a member of the Biomedical Sciences Graduate School Program, the UCSF Program in Immunology, and the UCSF Center for Reproductive Sciences. Since 2005 he has been active in many professional societies including the American Association of Immunologists and the American Society of Reproductive Immunology. In addition, since 2014 he has served as Associate Editor for The Journal of Immunology, a member of the Board of Consulting Editors the Journal of Clinical Investigation, a standing member of the Transplantation, Tolerance, and Tumor Immunology study section of the National Institutes of Health, and a member of the March of Dimes advisory committee for the Basil O'Connor Starter Scholar Award. Based on his outstanding research he was selected to present the 2005 President's Symposium invited lecture at the Society for the Study of Reproduction annual meeting, Quebec City, Quebec, Canada and the 2017 Presiden-

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

-Fuller W. Bazer

Right: Dr. Fuller Bazer presents Dr. Erlebacher with a plaque commemorating his presentation as the Twenty-fourth Annual Dr. Raymond O. Berry Memorial Lecturer.



For his outstanding contributions, Texas A&M University recognizes the work of Dr. Erlebacher through the Raymond O. Berry Memorial Lecture which was established in 1994 by **Dr. Fuller W. Bazer**. This Lecture Series ensures that his contributions will continue to inspire students and faculty whose application of biotechnology to the field of reproductive biology contributes to animal agriculture and impacts the biomedical community. Dr. Berry's pioneering studies of genetic factors affecting reproduction contributed basic knowledge about maternal immune recognition of the fetal-placental unit. These principles are now fundamental to the discipline of reproductive immunology.

Right: Members of Dr. Berry's family, Mr. Carl Thompson, Dr. Joe McLemore, (sons-in-law), and Mrs. Dorothy McLemore, Dr. Berry's daughter. Dr. Erlebacher, the R.O Berry Lecturer and meeting organizers, Drs. Fuller Bazer, Gary Newton and Greg Johnson.



lab as a member of the Collaborative Initiative in Maternal and Infant Health Research (CIMPIR) Tier One Program. Her future goals include continuing research for both animal and human pregnancy, fetal-maternal signaling, and fetal development.

***Nicky Oosthuizen** is a Ph.D. student in Physiology of Reproduction under **Dr. Cliff Lamb**. Nicky is originally from South Africa, where she earned her B.S. degree in Animal Science. She received her M.S. degree from the University of Florida in Animal Science in 2017 with a focus on applied beef cattle reproduction. Nicky's current research focuses on improving estrus synchronization protocols for beef heifers.



***Sarah West** recently completed her B.S. degree in Animal Science at Texas A&M University and joined the labs of **Drs. Rodolfo Cardoso** and **Gary Williams** as an M.S. student in Physiology of Reproduction. Sarah will be studying the effects of prenatal and early postnatal nutrition on the development of the hypothalamic Neuropeptide Y system in the bovine female.



***Gessica Franco** is from Goias, Brazil. She received a D.V.M in 2015 at Uberlandia Federal University (Brazil). In 2015 she joined **Dr Ky Pohler's** lab at University of Tennessee, Knoxville first as an intern and later as a Master Student, where she graduated with an Animal Science major and a statistics minor degree in 2018. Summer of 2018 she moved with Dr Pohler's lab to Texas A&M University, where she is currently a Physiology of Reproduction PhD student. Her major areas of research are understanding the sire effect on pregnancy establishment and maintenance in beef cattle and developing markers for sire fertility in regard to pregnancy loss.



***Sydney Reese**, a PhD student in **Dr. Pohler's** lab, joined TAMU IFRB in June 2018. Sydney earned her MS in Animal Science from University of Tennessee in 2017 and BS from TAMU in 2015. Her current research focuses on elucidating changes in uterine prostaglandin production in cows undergoing late embryonic mortality.



***Ramiro V. Oliveira Filho**, a M.S. student in Dr. Pohler's lab, joined TAMU IFRB in June 2018. Ramiro earned an undergraduate degree in Vet medicine from Sao Paulo State University in 2017. Ramiro's current research focus is investigating uterine disease postpartum in Bos indicus beef cows.



GRADUATE STUDENT AWARDS

***Avery Kramer**, trainee in **Dr. Greg Johnson's** lab placed 2nd place in the platform presentation competition at the 24th Annual Texas Forum for Reproductive Sciences in Houston Texas. The talk was entitled "Expression of SLC2A1 is replaced by SLC2A3 and SLC2A8 at the tips of uterine folds and in areolae of the uter-

ine-placental interface of pigs to maximize potential hexose sugar transport to the fetus."

***Bryan McLendon**, trainee in **Dr. Greg Johnson's** lab, received a 2018 USDA NIFA-AFRI Merit Award to attend the 5th Annual meeting of the Society for the Study of Reproduction. The title of his presentation was "Pig Conceptuses Secrete Interferon Gamma (IFNG) to Recruit Activated T-Cells to the Uterine Endometrium during the Peri-Implantation Period." \$500

***Raine Lunde**, trainee in **Dr. Jay Ramadoss's** laboratory received the Ken Warren Merit Award at the annual meeting of the Fetal Alcohol Spectrum Disorders Study Group (FASDSG) June 16, 2018 prior to the annual meeting Research Society on Alcoholism. The title of her talk was "Prenatal Alcohol Exposure Produces Sex-Dependent Patterns of Gene Disruption and Molecular Pathways in the Fetal Hippocampus."



FASDSG President Dr. Anna Klintsova presented the award to Raine.

***Brittni Littlejohn**, a Department of Animal Science graduate research assistant with **Dr. Tom Welsh, Jr.** and Ron Randel at the Texas A&M AgriLife Research and Extension Center, Overton, was the recipient of the 2018 A. M. "Tony" Sorensen Jr. Achievement Award. The award recognizes the most outstanding graduating doctoral student of physiology of reproduction within Texas A&M's animal sciences department.



***Marcus Orzabal**, graduate students in **Dr. Ramadoss's** laboratory received a Diversity Merit Fellowship from College of Veterinary Medicine for three academic years (2018-2020).

Graduate students receiving IFRB Trainee Travel Awards to the annual Society for the Study of Reproduction include **Kit-ty Halloran** and **Emily Hoskins** in Dr. Fuller Bazer's Lab, **Dr. Colleen Lambo**, in Dr. Shannon Washburn's lab, **Avery Kramer** and **Bryan McLendon** in Dr. Greg Johnson's lab, **Nan Ni** in Dr. Qinglei's lab and **Camille Goblet** in Dr. Annie Newell-Fugate's lab and **Cassie Herring** in Dr. Wu's lab. Trainees who received Travel Awards to the American Society of Animal Science Annual Meeting include **Amanda Bradbery** and **Elizabeth MacConnell** in Dr. Carey Satterfield's lab, **Brittni Littlejohn** in Dr. Tom Welsh's lab and **Meaghan O'Neil** in Dr. Gary William's Lab. **Camila Sandoval** in Dr. Satterfield's lab received a Travel Award to attend the MDRD meeting in Berlin, Germany.



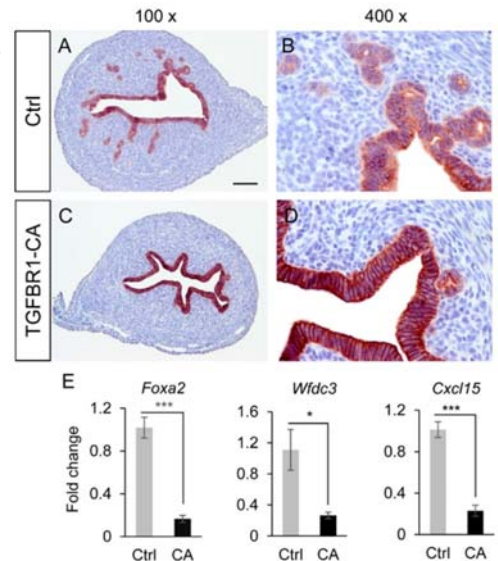
IFRB Graduate Student Spotlights

***Nan Ni** is a Ph.D. candidate in the Department of Veterinary Integrative Bioscience mentored by **Dr. Qinglei Li**. She received a B.S. in clinical medicine from Norman Bethune College of Medicine, Jilin University, China. Before joining Dr. Li's lab in September 2016, she had participated in research training programs as an undergraduate student. Nan's research focuses on the role of transforming growth factor beta (TGFB) signaling in uterine development and function. TGFB superfamily members are fundamental regulators of cell growth and differentiation and thus play critical but complex roles in vital reproductive processes. Work from Dr. Li's lab has revealed essential roles of TGFB receptor 1 in female reproductive tract development and function, gonadal tumor development, and endometrial cancer metastasis by using genetically engineered mouse models. Nan's current study utilized a unique gain-of-function mouse model containing overactivated TGFB receptor 1 in the uterus to study the effect and associated mechanisms of deregulated TGFB signaling on adenogenesis during postnatal development. Her work has established a link between adenogenic defects and abnormal endometrial differentiation and fibrotic changes arising from sustained activation of uterine TGFB signaling.

Nan has actively communicated her research findings to the scientific community. In 2017 and 2018, she presented findings on TGFB signaling in female reproductive track development and gynecologic tumors at the 50th and 51th Annual Meetings of the Society for the Study of Reproduction (SSR). She also delivered an oral talk at the 2018 IFRB Retreat in Navasota. Her travel to SSR meetings was supported by the IFRB travel awards and the Larry Ewing Memorial Trainee Travel Award from SSR. She also received a CVM graduate Student Trainee Research Award for her work exploring tumorigenic mechanisms in the context



of deregulated TGFB signaling in the ovary. Nan has enjoyed working as a graduate research assistant in the Li laboratory where she is excited about developing her critical thinking and technical skills, answering challenging questions using state-of-art technology, and shaping her career goals towards becoming an independent researcher. Outside of the lab, she enjoys sports and reading. With the guidance of her graduate committee consisting of Drs. Qinglei Li, Greg Johnson, Robert Burghardt and Fuller Bazer, Nan wishes to fulfill her goal to help patients with new research findings, a dream when she was in medical school.



Constitutive activation of TGFBRI in mouse uterus causes adenogenic defects at postnatal day 15. (A-D) Reduced uterine glands in TGFBRI CA^{flox/flox}; Pgr^{Cre/+} (CA) mice evidenced by KRT8 staining. Panels B and D are higher magnification images for panels A and C, respectively. Scale bar shown in panels A and C equals 100 μ m and 25 μ m in B and D. (E) Reduced expression of uterine gland-specific genes in the uteri of control (Ctrl) and TGFBRI CA^{flox/flox}; Pgr^{Cre/+} (CA) mice at D15. n = 4-5. Data are means \pm SEM. *P < 0.05 and *P < 0.001. From Ni et al., PLoS One 2018 Dec 14;13(12):e0209417.**



***Raine Lunde** Raine is a 3rd year Ph.D. student in Dr. Jay Ramadoss' lab in the department of Veterinary Physiology & Pharmacology (VTPP). She came into her current doctoral program with a firmly forged foundation in reproductive physiology and research practices. Raine began her research career while pursuing her undergraduate degree in Biomedical Sciences from Texas A&M, where she trained under Dr. Timothy Cudd, a former VTPP and IFRB professor. Following graduation, she joined Dr. Cudd's lab full time as a research associate investigating Fetal Alcohol Spectrum Disorders (FASD) utilizing an ovine model and gained proficiencies in ultrasonography, histological processing, aseptic surgical technique, small ruminant herd management, and stereological microscopy.

Raine joined Dr. Jayanth Ramadoss' lab as a graduate research assistant in the spring of 2015 while completing her master's program. This unique opportunity allowed her to continue investigation of perinatal physiology and FASD, but also explore new avenues, using a new model and alternate approaches and exposure paradigms. She was awarded Outstanding Master's Student Award, Non-thesis at the 2016 CVM honors convocation and authored her first first-author publication, a review article in Alcoholism: Clinical and Experimental Research titled, "Alcohol-induced developmental origins of adult-onset diseases; DOI: 10.1111/acer.13114." While in Dr. Ramadoss' lab, she has become proficient in pressure arteriography to study maternal and fetal vascular function under in vivo-like conditions, micro-dissection, and ultra-high



frequency ultrasonography.

Raine's current research interests include investigation of maternal, perinatal, and infant health consequences following gestational alcohol exposure. Alcohol exposure during pregnancy is a leading cause of developmental disability, yet how alcohol induces this damage occurs remains largely unknown and currently no approved cure exists. Alcohol's actions during pregnancy are complex and produce a myriad of heterogeneous outcomes that can affect nearly every fetal organ system, and this presents a fundamental challenge opposing FASD treatment discovery and intervention strategy. A 2018 study cited in numerous media news outlets, including NBC and the New York

Times, indicates that FASD is more prevalent than previously estimated, urgently warranting investigation that improves understanding of this pathology and that supports discovery of novel therapeutic interventional strategies. Raine is interested in elucidating how alcohol induces damage during pregnancy and hopes to advance the FASD field by identifying targets of prenatal alcohol exposure that remain less explored. Specifically, she is interested in how alcohol impairs maternal and fetal circulatory function and what specific health consequences these dysfunctions lead to in fetal development (Mechanisms Underlying Chronic Binge Alcohol Exposure-Induced Uterine Artery Dysfunction in Pregnant Rat; DOI: 10.1111/acer.13602), and in discerning regional sequelae in the developing brain following alcohol-induced damage in utero (Fig. 1; Regional dysregulation of taurine and related amino acids in the fetal rat brain following gestational alcohol exposure; DOI 10.1016/j.alcohol.2017.07.010).

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IRFB Faculty Activities, Awards, etc.

NEW GRANTS:

***Drs. Fuller Bazer (PI), Greg Johnson and Guoyao Wu (Co-Is)** received a grant from USDA CSRES AFRI (2018-67015-28093) entitled "Roles of Fructose and Glucose in Growth and Development of Ovine and Porcine Conceptuses." 03/01/18 – 02/28/22; \$500,000.

***Drs. Fuller Bazer (PI), Joseph Rutkowski (Co-I) and Carmen Tekwe (Co-I)** received a T3 Triads for Transformation grant from the President's Excellent Fund to study effects of interferon tau and arginine on obesity and diabetes in Zucker diabetic fatty rats. 03/01/18 to 02/28/19; \$30,000. **Dr. Guoyao Wu** is a major contributor as was **Ms. Erin Posey**, graduate research assistant.

***Drs. Dana Gaddy (PI), and Chuck Long, (Co-Is)** received a R21 grant from NIH (National Institute of Dental & Craniofacial Research) entitled "Modeling Odontohyphophasia in the Sheep." 08/01/18 - 07/31/20; \$230,880.

***Dr. Nancy Ing** received a grant from Select Sires. "Biomarkers of Bull Fertility: MicroRNAs in Sperm from Bulls of High and Low Fertility

***Drs. Qinglei Li (PI), Yanan Tian (Co-PI) and Xiaofang Wang (Co-PI)** received a T3 Triads for Transformation grant from the President's Excellent Fund to identify the role of EZH2 in endometrial cancer development and progression.



***Drs. Rodolfo Cardoso (PI), Tom Welsh, Jr. and Kevin Washburn (Co-PIs)** received a T3 Triads for Transformation grant from the President's Excellent Fund for the proposal, "Developmental Programming of Health and Disease."

***Drs. Gary R. Newton (PI), Shaye K. Lewis, (Co-PI), and William B. Foxworth (Co-PI)** received a USDA - 1890 Capacity Building Grant #2018-38821-27746, "Microbiome of Early Pregnancy." 07/01/18 – 06/30/21; \$299,982.



for teaching undergraduate students. **Dr. Annie Newell-Fugate**, pictured here with **Dr. Larry Suva** was the CVM awardee.



Dr. Kathrin A. Dunlap, pictured with **Dr. Bazer** was the COALS awardee. Both received a \$6,500 grant to further develop teaching excellence.



***Dr. Rodolfo**

Cardoso was the recipient of the 2018 AgriLife Research Early Career Award for Research Excellence honoring a faculty member who has made an exceptional contribution to the agency and research in the prior year.

AWARDS & HONORS:

***Dr. Qinglei Li** serves as ad hoc reviewer for the NIH Pregnancy and Neonatology Study Section (PN), ad hoc reviewer for DoD Ovarian Cancer Research Program (OCRCP), and as member of the Society for the Study of Reproduction Awards Committee.

***Dr. Greg Johnson** serves on the Board of Directors, Society for the Study of Reproduction. He attended Winter (Alexandria, VA) and Summer (New Orleans, LA) Board Meetings.

***Dr. Jay Ramadoss** received the Zoetis Award for Excellence in Veterinary Research, College of Veterinary Medicine, Texas A&M University (April 2018); He also served as Ad hoc Reviewer, NIH AA-4 Neuroscience Review Subcommittee (October 2018) and was appointed Fellow, Michael E. DeBakey Institute for Comparative Cardiovascular Sciences and Biomedical Devices (2018).

*IFRB faculty members in the CVM and COALS were selected as Montague-CTE Scholars. The awards are given annually to one tenure-track assistant professor from each College based on early success in and passion



INVITED LECTURES

***Dr. Sakhila Banu** was invited to present a talk entitled "Hexavalent Chromium Exposure and Intrauterine Growth Restriction" at the Tenth Conference on Metal Toxicity and Carcinogenesis. Albuquerque, New Mexico, October 28-31, 2018.

***Dr. Greg Johnson** was invited an invited presenter at the NRI Animal Reproduction Annual Investigator Meeting entitled "Pig Conceptuses Secrete Interferon Gamma (IFNG) to Recruit Activated T-cells to the Uterine Endometrium During the Peri-implantation Period."

***Dr. Qinglei Li** has been invited to give a talk entitled "TGF-beta Signaling in Uterine Function and Disease" at Endocrine Society's 101st Annual Meeting & Expo (ENDO 2019) in New Orleans, Louisiana, USA, to be held March 23–26, 2019.

***Dr. Gary Williams** was invited to present, "Nutritional Programming of Puberty in Heifers: Developmental, Genomic and Functional Implications" at the American Society of Animal Science, (continued on page 16)



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(continued on page 15)



Faculty Spotlight, Dr. Newton (cont'd from page 8)

conceptus and/or endometrial functions. This model is supported by a strikingly similar immunological mechanism that operates within the gastrointestinal tract. Bacteria, yeast, viruses and parasites have developed ways to attach to specific carbohydrate blood group antigens expressed by epithelial cells lining the gut, including HTI. Lymphoid cells and commensal bacteria induce intestinal epithelial FUT2 expression and cell surface fucosylation in mice. Rapid fucosylation of intestinal epithelium and availability of L-fucose attached to glycoproteins and glycolipids then creates a symbiotic environment that maintains gut epithelial – commensal microbial interactions during pathogen-induced stress, maintains homeostasis and protects against infection by pathogens.

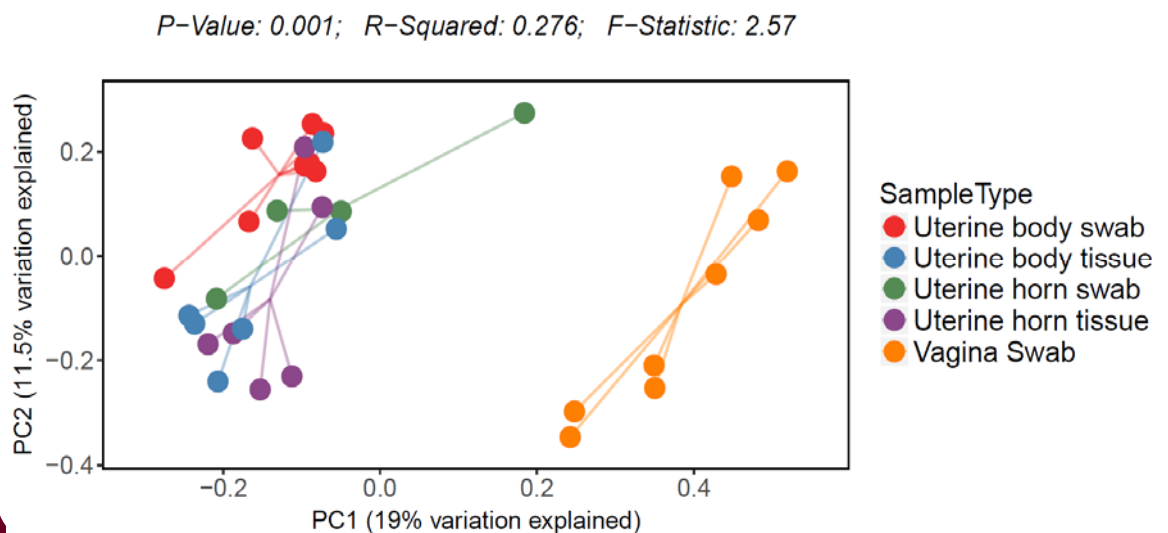
Dr. Newton recently received USDA funding to test whether the upper female reproductive tract (UFRT) contains a unique population of commensal bacteria that may influence UE cell function and/or protects against invasion by pathogenic bacteria that may infiltrate the uterus during breeding. Several studies in the literature suggests that the healthy UFRT, which was previously thought to be a sterile, harbors unique populations of bacteria in the absence of infection that are associated with diminished implantation rates and reduced pregnancy outcomes after in vitro fertilization. Preliminary data from Dr. Newton's and Dr. Shaye Lewis' laboratories, generated using 16s rRNA gene profiling, suggests that distinct bacterial community composition and structural differences exist between vaginal and uterine samples obtained on day three of the goat estrous cycle

(**Figure 3, below**). Interaction between commensal bacteria and the UFRT, especially during the earliest stages of pregnancy, is currently an active area of investigation in the IGRC laboratories of Drs. Newton, Lewis and Bill Foxworth. Specific goals of 2018 USDA 1890 Capacity Building grant are to: a) Identify temporal changes in microbial communities in the UFRT during

the estrous cycle and equivalent days of early pregnancy, b) Evaluate changes in the uterine luminal environment by measuring specific substances that can be attributed to known microbial communities metabolic reactions, and c) Evaluate endometrial response to the introduction of seminal plasma by assessing lymphocyte trafficking.

Collaborations with CORE facilities at Texas A&M University and Baylor College of Medicine are essential elements of microbiome research project. Since coming to PVAMU, Dr. Newton's research program has sought to provide opportunities for student experiential learning in reproductive biology. Several of his students have matriculated into graduate and veterinary degree programs at Texas A&M University. The collective efforts of Dr. Newton and his collaborators resulted in the College of Agriculture and Life Sciences Vice Chancellor's Award for Excellence in Diversity in 2010. Dr. Newton is currently leading a team effort to build a new Veterinary Treatment Facility at the International Goat Research Center. This facility will benefit the Texas A&M University System initiative to expand veterinary education, research and undergraduate outreach into several regions of the state. Dr. Newton and his colleagues at PVAMU expect the facility will create new partnerships, with Texas A&M University and other regional research-intensive campuses, to boost enrollment of minority students in graduate and professional degree programs and increase the supply of veterinarians who focus on the livestock industry.

Figure 3. Community composition and structure differs between vaginal swabs (yellow) and uterine body swabs (red) and tissues (blue) or uterine horn swabs (green) and tissues (purple). Data was analyzed by weighted UniFrac analyses. Distinct community relationships exist between vaginal and uterine samples ($P < .01$).



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Faculty Activities, cont'd from page 12

Southern Section meetings, Ft. Worth, TX, Feb. 2018.

INTERNATIONAL LECTURES

***Dr. Fuller Bazer** was an Invited Speaker, for the Founder's Lecture at the Gordon Research Conference on Mammalian Reproduction, Renaissance Tuscany Il Ciocco, Lucca (Barga), Italy July 28-August 3, 2018. The title of his lecture was "Interferon Tau: Effects Downstream Effects of Pregnancy Recognition Signaling On Conceptus Development."

***Dr. Greg Johnson**, gave an invited talk at the same Gordon Research Conference on Mammalian Reproduction, entitled "Cellular Events that Impact the Establishment of Pregnancy in Pigs and Sheep."

***Dr. Rodolfo Cardoso** gave an invited talk at the International Ruminant Reproduction Symposium, September 16-20 in Foz Du Iguacu, Brazil entitled, "Neuroendocrine Signaling Pathways and the Nutritional Control of Puberty in Heifers."

***Dr. Nancy Ing** attended the 12th International Symposium for Equine Reproduction in Cambridge UK July 22-27, 2018. The title of her presentation was "Functional RNAs in Stallion Sperm: Potential Indicators of Sperm Quality and Contributors to Fertility."

Dr. Johnson also gave a talk International Ruminant Reproduction Symposium, September 16-20 in Foz Du Iguacu, Brazil entitled "Cellular Events During Ovine Implantation and Impact for Gestation."

***Dr. Heewon Seo**, former postdoctoral fellow in Dr. Greg Johnson's laboratory, was promoted to Assistant Research Scientist in Veterinary Integrative Biosciences.

BOOK CHAPTERS

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Graduate Student Spotlight, cont'd from page 11

Raine has co-authored 14 peer-reviewed manuscripts in the FASD field, which have acquired 209 citations. These manuscripts showcase her versatility, with subject matter ranging from behavioral studies and neuroanatomical investigation to assessing maternal uterine artery vascular adaptations and proteome and transcriptome studies. Additionally, she has co-authored 42 abstracts and has presented 15 of these as poster presentations at regional and university-wide symposia and at 11 annual Research Society on Alcoholism (RSA) meetings. In June of 2018, she was awarded the Kenneth Warren Merit Award by the Fetal Alcohol Spectrum Disorders Study Group for her abstract, "Prenatal Alcohol Exposure Produces Sex-Dependent Patterns of Gene Disruption and Molecular Pathways in the Fetal Hippocampus." This award was given to one Ph.D. student or postdoctoral fellow for in recognition for outstanding research in the field of FASD research. Recently, Raine submitted an NIH F31 grant proposal in FASD investigation for the Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship.

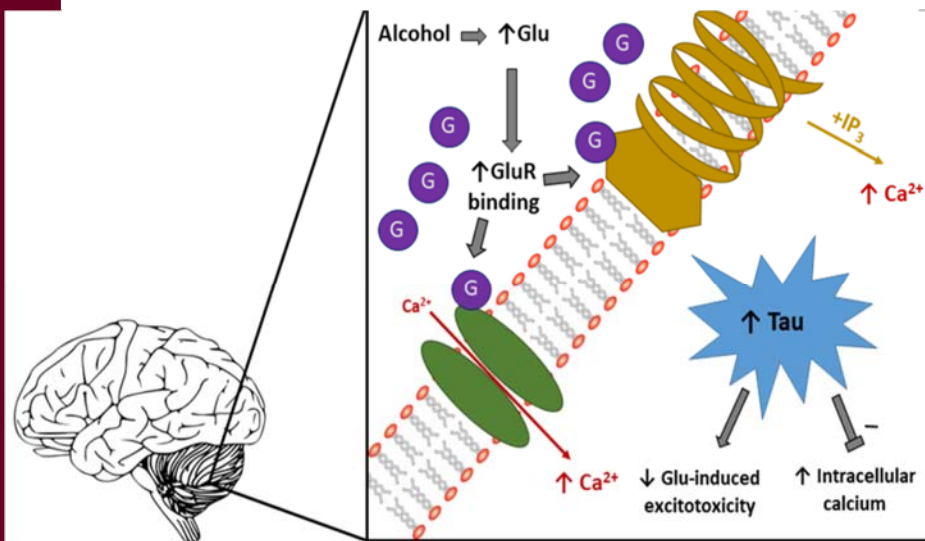


Figure 1. Working hypothesis. Glutamate and taurine increase in the fetal cerebellum and hippocampus following a chronic, binge, gestational alcohol-exposure paradigm. We theorize that this alcohol exposure increases glutamate and subsequent glutamate receptor (NMDA and/or metabotropic) binding in these structures, inducing calcium influx, in turn stimulating excitatory neurotoxicity leading to cell death, and potentially accounting for previously observed neuronal impairment following similar exposure paradigms. We speculate that taurine, an ideal osmolyte, increases in response to glutamate-induced calcium influx, counteracting osmotic disruption and offsetting alcohol-mediated damage within these distinctly

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12th Annual IFRB Retreat, 2018



The 12th Annual IFRB Retreat was held on October 19, 2018 in conjunction with the 24th Annual Dr. Raymond O. Berry Memorial Lecture.

Over 80 IFRB faculty and trainees from the Colleges of Veterinary Medicine & Biomedical Sciences and Agriculture and Life Sciences, Science and Medicine, along with Prairie View A&M participated in the Retreat which was held at the Navasota Civic Center, Navasota, TX.

Dr. Annie Newell-Fugate, Assistant Professor, Department of Veterinary Physiology & Pharmacology presided over the meeting.

Organizers of the retreat were Drs. Gary Newton from Prairie View A&M and **Greg Johnson**, Veterinary Integrative Biosciences.

Trainee platform presenters included:

Nan Ni, "Molecular basis of defective uterine gland formation in mice with dysregulated TGF-beta signaling,"

Pedro Fontes, "Impact of *Bos indicus* and *Bos taurus* genetics on early embryo and fetal development in beef cattle,"

Katherine Halloran, "Effects of exogenous progesterone on fetal and placental development in ewes,"

Alex Tseng, "Maternal circulating microRNAs control the placental response to alcohol,"

Jonathan Behlen, "Chromium VI exposure during pregnancy disorganizes uterine artery remodeling,"

Isabel Ortiz, "Effect of protein during calcium ionophore A23187 exposure on stallion sperm hyperactivated motility and acrosome status,"

Drew Anderson, "Interaction between sexual selection and sex hormone response elements: From pipefish to primates,"

Bryan McClendon, "Pig conceptuses secrete interferon gamma (IFNG) to recruit activated T-cells to the uterine endometrium during the peri-implantation period."

Invited faculty presenters included:

Dr. Rodolfo Cardoso, "Effect of prenatal



androgen excess on neuroendocrine and metabolic function in a sheep model of PCOS."

Dr. Mike Criscitiello, "Immunogenetic tricks of diverse vertebrates"

Retreat participants also attended a trainee poster session that included 25 posters from TAMU and PVAMU.

Support for the 12th Annual IFRB Retreat and Dr. Raymond O. Berry Memorial Lecture was provided by **Dr. Cliff Lamb**, Department of Animal Science, **Drs. Jane Welsh and Larry Suva**, Departments of Veterinary Integrative Biosciences, and Veterinary Physiology & Pharmacology and **Dr. Fuller Bazer**,

IFRB Undergraduate Student Spotlight



*Seth Reine is an undergraduate research assistant from Arlington, TX in **Dr. Jayanth Ramadoss'** perinatal research group. He first became interested in entering the field of reproductive physiology after taking a physiology course taught by Dr. Ramadoss during his sophomore year. This course challenged him to move beyond the basic memorization of powerpoints to applying the concepts of physiology to real-world scenarios. Seth is currently studying biomedical engineering and has a strong background in physics and mathematics. Seth loved how the complexities of physiology were analogous to his prior experiences in mathematics. For him, tissues are reminiscent of an equation with multiple variables capable of drastically affecting the desired output. As tissues begin to interact, they become a larger organ that still behaves in a similar manner to the constituent tissues. In the same way, individual equations begin to form a system of equations that is still characterized by individual equations. The parallels that Seth draws between his engineering background and physiology have been very encouraging for his path to pursue research as a long-term aim.

Seth's current research interests with the Ramadoss perinatal group include investigating improved imaging techniques for the early detection of teratogenic effects during fetal development and developing bioinstrumentation techniques for quantifying teratogenic biomarkers. His varied coursework in biomedical engineering and analytical chemistry have served him well in these pursuits as he utilizes this interdisciplinary background for his projects. This past summer, Seth had the opportunity to continue developing these skills as a research intern at Singapore University of Technology and Design



where he designed, built, and prototyped economical medical devices. This year, Seth has the opportunity to produce an original thesis through Texas A&M's Undergraduate Research Scholars program. He hopes that his contributions will lead to methods of early fetal screenings for improved prognosis in regards to birth defects.

Seth finds motivation for reproductive physiology research through his involvement with Aggie Miracle, a student philanthropy group partnered with McLane Children's Medical Center. Through this avenue, Seth has built relationships with children with severe medical conditions and their families. The perseverance displayed by these children constantly reminds Seth that the research he performs is working toward giving a child a normal, healthy life that most people take for granted. The experience Seth has gained within the Ramadoss perinatal research group has motivated him to continue pursuing research in some form of graduate studies.

Outside of his time performing reproductive physiology research, Seth serves as a director for Aggie Miracle, a delegate to the Abbott Family Leadership Conference, a delegate to the Sumner Leadership Conference, an ambassador for the biomedical engineering department, and an ambassador for LAUNCH as a University Scholar. Seth is also involved in the engineering honors program, the university honors program, and an engineering entrepreneurial team looking to patent a hemostatic device. Seth is an active member of Beta Upsilon Chi fraternity and his local church. Seth is excited about the continued experience and mentorship provided by Dr. Ramadoss and his group.

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51st SSR Annual Meeting, New Orleans, La 2018 American Society for Animal Science, Baltimore, MD



The 51st Annual Meeting of the Society for the Study of Reproduction was held 10 – 13 July 2018, New Orleans, LA. The theme of the Meeting was “Pathways to Discovery: Signals for Reproduction, Development, and Longevity.”

This year 18 IFRB faculty and 20 trainees contributed to the annual program. This included 8 trainees who submitted first-authored abstracts accepted for presentation at the Annual SSR meeting and received IFRB trainee travel funds to attend the meeting. Trainees receiving travel awards included Kitty Halloran, Emily Hoskins, John Long, Colleen



Lambo, Nan Ni, Bryan McLendon, Avery Kraemer, Camille Goblet and Cassie Herring.

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and Department Heads of the Colleges of Agriculture and Life Sciences, Medicine and Veterinary Medicine & Biomedical Sciences.

The 2018 American Society for Animal Science was held July 8-12 Vancouver, Canada.

More than 40 presentations were given by TAMU faculty including 12 IFRB members and 14 trainees. This included 7 trainees who submitted first-authored abstracts accepted for presentation at the ASAS meeting and received IFRB trainee travel funds to attend the meeting. Trainees receiving travel awards included, Amanda Bradbery, Brittini Littlejohn, Elizabeth MacConnell and Meaghan O’Neil.



2019 ASAS-CSAS Annual Meeting and Trade Show

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Austin, TX
July 8-11, 2019

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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.

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