With the summer of 2015 now officially behind us, we look forward to a busy fall. This summer was an active time for our Center for Reproductive Medicine (CRM) members. In June, CRM members returned to Frontiers in Reproduction (FIR) at the Marine Biological Laboratory in Woods Hole, Massachusetts. This beautiful water-side town with its rich scientific atmosphere and relaxed setting by the sea provides the perfect background for this summer reproductive sciences research laboratory and training course. FIR is unique for its dorm-like environment—everyone sits and eats together, attends social gatherings, participates in open reproductive medicine and career development discussions and networks freely with attendees, including everyone from teaching assistants beginning their research careers to field-leading investigators.

FIR is one of several meetings our members attended this summer to collaborate, discuss developments and share ideas that push forward reproductive science. This issue features some of that research presented during the American Urological Association (AUA) and Society for the Study of Reproduction (SSR) 2015 annual meetings. In September, I attended a meeting at the World Health Organization (WHO) in Geneva, Switzerland focused on a new area of concern for the WHO, namely the need not only for contraception but for infertility care throughout the world. The group of about 40 experts from around the world, including patient advocacy group representatives, developed guidelines for diagnosis and treatment, as well as a glossary of terms for use by healthcare providers, policymakers and governments. The work has only just begun!

In July, we bid a fond farewell to our Associate Director, Dr. Francesco DeMayo who moved to the National Institute for Environmental Health Sciences (NIEHS) after rising through the ranks from post-doctoral fellow to tenured professor at Baylor over the past 30 years. Dr. DeMayo was a Professor in Molecular and Cellular Biology and Pediatrics, held the Dan L. Duncan Cancer Center and Gordon Cain Professorships, was Director of the Genetically Engineered Mouse (GEM) Core and Director of the NIH-funded Center for Reproductive Biology U54 cooperative research grant. His research, teaching and leadership contributions to the College were extraordinary. Dr. DeMayo’s quick sense of humor and large collection of jokes will be sorely missed, as will his mentorship of graduate student trainees, lectures on uterine endometrial regulation and lung cancer, and his state-of-the-art expertise in mouse model development. We wish him luck in this new academic endeavor.
2015 FRONTIERS IN REPRODUCTION

Frontiers in Reproduction (FIR) is an annual, six-week-long laboratory and lecture course designed for scientists-in-training (graduate students, postdoctoral fellows, as well as clinical fellows) who are interested in improving basic conceptual knowledge and methodological skills to pursue a research career in the reproductive sciences. CRM members returned to FIR May 3 through June 4, 2015, to lead lectures and labs in three different tracks: Signal Transduction and Gene Regulation in the Hypothalamic-Pituitary-Gonadal Axis; Gametogenesis, Fertilization and Stem Cells; and Implantation, Development of the Reproductive Tract and Transgenesis.

JoAnne S. Richards, Ph.D.
Professor, Department of Molecular and Cellular Biology

“Signaling Cascades that Regulate Ovarian Follicle Development”

Speaking about her participation at FIR over the years, Dr. Richards reflects on how the content of her lectures has adapted, as her research expertise has deepened.

I have been immensely proud and honored to be a participant in Frontiers in Reproduction (FIR) since its inception in 1998 and to receive the Pioneer Award in 2003. Kelly Mayo, Ph.D., Professor, Department of Molecular Biosciences at Northwestern University, was the organizer and energizer of FIR in 1998 and invited me to give the opening lecture on ovarian physiology and cell signaling. Because I come from New Hampshire, going to FIR in Woods Hole was like going home and being a lemming to the sea. My fondness for New England in the early spring was more than rewarded for the effort to give a seminar at FIR.

In all the years that I have lectured, the major emphasis has been on how the gonadotropins, FSH and LH, regulate ovarian follicular growth and ovulation at the physiological and molecular levels. As time passed, the lecture has included how LH via the EGF-like factors stimulates ovulation and how the FOXO1/3 transcription factors regulate ovarian follicle growth. More recently, with our studies of granulosa cells in women with polycystic ovarian syndrome (PCOS), mouse models of epithelial ovarian cancer and granulosa cell tumor development, my lecture has incorporated new signaling pathways and endocrine events related to ovarian pathology and disease.

Kjersti Aagaard, M.D., Ph.D.
Associate Professor, Department of Obstetrics and Gynecology

Derrick Chu, M.D.
Postdoctoral Candidate, Translational Biology and Molecular Medicine

Lecture:
“Reproductive Microbiome and Perinatal Outcomes”
with accompanying workshop,
“Analysis of Microbiome Data”

Laying the framework of their research, Dr. Aagaard placed emphasis on the 12 – 14 million preterm births annually, without an identified pathogen. Preterm birth and the subsequent health consequences for both the infant and mother pose a significant challenge to clinicians and researchers. It is clear that the cause of preterm birth is multifactorial and although an infectious etiology has been sought out, no single pathogen has been identified as the primary culprit.

Recently, Dr. Aagaard’s lab characterized the community of commensal bacteria known as the microbiome of the placenta. Because abnormalities of the microbiome have been associated with human disease, further analysis of the microbiome of the placenta in her group may lead to a better understanding of the suspected causes of preterm birth.

CONTINUED ON PAGE 3
To better familiarize students with microbiome analysis, Dr. Chu taught a lab using the latest bioinformatic techniques. The lab was made more interesting by asking students to submit a stool sample so they could analyze their own microbiome during the lab. Students were very receptive to it, as they come to realize the importance of these techniques employed in leading labs analyzing the human microbiome.

SECTION 1: Signal Transduction and Gene Regulation in the Hypothalamic-Pituitary-Gonadal Axis
Joanne S. Richards, Ph.D.
- Lecture: “Signaling Cascades that Regulate Ovarian Follicle Development”

Section 2: Gametogenesis, Fertilization and Stem Cells
Dolores J. Lamb, Ph.D.
- Lecture: “Genetics of Infertility”

Section 3: Implantation, Development of the Reproductive Tract and Transgenesis
Francesco DeMayo, Ph.D.
- Lecture: “Strategies for Genetic Engineering in Mice” with accompanying lab, “DNA Microinjection and Embryo Transfer, Transgenic Methods to Study Utero-placental Function”
- Lecture: “Analysis of Progesterone Actions in the Uterus” with accompanying lab, “Lentiviral Transfection and Karyotyping of Mice”

Kjersti Aagaard, M.D., Ph.D. and Derrick Chu, M.D., Postdoctoral Candidate
- Lecture: “Reproductive Microbiome and Perinatal Outcomes” with accompanying lab, “Analysis of Microbiome Data”

Frontiers in Reproduction
May 3 – June 14, 2015
Woods Hole, Massachusetts

18th Year of Course

56 Course Directors and Invited Lecturers from Around the World

20 Graduate Students, Postdoctoral Fellows, Clinical Fellows and Physicians

308 Alumni (FIRbees) Worldwide

5 Invited Lecturers from the Center for Reproductive Medicine

It was an incredible experience. If you want to learn cutting-edge research and techniques from the best in the field, FIR is where you need to be. It definitely earns its reputation as being one of the most prestigious courses available.

– Derrick Chu, M.D.
Alexander Pastuszak, M.D., Ph.D., Assistant Professor, Department of Urology

“Sexual and Genital Health Awareness Among Males Attending Youth Health Clinics”

Dr. Pastuszak’s study with the Baylor Teen Health Clinic found that high levels of young males had little knowledge of their own or their partner’s reproductive health risks. 80% of young males with high-risk sexual behaviors perceived their risk of getting an STD/HIV as very low or low, and 20% got a STD. Therefore, Dr. Pastuszak emphasized the need for additional sexual and reproductive health services and outreach education for young minority males which would likely yield greater impacts in terms of prevention and spread of STDs.

Larry Lipshultz, M.D., Professor, Department of Urology and Ranjith Ramasamy, M.D.

“Association between Testosterone Therapy and Thrombotic Events in Elderly Men”

Drs. Lipshultz and Ramasamy found an increased number of deaths in hypogonadal men not treated with testosterone compared to men who received testosterone therapy. They concluded that there was no difference in the prevalence of myocardial infarctions, strokes or pulmonary embolisms, after a three year follow-up in men who received testosterone therapy. Therefore, testosterone therapy appears to be a safe treatment of hypogonadism in men, over the age of 65.

Ranjith Ramasamy, M.D., a fellow and NIH K12 scholar in the Department of Urology, was chosen to give the “Take Home Messages on Infertility and Andrology Talk” during the American Urological Association annual Meeting in May 2015. Dr. Ramasamy selected from over 200 of the meeting’s abstracts and talks those leading ideas which would have the most influence on clinical practice of urology in the future. To see a webcast of Dr. Ramasamy’s full presentation, visit: aua2015.org/webcasts/webcast_play.cfm?videoID=1985&agendaid=7989.
SOCIETY FOR THE STUDY OF REPRODUCTION
2015 ANNUAL MEETING

Held in San Juan, Puerto Rico, the Society for the Study of Reproduction’s (SSR) 2015 annual meeting brought together over 1000 trainees, fellows and scientists from all over the world, to an interactive forum to energize, rejuvenate and initiate new experiments in reproductive medicine and science, through notable presentations, lectures and networking events.

In 2013, Society member, Stephanie Pangas, Ph.D., Associate Professor, Department of Pathology, received the SSR New Investigators Award for her outstanding contributions and publications focused on reproductive biology and cancer research. Here Dr. Pangas reflects on her SSR experiences and the abstract, “Protein SUMOylation is Essential for Oocyte Development and Female Fertility,” presented by graduate student, Amanda Rodriguez, Predoctoral Fellow, Department of Pathology, during the 2015 annual meeting in June.

Q: Can you tell me about your experience at the SSR annual meetings through the years, including any reflections about the impact it has had on your career?
A: I’ve been a member of SSR since I was a postdoctoral fellow and I consider it my ‘home’ scientific society. SSR is a small and very welcoming society, which has the added benefit of allowing them to emphasize trainee mentorship and participation. Plus, you don’t get lost in a giant maze of strange faces, posters and talks as you can at some of the other science meetings.

CONTINUED ON PAGE 6

Martin M. Matzuk, M.D., Ph.D., Chair, “Analysis of Ovarian Function/Testis Biology: Of Mice and Men” SSR focus session, receives the 2015 SSR Trainee Mentoring Award.

Society for the Study of Reproduction
48th Annual Meeting:
“Evolution of Sex”
June 18 - 22, 2015
San Juan, Puerto Rico

1000+ trainees, research scientists, medical doctors, postdoctoral fellows, and graduate students from the U.S. and
34 international countries
700+ abstracts submitted
18 focus sessions
14 featured speakers
16 sponsors
2 Invited Talks by CRM Members
“The Role of Progesterone Receptor Signaling in Regulating Uterine Receptivity in the Peri-Implantation Period”
Francesco DeMayo, Ph.D.
“Regulation of the Spermatogonial Stem Cell Niche by NOTCH Signaling”
Marie-Claude Hofmann, Ph.D.

8 CRM Members presenting in 5 Focus Sessions
“Uterine Receptivity to Implantation and Placentation”
Diana Monsivais, Ph.D. (2015 Burroughs Wellcome Travel Fellowship Recipient)
Yasmin M. Vasquez
Madhu Chauhan, Ph.D. / Presented by Chandra Yallampalli, Ph.D.
Margeaux Wetendorf
“Emerging Roles of Developmental Signaling Pathways in the Adult Gonad”
Thomas Garcia, Ph.D.
“Male Germ Cell Biology”
Emily Dawson
“Analysis of Ovarian Function/Testis Biology: Of Mice and Men”
Julio M. Castaneda, Ph.D. (2015 Burroughs Wellcome Travel Fellowship Recipient)
“Oocytes Unscrambled”
Amanda Rodriguez
This facilitates the networking that trainees, or even established scientists can take advantage of, as it opens doors to different opportunities, whether it’s in academics or industry. I was always grateful that my mentors took time out during the SSR annual meetings to introduce me to the top leaders in the field and provide me with the opportunity to present my research. Many of those introductions have developed into long-term collaborations, friendships, or new mentorships that have added value to my science and assisted with my career progression. This is something that I try to pass along to my own trainees as they get started on their own scientific journey. I am also pleased to see SSR’s recent support for establishing the Women in Reproductive Sciences organization. Though the details are still being ironed out, hopefully such a group will be able to additionally support the professional development of women researchers at all levels within the Society.

**Q:** Amanda Rodriguez presented her abstract, “Protein SUMOylation is Essential for Oocyte Development and Female Fertility,” during SSR this year. Can you tell me how this research was received at the meeting?

**A:** This was Amanda’s first experience giving an oral presentation to a large audience of internationally diverse and distinguished reproductive biologists. In the beginning, she was a bit overwhelmed and had to fight that initial urge to run off the stage, but in the end, did a fantastic job. I think probably all of us have been in that situation at least once, but accomplishing that first national talk builds a lot of confidence for future presentations. We received overwhelmingly positive feedback on the project, in part because the mouse model has such a robust phenotype (complete germ cell loss by two months of age in mice) and because it is on a topic (SUMOylation) that has been understudied in female germ cell biology. Our next steps are to focus on uncovering some of the underlying mechanisms contributing to this phenotype and to publish our manuscript detailing the knockout mouse model results thus far.

**UPCOMING EVENTS**

**CRM and MCB R&D Workshop Seminar**

**Thursday, October 8, 2015**
12 – 1 p.m.
DeBakey, Room M616

**Richard Behringer, Ph.D.**
Professor, Department of Genetics,
The University of Texas MD Anderson Cancer Center

**“Developmental Genetic Regulation of Female Reproductive Organs”**

Dr. Behringer will discuss the developmental genetics of female reproductive tract formation and the mammalian female reproductive tract, including the oviducts, uterus and vagina which are essential for the generation of offspring. Unfortunately, these sites are often sources of human disease, notably infertility and cancer. He will also expand upon his research in determining the molecular, cellular and developmental mechanisms that regulate female reproductive tract organogenesis and its regression during male differentiation.

**Mark your calendars for our remaining FY 2016 seminars taking place at noon in DeBakey M616: Nov. 12, Dec. 3, Jan. 17, Feb. 11, March 17 and April 14.**

**Saturday Morning Science 2 Fall 2015**

This fall, high school students return to BCM’s classrooms for Saturday morning lectures and hands-on experiments bringing basic reproductive science concepts and research to life. Graduate and medical student Teaching Assistants help demonstrate activities corresponding to the leading morning lecture, delivered by the College’s world-famous experts in reproductive medicine. Morning lectures will be held in Alkek, Room N315. Dates for fall 2015 are 8:30 a.m. – Noon on Saturday:

- Sept. 26: Dolores Lamb, Ph.D., “What Genetics Can Tell Us about Male Infertility”
- Oct. 17: Jason Heaney, Ph.D., “Using Genetically Engineered Mice to Investigate the Embryonic Origins of Testicular Germ Cell Tumors”
- Nov. 14: Alexander Pastuszak, M.D., Ph.D., “Anabolic Steroids: Bane or Balm?”
- Dec. 5: Melissa Suter, Ph.D., “A Day in the Life of an OB/GYN Researcher”
THE BASIC SCIENCE, TRANSLATIONAL AND ETHICAL IMPLICATIONS OF CRISPR/CAS9

Highlighting the controversial genome editing technique, CRISPR/Cas9, “CRISPR, the disruptor,” published in the June 4, 2015 issue of NATURE, spotlights the ethical and safety concerns this technique raises. Taking advantage of our faculty member’s breadth of expertise, we invited a basic bench scientist, a translational researcher, and leading scholar of bioethics to provide a unique, multi-perspective look into the innovative uses and risks of this technology.

BASIC SCIENCE

David Lonard, Ph.D.
Associate Professor, Department of Molecular and Cellular Biology

Compared to older systems, CRISPR is much more simple to design and use for the bench scientist. For each target site in the genome that is being targeted, all that is needed is to program a 20 nucleotide genomic target site into the overall sgRNA. Plasmid construction is straightforward and simple. For gene editing experiments, the sgRNA is co-expressed with a common Cas9 nuclease. 1st generation CRISPR technology has a very high rate of success for editing its designed genomic target, however, off-target activity of the system can be a significant issue for many applications. Truncated sgRNAs, paired nickases and other newer designs are being designed to achieve more specificity.

CRISPR-based gene editing and targeting strategies are now being routinely used in cell culture experiments to target one or many genes with far greater throughput than was possible with zinc finger nuclease (ZFN)- and TALEN-based approaches.

For instance, it is now possible to introduce specific, recurrent oncogene driver mutations or to delete cassettes of tumor suppressor genes simultaneously in cell culture lines.

CRISPR/Cas9 – Translational implications from Dr. Lamb

Dolores Lamb, Ph.D.
Director, Center for Reproductive Medicine
Professor, Department of Urology and Molecular and Cellular Biology

An obvious application of CRISPR/Cas9 will be for gene therapy for the eradication of human genetic syndromes. Although several groups reported that off-target effects were seemingly rare in human pluripotent stem cells, the efficacy and specificity of this approach in human embryos was largely unknown. In April, investigators reported on the use of CRISPR/Cas9 technologies for genome editing of human pre-implantation embryos. The investigators were attempting to correct a genetic disorder with devastating consequences called ß-thalassemia, yet their findings raised serious technical and ethical concerns. Of the 86 embryos injected, just 71 survived and 54 were analyzed revealing that only one-third were successfully edited. Most importantly, off target mutations were much higher than expected. Despite the simplicity of this genome-editing approach, efficacy and safety concerns suggest caution is warranted prior to human translation. This simplicity also suggests that laboratory groups will continue to pursue gene editing in human embryos despite technical and ethical concerns.
ETHICAL IMPLICATIONS
Laurence McCullough, Ph.D.
Dalton Tomlin Chair in Medical Ethics and Health Policy
Center for Medical Ethics and Health Policy

The history of biology is like the history of the other sciences: technologic advances create new tools to manipulate nature, sometimes potentially very powerful tools. There is a pattern to such discovery.

In their early stages of development in the laboratory, enthusiasm (a belief formed in the absence of supporting evidence) leads to the overestimation of a new tool’s biologic power and potential clinical benefit and an underestimation of its biologic risks and potential clinical harm. CRISPR appears to fit the pattern exactly.

For example, in a recent article in Nature CRISPR has been described as “the disruptor” and “the biggest game changer to hit biology since PCR.” This is the language of enthusiasm and one would think that, by now in the history of science, responsible scientists would not succumb to enthusiasm. There are good reasons not to do so, as the same article documents. The efficiency of CRISPR is low. It also makes “off-target cuts,” i.e., it is not under the control of scientists who use it. CRISPR is far from being ready for early-phase safety and efficacy clinical trials with animal subjects, much less human subjects.

CRISPR is also typical for the use of bewitching language, in this case “editing” DNA. Editors of texts remove letters or words and add letters or words, just where they want them and nowhere else. The new letters and words are only those selected by the editor and they stay right where they are put. Editing is 100% efficient and here are no “off-target” cuts or additions of letters and words. CRISPR is not a form of “editing” DNA, not even close. Like all of the biologic tools that preceded it and all that will follow it, CRISPR is just one more form of biologic alteration that lacks the capacity to control human biology.

CRISPR needs to be better understood, especially in its germline implications, through comprehensive, well-designed in vitro research. The results might merit transitioning, very cautiously, to animal models. The scientific, clinical, and ethical burden of proof will be on making this transition and the burden will be steep. Such a disciplined, deliberative approach will replace enthusiasm with scientific integrity. Until CRISPR is better understood, clinical trials with human subjects should not even be considered.

1Ledford H. CRISPR, the disruptor. Nature 2015 Jun 4; 522 (7554): 138-139.

BAYLOR’S CELL-BASED ASSAY SCREENING SERVICE (C-BASS) CORE FACILITY OFFERS CRISPR/CAS9 GENOME EDITING SERVICES

By providing access to professional expertise and a variety of cutting-edge technologies and robotics platforms, the C-BASS core facility seeks to facilitate the advancement of our understanding of complex biological questions using well-established model systems, and to foster collaborations amongst BCM researchers. CRISPR/Cas9 services offered by C-BASS, include:

- Vectors
- gRNA Vector Construction
- Testing Vector Efficiency
- Optimizing Transfection
- Cell Cloning
- Clone Analysis

For more information, including cost and ordering forms, visit bcm.edu/cbass, e-mail c_bass@bcm.edu, or call 713.798.8987
COMMUNITY AND OUTREACH

RESOLVE Texas Walk of Hope 2015

Sponsored by RESOLVE, The National Infertility Association, the 2015 Texas Walk of Hope kicked-off National Infertility Awareness Week on May 19 at Sugar Land Town Square. Now in its third year, Texas had the largest of the 11 walks across the country—with 800 registrants, 18 sponsors, and raising nearly $90,000 in 2015.

Donations made this year grew the national Walk of Hope events by adding seven new walk locations, created 23 new support groups, provided training for 25 new RESOLVE ambassadors across the nation and promoted positive legislation through a larger and stronger advocacy initiative during RESOLVE’s Advocacy Day 2015 on Capitol Hill.

For more information, including outreach and volunteer efforts in the Houston-area, visit: resolve.org.

It is truly amazing to see how many people from all walks of life, whether infertility is personal to them or not, join the cause and rally around infertility, a disease that is still rather taboo in this day and age.

- Angelica Nassar, Texas Walk of Hope Public Relations and Media Chair, Resolve National Board Member

N.E.D. (No Evidence of Disease) Puts “Below the Belt” Cancers on Center Stage

Commemorating World Ovarian Cancer Day on May 8, two Houston-based foundations, Judy’s Mission and the Susan Poorman Blackie Ovarian Cancer Foundation, coordinated a screening of N.E.D. (No Evidence of Disease) at the Sundance movie theatre—sharing the film’s powerful message and educating the community on the signs, symptoms, and critical importance of early diagnosis of gynecological cancers. N.E.D. bass player, William “Rusty” Roberton, M.D., Professor of Gynecologic Oncology at Tulane University School of Medicine in New Orleans, drove in to Houston to attend the screening, answer questions and sign autographs.

You can see the trailer and find out more at: nedthemovie.com.

There’s this group of cancers that has been ignored. Hopefully, we can bring some noise to that, so that we’re heard—so that our patients are heard.

- John Soper, M.D., Professor, Obstetrics and Gynecology, University of North Carolina School of Medicine, N.E.D. Guitarist
Through interactive presentations and networking sessions Baylor Teen Health Clinic’s annual meeting in May hosted public health professionals who emphasized the importance of mobile optimization, in empowering teens to take initiative of their overall reproductive health.

*Technology is where the kids are. While the message is incredibly important, it is equally important that we understand the vehicle, the mode of communication,* pointed out Rachel Kachur, M.P.H., health scientist, Centers for Disease Control and Prevention (CDC).

Information should be at a teen’s fingertips—finding creative ways to harness social media applications and constructing clear, easily accessible and relevant information, based on mobile location, encourages involvement. To optimize access to healthcare information and services for Houston-area teens, Baylor Teen Health Clinic unveiled their mobile application, *Hi52Hlth (High Five to Health)*, during the conference.

2015 SMART PROGRAM

Kailand Thompson, a junior from Texas Southern University (TSU) in Houston, joined the CRM as the 2015 Summer Medical and Research Training (SMART) Program intern. During the program, undergraduate students are given reproductive medicine research experience and participate in science lectures that offer them exposure to professional scientific research lab environments.

Under the mentorship of Dr. Carolina Jorgez, Kailand received hands-on research experience in her lab. Her duties involved assisting Dr. Jorgez by collecting data on the EF21 gene and its link to cryptorchidism, setting up PCRs, performing gel extractions, splitting cells, running QPCRs and sectioning tissue. Kailand plans on applying her summer experience to additional research opportunities at TSU and eventually pursuing a career in orthopedics.

2015 SATURDAY MORNING SCIENCE SUMMER RESEARCH PROGRAM

We were excited to host Ilyasah Muhammad, a junior from the Harmony School of Advancement in Houston, for the 2015 Saturday Morning Science Summer Research Program. Ilyasah interned in Dr. Lamb’s Laboratory for Male Reproductive Research and Testing to gain hands-on experience. She is looking forward to applying her summer experience to her advanced high school science courses in the fall and perhaps pursuing a career as a pediatrician.

*You read about this in textbooks, but it helps when you can actually see and do it in person. I’m having fun and learning so much, that it is a great experience!*
**BAYLOR COLLEGE OF MEDICINE**  
**DISTINGUISHED ALUMNI**  

**Donald Patrick McDonnell, Ph.D.**  
Professor of Pharmacology & Cancer Biology, Duke University  
Chair, Department of Pharmacology & Cancer Biology  
Glaxo-Wellcome Professor of Molecular Cancer Biology  
Member of the Duke Cancer Institute  
Professor in Medicine

**Q: How did Baylor of Medicine set the foundation for success in your career?**  
**A:** It is hard to single out one thing that made my training at BCM such an enjoyable, rewarding experience. Looking back however, the most compelling reason to train there was the common threads in research programs in which experts with complimentary expertise came together to answer big questions. I trained as a graduate student with Dr. Bert O’Malley at a time when there was a large effort in the field to clone nuclear receptor cDNAs. It was an extremely exciting time and we took an “all hands on deck approach”—learning, developing, and applying state of the art techniques to clone the cDNAs corresponding to exceptionally rare mRNAs.

The goal of my thesis project was to clone the cDNA for the vitamin D receptor (VDR). At the time we started the project there was some biochemical evidence to suggest that the mechanism by which VDR regulated transcription was similar to that of the classical steroid hormones. However, because 1,25,(OH)2D3 (vitamin D) was a secosteroid it was generally believed that VDR was part of a distinct sub-family of receptors. However, in February 1987 as Wanda Beatty in the sequencing laboratory read the DNA sequence to me it became clear for the first time that VDR was a member of a superfamily of structurally and functionally distinct receptors that we now call the “nuclear receptor superfamily.” With receptor cDNAs in hand, I set out to develop systems that could be used to define the molecular basis of receptor pharmacology and use this information to inform new drug discovery. Twenty-eight years after finishing my PhD I am still involved in the development of drugs that target nuclear receptors.

**Q: What are some memories you had from your time here at Baylor?**  
**A:** On this topic I could fill a book. From a research perspective it was definitely the adrenaline rush for the few years when we were competing with many laboratories over the world to clone the nuclear receptor cDNAs. I don’t think I have ever worked as hard as that period in my life but we were all so engaged and helpful to each other that it was really a lot of fun. The other thing that stands out is how work and play were inextricably linked. Parties were a big thing! Those at the old Shamrock Hilton and the “door-busting” St. Patrick’s Day parties at Dr. O’Malley’s home were among the most memorable. Finally, and that which gives me great pleasure over a beer, is recounting the extremely well planned and perfectly executed practical jokes that we played on each other.

**Q: What do you believe is your most significant contribution to reproductive medicine?**  
**A:** I tell young faculty when they start their laboratories that it is important that they should be able to describe their primary research focus in one sentence. My “one liner” is that our group focuses on the “definition of the molecular mechanism(s) that determine the pharmacology of nuclear receptor ligands and the exploitation of this information to develop therapeutics for endocrine-related diseases.” Probably the most fundamental discovery that we have made is the demonstration that the conformation of nuclear receptors is influenced by the ligand, to which it is bound, and that conformation regulates the interaction of different receptor-ligand complexes with functionally distinct coregulators. Thus, subtle changes in ligand structure can have a profound effect on receptor transcriptional activity and the same receptor-ligand complex can have different activities in different cells. These findings have been leveraged in the development of the second and third generation Selective Estrogen Receptor Modulators (SERMs) and Selective Estrogen Receptor Downregulators (SERDs). These drugs are either approved for the treatment of osteoporosis or are in development for the treatment of metastatic breast cancer. The model systems we have developed are also being used in the development of modulators of the progesterone and androgen receptors. While continuing these projects we have most recently embarked on a project to define the role of nuclear receptors in regulating the metabolic plasticity associated with cell transformation.

To read the full interview with Dr. McDonnell, visit the CRM website under About Us at: bcm.edu/reproductivemedicine.
GRANT OPPORTUNITY

2016-2017 Gallagher Health Policy Scholar Program from The American Urological Association (AUA)

Applicants must be AUA member urologists who have demonstrated a commitment to or have a keen interest in the field of health policy and who are dedicated to advancing urology’s health policy agenda. Scholars will spend up to 30 days away from their practice for intensive training on a wide range of health policy issues. A stipend of $15,000 and reimbursement for travel and other expenses will be provided over the course of the year-long program. The application deadline is Friday, October 16, 2015.

For more information and to apply: auanet.org/advocacy/gallagher-health-policy-scholar.cfm.
Bert W. O’Malley, M.D.
Chairman and Professor, Department of Molecular and Cellular Biology

Endocrine Society 2015 Laureate Outstanding Innovation Award
Considered the father of endocrinology, Dr. O’Malley, was recognized for his innovative discoveries of the molecular pathways underlying the steroid hormone action and their extraordinary impact on the endocrinology field over the past 40 years, during the ENDO 2015 Annual Meeting in March.

Larry Lipshultz, M.D.
Professor, Department of Urology
Chief, Scott Department of Urology, Division of Male Reproductive Medicine and Surgery

2015 American Medical Systems F. Brantley Scott Award of Excellence from Baylor College of Medicine
This award recognizes the urological contributions of Dr. Scott, a former BCM professor, and furthers his legacy through physician education and training for urologists around the world. In April, Dr. Lipshultz was honored for his passion, expertise, and dedication in educating fellow physicians on the safe and effective use of American Medical Systems (AMS) products and the impact it has made on medicine and the quality of life for patients.

Martin M. Matzuk, M.D., Ph.D.
Director, Center for Drug Discovery
Vice Chair, Department of Pathology and Immunology

Elected to the National Academy of Sciences in April 2015
Dr. Matzuk was elected for his distinguished and continued research achievements focusing on the discovery of the critical proteins and mechanisms involved in both normal and abnormal reproductive development.

2015 Society for the Study of Reproduction (SSR) Trainee Mentoring Award
At the SSR 2015 Annual Meeting in June, Dr. Matzuk was recognized for the significant impact his scientific intuition, enthusiasm and professional guidance has made on SSR trainees, including over 40 Ph.D. students and postdoctoral fellows and serving on the thesis committees for many others.

Kjersti Aagaard, M.D., Ph.D.
Associate Professor, Department of Obstetrics and Gynecology – “Pregnancy, Heredity and Programming: Coding the Future”

Li Xin, Ph.D.
Associate Professor, Department of Molecular and Cellular Biology – “Prostate Epithelial Lineage Hierarchy”

2015 Michael E. DeBakey, M.D., Excellence in Research Award from Baylor College of Medicine
In May 2015, BCM faculty members who have made the most significant published scientific contribution to clinical or basic biomedical research during the past three years.

Ramakrishna Kommagani, Ph.D.
Postdoctoral Associate, Department of Molecular and Cellular Biology

Endocrine Society 2015 Early Investigators Award
During the ENDO 2015 Annual Meeting in March, Dr. Kommagani was recognized for his research focusing on the delineation of molecular mechanisms of steroid hormone actions in the female reproductive tract, particularly in two endocrine-related conditions adversely affecting a woman’s reproductive health—early implantation failure and endometriosis.
**WHO ARE THE MEMBERS OF THE CENTER FOR REPRODUCTIVE MEDICINE AND WHAT ARE THEIR INTERESTS?**

**OUR MISSION:** The Center for Reproductive Medicine (CRM) houses a robust team of leading-edge researchers, educators, physicians, clinicians, trainees and community healthcare workers, who are committed to enhancing reproductive health, from pre-conception to the senior years.

### CRM DIRECTOR
Dolores J. Lamb, Ph.D., HCLD

### SENIOR ADVISORY COMMITTEE
Michael Coburn, M.D., F.A.C.S.
- William E. Gibbons, M.D.
- Larry Lipshultz, M.D.
- Bert W. O'Malley, M.D.
- Peggy Smith, Ph.D.
- Ignatia Barbara Van den Veyver, M.D.

### TRANSLATIONAL RESEARCH GROUPS AND LEADERS

#### Reproductive Cancers
- Stephanie Pangas, Ph.D.
- Nancy Weigel, Ph.D.

#### Reproductive Diseases
- David Rowley, Ph.D.
- Shannon Hawkins, M.D.
- William E. Gibbons, M.D.
- Martin Matzuk, M.D., Ph.D.

#### Sexual Medicine
- Larry Lipshultz, M.D.
- Rose Khavari, M.D.

#### Birth Defects (Male & Female)
- Jennifer Dietrich, M.D.
- Carolina Jorgez, Ph.D.
- Abhishek Seth, M.D.

#### Gametogenesis/ Fertility/Contraception
- Male
  - Larry Lipshultz, M.D.
  - Dolores J. Lamb, Ph.D., HCLD
- Female
  - William E. Gibbons, M.D.
  - Martin Matzuk, M.D., Ph.D.

#### Pregnancy/Neonatal
- Kjersti Aagaard, M.D., Ph.D.
- Chandrasekhar Yallampalli, Ph.D.

#### Advanced Maternal
- Fetal Diagnosis, Surgery & Care
  - Ignatia Barbara Van den Veyver, M.D.

#### Bioethics
- Laurence McCullough, Ph.D.
- Amy McGuire, J.D., Ph.D.

#### Reproductive Health in the Community
- Peggy Smith, Ph.D.
- Alexander Pastuszak, M.D., Ph.D.

#### Bioinformatics & Computational Biology
- Rainer Lanz, Ph.D.

### TOP DEPARTMENTS

- **25%** Molecular & Cellular Biology
- **19%** Obstetrics & Gynecology
- **13%** Urology
- **8%** Molecular & Human Genetics
- **7%** Pediatrics
- **6%** Pathology & Immunology
- **22%** Related Field

### TOP PRIMARY INTERESTS

- **24%** Reproductive Biology/Infertility
- **17%** Reproductive Cancers - Research & Clinical
- **8%** Urology
- **8%** Genetics
- **7%** Endocrinology
- **5%** Genitourinary Birth Defects

### TOP SECONDARY INTERESTS

- **12%** Genetics
- **10%** Reproductive Diseases
- **10%** Reproductive Cancers - Research & Clinical
- **9%** Reproductive Biology/Infertility
- **7%** Endocrinology
- **6%** Reproductive Endocrinology

### MEMBERSHIP EDUCATION

- **79 Ph.D.**
- **11 M.D., Ph.D.**
- **36 M.D.**
- **18 Masters**
- **20 Bachelors**

**164 CRM MEMBERS**

Faculty, including professors, associate professors, assistant professors, and instructors, students and postdoctoral trainees comprise over 85% of the CRM membership.