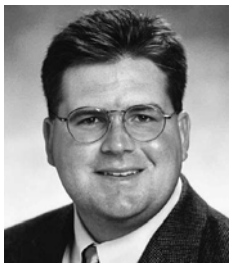

SSR New Investigator Award *(sponsored by Virendra B. Mahesh New Investigator Endowment Fund).* Dr. Thomas E. Spencer is the recipient of the 2004 SSR New Investigator Award.

There are many ways to measure success, but peer-evaluation is the most objective. Dr. Spencer's CV documents recognition by his peers who have invited him to provide service to scientific societies and editorial boards, given their approval to his science that is reflected in his outstanding record of publications in peer- reviewed journals, and recommended funding from competitive review in NIH and USDA panels for his research.

Other awards and honors that Dr. Spencer has received to date include Texas A&M Regent's Fellow (1992–1994), Tom Slick Fellow (1994–1995), Dr. A.M. ''Tony'' Sorenson Achievement Award (1995), Vice Chancellor's Award of Excellence for Graduate Student Research (1995), NIH National Research Service Award (1996), and Outstanding Young Animal Scientist Award-Research (2003) from the Southern Section of the American Society of Animal Science.

Dr. Spencer received his BS and MS degrees from Auburn University and PhD from Texas A&M University (1995). After completing his graduate education, Dr. Spencer obtained postdoctoral training with Drs. Bert O'Malley and Ming-Jer Tsai at Baylor College of Medicine (1995–1997) before returning to Texas A&M University to begin his academic career in research, graduate education, and service.

Dr. Spencer has developed an independent research program funded by grants from the NIH, USDA, and several biotechnology companies for studying uterine biology and pregnancy at the cellular and molecular levels. He has made many key discoveries in research that have significantly advanced our understanding of uterine biology and pregnancy. He developed the novel ''uterine gland knockout'' (UGKO) ewe model resulting from inappropriate exposure of neonatal lambs to progesterone for the first 56 days after birth. His research with UGKO ewes revealed that uterine glands are essential for them to experience normal estrous cycles and that uterine secretions are unequivocally required for conceptus survival and development beyond the pre-implantation period of pregnancy. He is now applying a comprehensive functional genomics and proteomics approach to identify key genes and gene products that discriminate between a uterus that will (normal) or will not (UGKO) support conceptus growth and development and establishment of pregnancy. These studies are defining the genes that are essential for pregnancy, affect uterine capacity, and influence prolificacy and fecundity in domestic animals.

Based on findings from the UGKO ewe model, Dr. Spencer initiated a research program to discover hormonal, cellular, and molecular mechanisms regulating uterine gland development or adenogenesis using the neonatal ewe as a model system. Novel findings are that prolactin from the pituitary acts on prolactin receptors that are expressed exclusively by uterine gland epithelium to regulate their coiling and branching morphogenetic development. His research has also revealed key regulators of endometrial adenogenesis, including insulin-like growth factors-I and -II, fibroblast growth factors-7 and -10, hepatocyte growth factor, and activins in the stroma that act on epithelial receptors. Finally, ovarian factors were shown to influence endometrial gland morphogenesis. This novel area of research is defining mechanisms that are relevant to endometrial adenogenesis in the neonatal human as well as to reconstruction of the endometrium during the menstrual cycle of women.

The most abundant uterine endometrial gene transcripts identified to date by Dr. Spencer are for the endogenous Jaagsiekte retroviruses (enJSRVs). The endogenous JSRV genes were discovered by Dr. Spencer by transcriptional profiling of genes expressed differentially in the endometrium of normal and UGKO ewes. In collaboration with Dr. Massimo Palmarini (University of Georgia), the published evidence and work in progress indicate that enJSRVs are uniquely controlled by progesterone and probably responsible for stimulating trophectoderm to proliferate, produce interferon tau, the pregnancy recognition signal in ruminants, and to differentiate by forming syncytia (binucleate cells) that produce ovine placental lactogen. Dr. Spencer has demonstrated that ovine placental lactogen binds to homodimers of the prolactin receptor and to heterodimers of the prolactin and growth hormone receptors in the endometrial glands to stimulate their proliferation and production of secretory proteins such as osteopontin and uterine serpins. Further, he has collaborated with colleagues in Israel (Drs. Elisha Goo- twine and Arieh Gertler) to demonstrate that the biological activity of ovine placental lactogen is positively associated with lamb birth weight and milk production.

Dr. Spencer has played a key role in molecular and cellular studies that revealed that interferon tau inhibits transcription of the estrogen receptor alpha gene in uterine luminal and superficial gland epithelia. In the absence of these uterine estrogen receptors, oxytocin receptors are not expressed and uterine release of luteolytic pulses of prostaglandin $F_{2\alpha}$ is abrogated. He has also led efforts to determine the signal transduction pathways of interferon tau in the uterine endometrium. In collaboration with Dr. Fuller W. Bazer, he found that most interferon-stimulated genes are increased by interferon tau only in the endometrial stroma and glandular epithelium, because the endometrial epithelium expresses interferon regulatory

factor 2 (IRF-2), a potent repressor of interferon-stimulated genes. A novel finding from this work is that interferon tau regulates genes, such as *Wnt7a,* in endometrial epithelia through an uncharacterized signal transduction pathway(s) that is independent of the classical JAK-STAT pathway.

Dr. Spencer's intellectual background, technical expertise, imagination, dedication, and organizational skills are such that he is already recognized as a leader in reproductive biology and endocrinology. For example, he will serve as Chair of the Session on Uterine Biology at the 2004 Gordon Research Conference on Reproductive Tract Biology, and he presented an invited lecture on "Lactogenic Hormones and Uterine Function" at the 2004 Gordon Conference on Prolactin in Ventura, California. He has also presented key papers on "Uterine and placental factors regulating conceptus growth in domestic animals" at the Triennial Symposium on Reproductive Biology of the 2003 joint meeting of the American Society of Animal Science and American Dairy Science Association. He also presented a paper on "Biology of Progesterone and Placental Hormone Actions on the Uterus" in a minisymposium on Steroids and Uterine Function at the 2003 annual meeting of the SSR.

The credentials detailed above make Dr. Spencer a worthy choice for the inaugural SSR New Investigator Award.