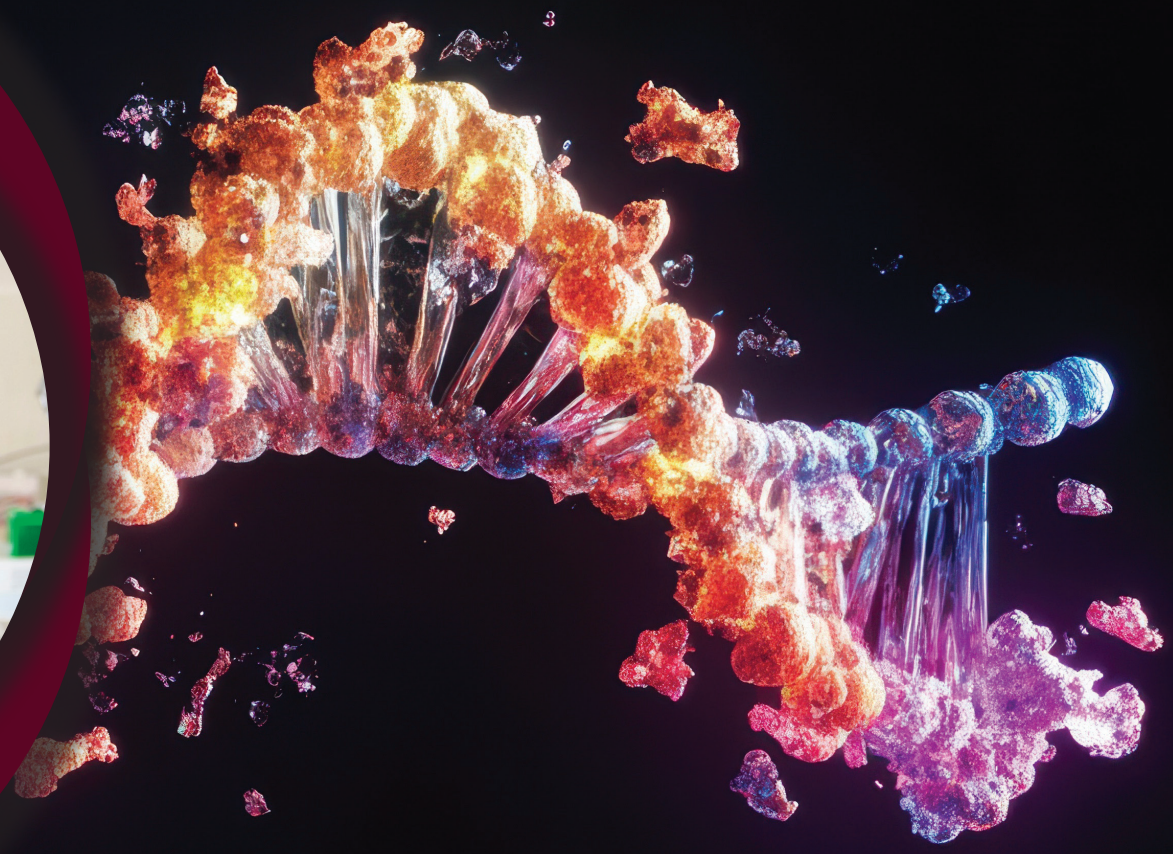
TEXAS A&M UNIVERSITY

# James E. Womack
# MEMORIAL SYMPOSIUM



## Comparative Genomics:
## *The Dark Genome, One Health, & the Future of Clinical Veterinary Genomics*

**Wednesday–Thursday, March 19–20, 2025**

Doug Pitcock ‘49 Texas A&M Hotel and Conference Center

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**The James E. Womack Memorial Symposium is co-sponsored by the following Texas A&M entities:**

College of Veterinary Medicine & Biomedical Sciences (VMBS)

Hagler Institute for Advanced Study

AgriLife Research

Faculty Affairs

# JAMES E. WOMACK MEMORIAL SYMPOSIUM PROGRAM

## Wednesday, March 19, 2025


*Brazos Bend State Park*

7a.m.–5 p.m. **Wildlife Viewing Trip to Brazos Bend State Park**
*Hosted by Dr. Leif Andersson & Dr. Gus Cothran*

## *Century Ballroom I & II*
## *Doug Pitcock '49 Texas A&M Hotel and Conference Center*

5–7 p.m. **Registration & Happy Hour** with Heavy Hors d'oeuvres

7–7:15 p.m. **Welcome & Introductions**
**Dr. John August** | The Carl B. King Dean of Veterinary Medicine, Texas A&M University

7:15–8:30 p.m. Invited Speaker – **Dr. Harris Lewin**
**"Genomes in dialogue: The enduring impact of James E. Womack on comparative genomics"**
*Introduced by Dr. Lawrence Schook, University of Illinois*


*Lewin*

**Dr. Harris Lewin** is a Research Professor at Arizona State University, Distinguished Professor Emeritus of Evolution and Ecology at the University of California, Davis, and Professor Emeritus of Animal Sciences at the University of Illinois at Urbana-Champaign. At Illinois, he served as Founding Director of the W.M. Keck Center for Comparative and Functional Genomics and Founding Director of the Carl R. Woese Institute for Genomic Biology. Lewin's current research interest is in mammalian genome evolution as it relates to adaptation, speciation, and the origins of cancer. Lewin co-founded the Earth BioGenome Project (EBP), which aims to sequence all described eukaryotic life, and currently serves as the Chair of the EBP Executive Council. Lewin is a Foreign Member of the Royal Swedish Academy of Agriculture and Forestry and a member of the U.S. National Academy of Sciences. Lewin was awarded the Wolf Prize in Agriculture, the Lowell Thomas Award from the Explorers Club (NYC), and the Zhongguancun International Cooperation Award from Beijing.

8:30–10 p.m. **Social Hour**

# Thursday, March 20, 2025

## *Century Ballroom I & II*
## *Doug Pitcock '49 Texas A&M Hotel and Conference Center*

7–8 a.m. **Continental Breakfast**

8:15–8:30 a.m. **Welcome & Announcements**

8:30–9:30 a.m. Invited Speaker – **Dr. William Murphy**
**"Comparative genomics illuminates the dark side of the genome"**
*Introduced by Dr. David Threadgill, Texas A&M University*


*Murphy*

**Dr. William Murphy** is the James E. Womack University Professor of Genetics; a Texas A&M University System Regents Professor in the Department of Veterinary Integrative Biosciences at the Texas A&M College of Veterinary Medicine & Biomedical Sciences (VMBS); and director of the recently established Texas A&M AgriLife Center for Comparative Genomics. Well-known for his contributions to comparative mammalian genomics, molecular phylogeny, biogeography, and molecular evolution, including gene mapping, sex chromosome genetics, speciation, and mechanisms of male hybrid sterility, his work has helped redefine the mammalian tree of life and transform our understanding of biology, especially through his research on the domestic cat genome. Some of his most transformative work has come from his participation in the Zoonomia Project, an international consortium of scientists who use the largest mammalian genomic dataset in history to answer questions about human evolution as it relates to overall mammal evolution. Murphy was elected to the U.S. National Academy of Sciences in 2024.

9:30–10:30 a.m. Invited Speaker – **Dr. Leif Andersson**
**"Comparative genetics of phenotypic diversity in domestic animals and natural populations"**
*Introduced by Dr. Max Rothschild, Iowa State University*


*Andersson*

**Dr. Leif Andersson** is a professor at the VMBS and a fellow of the Hagler Institute for Advanced Study from the class of 2013–14. He also holds professorships in functional genomics in the Department of Medical Biochemistry and Microbiology at Uppsala University and in molecular animal genetics at the Swedish University of Agricultural Sciences in Uppsala. He is among the world's most renowned scholars in the genomic and molecular study of domestic animals and has carved a scientific niche by approaching farm animals as model organisms. He is a member of the U.S. National Academy of Sciences and the Royal Swedish Academy of Sciences. Andersson was awarded the Wolf Prize in Agriculture in 2014, the Thureus Prize in Natural History and Medicine from the Royal Society of Sciences, the Linneus Prize in Zoology from the Royal Physiographic Society of Lund, the Hilda and Alfred Eriksson's Prize in Medicine from the Royal Swedish Academy of Sciences, and the Olof Rudbeck Prize from Uppsala Medical Society.

10:30–10:45 a.m. **Break**

10:45–11:30 a.m. Invited Speaker – **Dr. Michel Georges**
**"The processes of *de novo* mutations in the bovine germline"**
*Introduced by Dr. Daniel Pomp, University of North Carolina, Chapel Hill*


Georges

**Dr. Michel Georges** is a professor of genetics and genomics at the Faculty of Veterinary Medicine of the University of Liège in Belgium. From 1989 to 1993, he was a senior scientist, then director of research at Genmark Inc., and an adjunct professor in the Department of Human Genetics at the University of Utah in Salt Lake City. Since 1994, he has headed the Unit of Animal Genomics at the University of Liège, where he has played an instrumental role in establishing the GIGA Research Institute. Georges was awarded the Wolf Prize in Agriculture in 2007, the Francqui Prize in Biological and Medical Sciences in 2008, and was elected to the U.S. National Academy of Sciences in 2013.

11:30 a.m.–1 p.m. **Lunch**

1–1:45 p.m. Invited Speaker – **Dr. Kathryn Meurs**
**"Moving from reactive to proactive medical care—the power of clinical genetics"**
*Introduced by Dr. Michael Criscitiello, Texas A&M University*


Meurs

**Dr. Kathryn Meurs** is the Randall B. Terry, Jr. Dean and distinguished professor in comparative medicine at the North Carolina State University College of Veterinary Medicine. She completed her DVM at the University of Wisconsin–Madison and completed a small animal internship at North Carolina State University. She completed a cardiology residency at Texas A&M University and is board-certified by the American College of Veterinary Internal Medicine (ACVIM) in Cardiology. She has served as Chair of the American Veterinary Medical Association (AVMA) Council of Research, the American Association of Veterinary Medical Colleges (AAVMC) Research Committee, and the Morris Animal Foundation Scientific Advisory Board. She has a Ph.D. in Genetics from Texas A&M University, and her research and clinical interests include familial forms of cardiac disease, particularly canine and feline cardiomyopathy. She has authored or co-authored more than 130 peer- or editor-reviewed manuscripts and 75 scientific abstracts.

2–2:45 p.m. Invited Speaker – **Dr. Richard Gibbs**
**"Clinical translation of genomics to advance discovery"**
*Introduced by Dr. Loren Skow, Texas A&M University*


Gibbs

**Dr. Richard Gibbs** holds the Wofford Cain Chair in Molecular and Human Genetics at Baylor College of Medicine (BCM), is a member of the National Academy of Medicine, and a fellow of the Hagler Institute for Advanced Study at Texas A&M University from the class of 2015–16. He is the founder and director of the Human Genome Sequencing Center (HGSC), established at BCM in 1996. The HGSC has a core mission of advancing medical care through research and translation of genomics and is one of the five worldwide sites selected to undertake and complete the Human Genome Project. The group subsequently collaborated to sequence the genomes of many key species, including *Drosophila melanogaster*, Brown Norway rat, *Rhesus macaque*, cattle, *Dictyostelium*

*discoideum*, sea urchin, and honeybee. His research group generated the first comprehensive map of human genetic variation. The HapMap project was the first to demonstrate the utility of diagnostic whole genome sequencing to guide effective clinical treatments of genetic diseases. The HGSC now provides full genome sequencing to hundreds of individual patients each month.

2:45–3:15 p.m. **Break**

3:15–5 p.m. Panel Discussion – **Issues in Clinical Veterinary Genomics**
*Introduced by Dr. Michael Criscitiello | Panel Moderator: Dr. Kathryn Meurs*


Bannasch

**Dr. Danika Bannasch** is a professor in the Department of Population, Health & Reproduction, associate director of the Center for Companion Animal Health, and associate dean of the School of Veterinary Medicine at UC Davis. Her research is focused on the genetic basis of inherited diseases in animals, particularly in dogs and horses, as models of human inherited diseases.


Cothran

**Dr. Gus Cothran** is a professor emeritus at the VMBS with a focus on equine population genetics, conservation genetics, and genetic diversity of both domestic and wild horse breeds worldwide. He previously served as the director of the Equine Parentage Testing and Research Laboratory at the University of Kentucky and, more recently, as the director of the Animal Genetics Laboratory at Texas A&M. He served four terms as the chair of the International Society of Animal Genetics (ISAG) standing committee for Thoroughbred DNA Typing Standardization and is a past chair of the Equine Standing Committee of ISAG. In addition, he has served on the Deer Genetics Standing Committee and the ISAG/FAO Standing Committee for Domestic Animal Genetic Diversity.


Davis

**Dr. Brian Davis** is an assistant professor in the Department of Veterinary Pathobiology, with a joint appointment in the Department of Small Animal Clinical Sciences, and is the director of the Veterinary Medical Biorepository (biobank) in the Office of Veterinary Clinical Investigation at the VMBS. His research focuses on the field of comparative genomics, and he has been instrumental in addressing hereditary diseases in dogs, cats, and other animals with the potential to translate these findings into treatments for similar human conditions.


McCue

**Dr. Molly McCue** is a professor and former associate dean of research in the College of Veterinary Medicine, University of Minnesota. She has established herself as a leader in the field of veterinary genetics, with a particular focus on metabolic disorders, performance traits, and inherited diseases in horses and dogs.


Raudsepp

**Dr. Terje Raudsepp** is a professor in the Department of Veterinary Integrative Biosciences and the director of the Molecular Cytogenetics Laboratory at the VMBS. She specializes in animal cytogenetics and genomics with a particular focus on equine and comparative genomics. Known for her expertise in chromosome biology, she has made significant contributions to understanding the structure, function, and evolution of animal genomes, particularly in domestic and wild species of equids and camelids.

# IN-GENE-IOUS: A MAN WITH A PLAN

*The following is a retrospective of Dr. Womack's career taken from* CVM Impact, *a special publication about research at the Texas A&M College of Veterinary Medicine & Biomedical Sciences (VMBS), published in Fall 2016. The article was written by Dr. Megan Palsa, former CVM Communications Executive Director.*

*Dr. James Womack in his lab*

Dr. James Womack, distinguished professor in the Department of Veterinary Pathobiology, researches inherited resistance to disease in certain animals—both individual animals and breeds. For example, certain cattle have evolved a stronger defense against bacterial and viral pathogens. Womack wants to understand the genetics behind this because it could allow breeders to develop a healthier herd. This is the topic of his most recent USDA-funded research project.

Bovine respiratory disease is the most common and costly disease affecting the North American cattle industry. "Not all cattle respond to bovine respiratory pathogens the same, and we're trying to develop a DNA chip where a little bit of DNA can determine the relative susceptibility or resistance of a particular animal to respiratory disease," Womack said.

Womack and his team of researchers have identified some genes and clusters of genes that convey resistance, and although they are still being validated with additional studies, they have begun to publish the data. Their goal is to give dairy and beef cattle breeders a tool, the DNA chip, to help determine if an animal is resistant to bovine respiratory pathogens. "We want to be able to look at the DNA chip and say we want to breed this individual, and this one will have offspring that are more resistant," he said.

Womack's research isn't restricted to cattle; he has worked extensively with mice as well as chickens. He has spent time in Korea studying chickens with the same goal—finding genes that confer disease resistance. Recently, he studied a gene in rats that allows the rats to be resistant to Rift Valley fever, a disease that has taken a toll in Africa and affects cattle, sheep, and goats. "We found a rat model for it

and identified that gene," Womack said. "We occasionally work with dogs, cats, pigs, and horses, too." Most of Womack's research has taken place right here in College Station. He said he "got a good start" in research at the Jackson Laboratory, but he was able to continue his work in his current position. "I was very interested in the evolution of animal genomes, how the mouse genome compared to the human genome, and what the differences are between them. When I got here, I expanded my research into the cattle genome. My work is kind of comparative genomics, I guess, and how these little subtle differences seemed to make a difference and why cattle have more genes related to immune function than other mammals," he said.

**WOMACK HAS BEEN PART OF THE TEXAS A&M FAMILY FOR 39 YEARS. The distinguished professor, a designation he has held since 2001, has a joint appointment in the Department of Molecular and Cellular Medicine at Texas A&M's College of Medicine and the Department of Veterinary Pathobiology. He was promoted to professor in 1983, and two years later received the W.P. Luse Endowed Professorship. From 1989 to 1996, he was director of the Center for Animal Genetics at the Institute of Biosciences and Technology, and he was named interim associate department head for the Department of Veterinary Pathobiology from 1990 to 1993.**

## IMPACTING STUDENTS

Womack noted that his students have been a large part of the success he's enjoyed in research. His 50th doctoral student recently defended her dissertation, and he has had a myriad of master's students as well.

"We have a genetics graduate program here, and we have 10 or 12 students every year admitted to that program," he said. "They apply from all over the country. We also have international students here who know about our program, maybe from professors in China or Korea, who also contact us."

In fact, it was one of his former students, now a professor at Washington State University, who contacted him regarding the USDA Bovine Respiratory program. "Then, another fellow, whom I had worked with before at The University of Missouri, and a group at the University of California, Davis—we all just got together and said, 'Let's put one of these big grants together.'" They nominated Womack as their project leader.

Womack continues to love and be inspired by teaching undergraduate students. "These are juniors and seniors, and they're usually applying to medical schools, veterinary colleges, and graduate schools. I write a lot of letters, and then they stay in touch with me. I enjoy that. My students kind of become like my children."

## COLLABORATION

Being next to the break room, Womack said many "coffee pot discussions" take place outside his office. "I usually leave my door open, and the coffee pot's right out there. I have a lot of people coming by." A lot of those people coming by are fellow researchers. He said it's valuable and interesting to learn about others' research and that some things that seem unrelated can actually shed light on other topics.

Spending time with other faculty members and researchers is important to Womack and his research. He often sits down to learn from and brainstorm with his colleagues across the college. "We've come to realize that this fast-paced world requires strong partnerships to leverage creativity, experience, and resources. With unique thinkers, we can help one another generate ideas—and possibly arrive at viable solutions in less time," said Womack.

# HONORED BY HIS PEERS

Although his list of honors is lengthy, there is one award of which Womack is most proud.

It's the Wolf Prize in Agriculture, which he received in 2001 for his "use of recombinant DNA technology to revolutionize plant and animal sciences, paving the way for applications to neighboring fields," according to the Wolf Foundation, which awards the prize.

The Wolf Prize in Agriculture is awarded annually in Israel. One of six such prizes established by the Wolf Foundation, the Wolf Prize in Agriculture is considered by many to be the Nobel Prize within the field of agriculture.

Prior to that honor, in 1999, he was named to the U.S. National Academy of Sciences (NAS). This organization recognizes and promotes outstanding science through election to its membership, publication in its prestigious journal, and its awards, programs, and activities.

*Womack with his Wolf Prize*

Election to the NAS is considered one of the highest honors a scientist can receive. Today, there are approximately 2,250 members and nearly 440 foreign associates, of whom approximately 200 have received Nobel prizes.

Womack's other honors include the Bush Excellence Award for Faculty in International Research, Texas A&M University, 2008; Dean's Impact Award, College of Veterinary Medicine, Texas A&M, 2007; Outstanding Alumnus of the Year, Abilene Christian University, 2006; Distinguished Service Award, Texas Genetics Society, 2006; Fellow, American Association for the Advancement of Science, 1999; Outstanding Texas Geneticist, Texas Genetics Society, 1996; CIBA Prize for Research in Animal Health, 1993; McMaster Fellow, CSIRO, Australia, 1990; Carrington Award for Research in Cell Biology, 1990; Faculty Distinguished Achievement Award for Research, Texas A&M University, 1987; and the Alumni Citation Award, Abilene Christian University, 1983.

He serves or has served on editorial boards for these publications: *Genomics, Journal of Heredity, Biochemical Genetics, Animal Genetics, Mammalian Genome, Genome Research,* and *Animal Biotechnology.*

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*Womack working cattle on his ranch*

# JAMES E. WOMACK MEMORIAL SYMPOSIUM ORGANIZING COMMITTEE

**Dr. Loren Skow** | Senior Professor, Department of Veterinary Integrative Biosciences | Texas A&M College of Veterinary Medicine & Biomedical Sciences (VMBS)

**Dr. Penny Riggs** | Associate Professor, Department of Animal Science | Texas A&M College of Agriculture & Life Sciences (COALS)

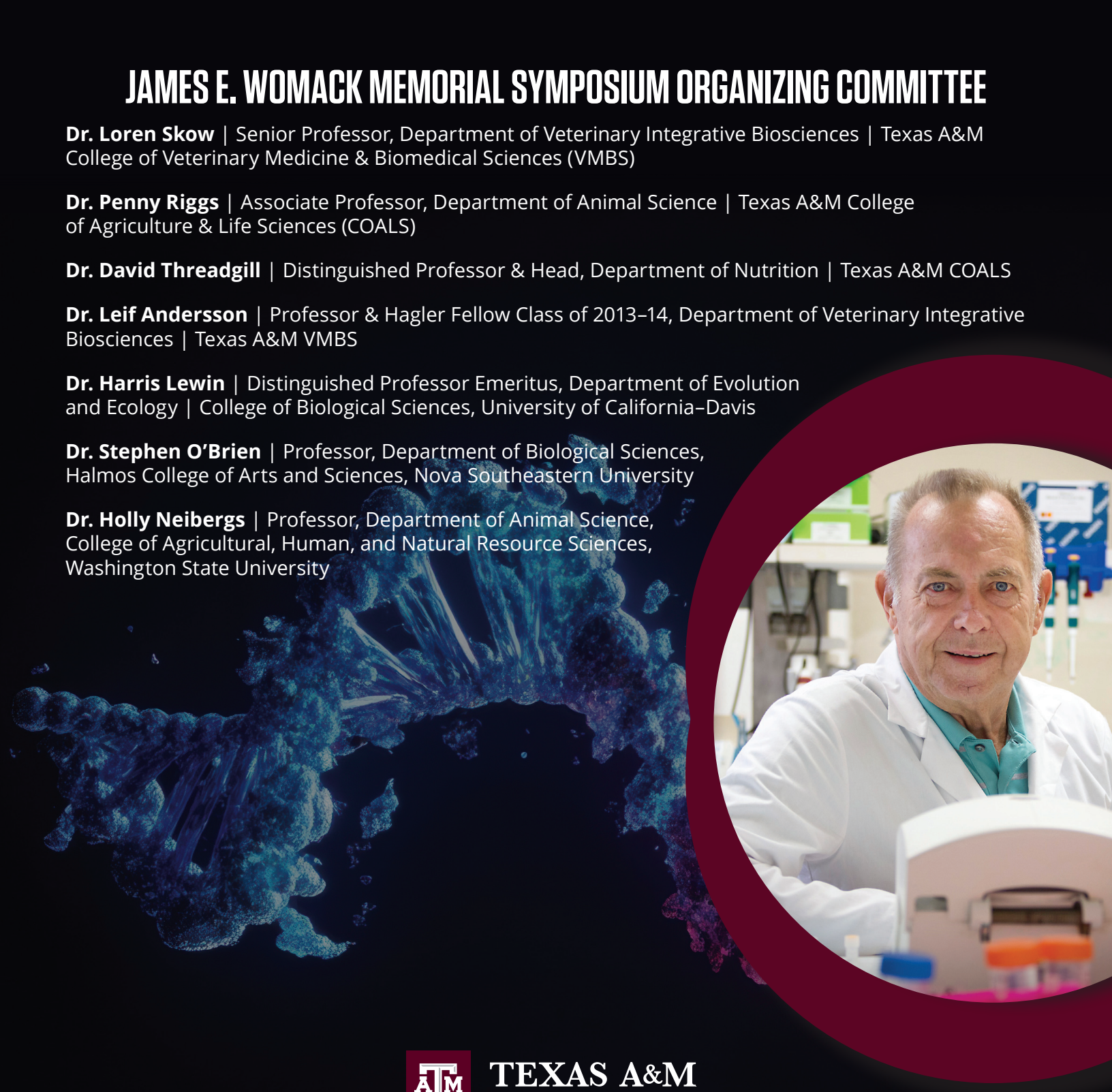
**Dr. David Threadgill** | Distinguished Professor & Head, Department of Nutrition | Texas A&M COALS

**Dr. Leif Andersson** | Professor & Hagler Fellow Class of 2013–14, Department of Veterinary Integrative Biosciences | Texas A&M VMBS

**Dr. Harris Lewin** | Distinguished Professor Emeritus, Department of Evolution and Ecology | College of Biological Sciences, University of California–Davis

**Dr. Stephen O'Brien** | Professor, Department of Biological Sciences, Halmos College of Arts and Sciences, Nova Southeastern University

**Dr. Holly Neibergs** | Professor, Department of Animal Science, College of Agricultural, Human, and Natural Resource Sciences, Washington State University



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