



In Memoriam

Dr. James E. Womack

March 30, 1941–August 13, 2023

With considerable sadness, we report the passing of our dear friend and colleague, Dr. James Womack.

Early Life

James (Jim) E. Womack was born March 30, 1941, to Charles E. and Eva Mae Womack in Anson, Texas. He was an outstanding high school athlete, named to first team All-State basketball in both his junior and senior years as a point guard at Hawley High School (Hawley, TX), where his father was the basketball coach. After a sterling academic and athletic high school career, where he graduated in a class of 16, Jim accepted a basketball scholarship and enrolled in Abilene Christian College (now Abilene Christian University; ACU) in 1959. His plan was to become a high school basketball coach like his father and teach math and science. Jim led the ACU Wildcats to two consecutive conference championships and NCAA postseason tournaments. His contributions were later recognized when he was elected to the ACU Wildcat Sports Hall of Fame in 2010, and the Jim Womack Award is now given annually to a former ACU student-athlete who excelled in athletics and academics. Jim received a BS in mathematics education in 1964, after marrying his college sweetheart, Raby Beakley, in 1963.

Introduction to Genetics

During his third year at ACU, Jim decided he wanted to go to dental school but had not taken any biology courses, having only focused on math, physics, and chemistry. To obtain the required eight hours of biology courses, he took comparative anatomy, which was required for dental school. Because the anatomy course had three labs each week, he had to find another biology course that didn't have a lab in order to continue playing basketball. The only biology course without a lab at ACU was genetics. After begging the professor to enroll without the proper prerequisites and being told he likely wouldn't pass because he was an athlete, Jim took this on as a challenge. He bought the textbook, written by Irwin Herskowitz 10 years after the discovery of the structure of DNA by Watson and Crick, and read it before the course even started to prove the professor wrong. During the course, Jim became fascinated by genetics and decided to become a geneticist. As with most of his endeavors, he excelled in the course, and the same professor that initially showed little faith in his abilities became a friend, wrote letters of recommendation, and helped him get into a PhD program on a NASA Fellowship at Oregon State University, where he could also partake in his lifelong enjoyment of flyfishing.

Jim joined the lab of Dr. Ralph Bogart in the Department of Animal Sciences, where his dissertation research was on the effects of X irradiation on genetic traits in mice, with his first research paper reporting the effects of irradiation on selection response in mice. He graduated

with a PhD in genetics in 1968, after which he returned to ACU as an assistant professor of biology and was quickly promoted to an associate professor. Although Jim immensely enjoyed teaching, he also wanted to develop a research program in genetics. While at ACU, he started investigating the genetic variation in rat isozymes and initiated his career in comparative genetics using isozyme variation across species. During summers of 1971 to 1974, Jim and Raby supervised The Jackson Laboratory (JAX) Summer Research Program for college undergraduate students in Bar Harbor, Maine, and in 1975, Jim accepted a staff scientist position at JAX, where he shifted to a research-centric career.

Comparative Genomics in Agriculture

After a few years of focusing on his research at JAX, Jim began missing the teaching component and started to look for other opportunities. In 1977, he accepted an associate professor position at Texas A&M University as part of a comparative medicine program between Texas A&M College of Veterinary Medicine and Baylor College of Medicine. His appointment was in the Department of Veterinary Pathobiology. At Texas A&M, Jim sensed his professional career in Texas might be more quickly advanced by a research program more appropriate for the Texas culture. So, at the prompting of his colleague and good friend, Stephen O'Brien, Jim pivoted away from mouse genetics and developed a comparative genetics program for cattle, which eventually included other species such as sheep, goats, dogs, cats, pigs, and horses. He was promoted to professor in 1983, and two years later, he received the W.P. Luse Endowed Professorship. His work in cattle quickly gained national attention, including the lay press. During the national network debut of "Star Wars" on February 24, 1984, Charles Osgood noted during a news break, "A scientist at Texas A&M says humans and cows are a perfect match in gene traits and that cows can be used in experimental research. That may seem like a good idea in Texas, but elsewhere mice may seem easier to get into those little cages."

Jim's scientific contributions spanned nearly 50 years, from the earliest days of comparative mammalian genetics to the sequencing of the cattle genome. Of his many scientific contributions, he was best known for developing the first comparative synteny map of the cattle genome, which was instrumental in anchoring linkage groups to their proper chromosomes. His seminal paper that launched the field of comparative agricultural genetics was published in 1986 (J. E. Womack and Y. D. Moll; Gene map of the cow: Conservation of linkage with mouse and man; *J. Heredity* 77:2-7). These studies revealed the deep conservation of chromosome organization in mammals, opening the door to the explosion in comparative genomics in farm animals and other species. Jim was integral to the origin of the word "genomics," proposed in 1986 by Tom Roderick of JAX one evening over beers during a human genome meeting with Tom Roderick, Stephen O'Brien, and Tom Shows, for the name of a new scientific journal. Genomics subsequently became synonymous with an entirely new scientific discipline pioneered by Jim. His near complete shift from experimental genetics using mice and rats to agriculture species in the mid-1980s was due to an unfortunate accident when a thermostat malfunctioned in his animal room, resulting in the death of most of his rodent stocks. Like most challenges, Jim overcame this setback and continued to excel in the new field of comparative genomics. He was instrumental in launching the NIH/USDA Bovine Sequencing Initiative with Richard Gibbs of

Baylor College of Medicine and served as the first coordinator for the USDA Cattle Genome Research Program. During his career, Jim published over 380 peer-refereed scientific publications and several hundred abstracts and other publications. His influence extended well beyond cattle and agriculture. For many years, he provided lectures at the “Short Course in Medical and Experimental Genetics” at JAX. One of his favorite sayings at the course was “humans are excellent models for genetic analysis of other animals.” As his scientific stature grew, he and his wife Raby traveled widely as an invited speaker at many conferences, universities, and research centers.

Dedication to Trainees and Colleagues

Jim was a consummate mentor and friend to both his students and colleagues. Throughout his career he taught both undergraduate and graduate classes and was an outstanding mentor. Jim noted later in his career that his students were a large part of the success he enjoyed in research. He trained over 50 graduate students and dozens of pre- and postdoctoral students and residents and was host to countless visitors and scientists from many countries across the globe. Jim was particularly inspired by teaching undergraduate students. He once said in an interview, “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.”

His dedication to trainees was recognized by a 2009 Student-Led Award for Teaching Excellence by the Texas A&M University System, and in 2010 with the Texas A&M University Faculty Distinguished Achievement Award for Graduate Student Mentoring. His commitment to student education led Jim and Raby to establish the Raby and Jim Womack Endowed Basketball Scholarship at ACU, and upon his retirement in 2018, his former graduate students honored him “for the impact he made in the classroom and in his laboratory” with The James Womack Endowed Fund in Animal Genomics at Texas A&M.

Research Accolades

Jim’s transformative research was recognized through numerous awards. These include the 1993 CIBA Prize for Research in Animal Health (Basel, Switzerland), 1999 election to the National Academy of Sciences and Fellow of the American Association for the Advancement of Science, and the 2001 Wolf Prize in Agriculture (Israel), considered by many to be the Nobel Prize within the field of agriculture. Jim was also named a University Distinguished Professor at Texas A&M in 2001 and a 2013 Oregon State University Alumni Fellow, and he was recognized with the 1996 Outstanding Texas Geneticist Award from the Texas Genetics Society, 2006 Distinguished Service Award from the Texas Genetics Society, 2006 Outstanding Alumnus of the Year by Abilene Christian University, 2008 George Bush Award for Excellence in International Research by Texas A&M, and 2016 American Association of Veterinary Medical Colleges (AAVMC) Excellence in Research Award.

Jim was also widely appreciated for his outstanding service to the scientific community. He served as president of the Texas Genetics Society (1989), the first coordinator of the USDA-NRSP8 Bovine Genome Program (1993-2008), executive vice president of the American Genetic

Association (1996-2003), and president of the International Society for Animal Genetics (2000-2006). Jim also served on the editorial boards for *Genomics*, *Journal of Heredity*, *Biochemical Genetics*, *Animal Genetics*, *Mammalian Genome*, *Genome Research*, and *Animal Biotechnology*.

Retirement

Jim went into partial retirement in 2017 to help care for his wife Raby, but he remained active at Texas A&M, where he continued to help colleagues, taught genetics to more than 80 undergraduate students each year, and maintained an active research program. For all of these accomplishments, Jim would quickly say that his greatest love was people, his family and friends, his students, and his faith in God. Jim and his wife Raby spent much of their time in recent years on their ranch outside of College Station, Texas, where they raised cattle and horses and looked after their dogs. The Womacks had two children, Wendy and James M. (Jimmy, now deceased), and two grandsons, Quaid Faltys, who followed in his grandfather's "almost" footsteps by becoming a dentist, and James Hamlin (J. H.) Hill, who shared Jim's love of fishing. Jim loved flyfishing with friends in a clear Colorado stream in early summer, floating the rivers in Montana with his son Jimmy, and more recently teaching his grandson, J. H., to catch bass in his farm pond. Often visitors were invited to the ranch for an afternoon of great conversation, fishing, and the Womacks' famous Texas hospitality. By his side through this journey was Raby, Jim's wife of 60 years, whom he called "a great teacher" and who, now retired, had a 30-year teaching career in College Station, Texas. He once said that "She's a whole lot smarter than me; I have been blessed."

Dr. Jim Womack was truly a giant in the field of mammalian genetics and genomics, and through his leadership, he helped to usher in the era of cattle genomics. In his chapter "Mapping genes is good for you" in the 2019 *Annual Review of Animal Biosciences*, he wrote, "I have had the pleasure of working with outstanding graduate students, postdocs, and colleagues to contribute my small part to a discipline that has evolved from a few individuals mapping an orphan genome to a discipline underlying a revolution in animal breeding."

His many colleagues, former students, and friends will miss him greatly. His friends and colleagues offer their condolences to Raby and their family. May his memory be a blessing. The family asks that contributions be made to the Texas A&M Foundation, 401 George Bush Drive, College Station, Texas 77840. Please designate The Jim Womack Endowed Fund in Animal Genomics in the memo line. Online contributions can be made at <http://give.am/JimWomackEndowedFund>.



Jim and Raby Womack at their 60th wedding anniversary party in 2023.



Jim with one of his prized catches from the pond on his ranch.



Students and colleagues who got together to share their stories of Jim after his memorial on August 18, 2023. Front row, left to right: Donna Foyt, Al Dietz, Debbie Threadgill, Steve O'Brien, Harris Lewin, Gus Cothran, Jan Elliot, Tim Elliot, Penny Riggs, and Marian Cothran. Back row, left to right: Lei Li, Stephanie McKay, Loren Skow, Holly Neibergs, Ann Ryan, Dan Gallegher, Brian Davis, Bill Murphy, David Threadgill, Jim Derr, and Jackie Derr.