IN MEMORIAM

EUGENE H. WISSLER

Dr. Eugene H. Wissler, Professor Emeritus of chemical engineering, was born in Cherokee, Iowa, in 1927 and passed away June 26, 2018, at his home in Montgomery, Texas. Gene was a distinguished scholar, researcher, and professor. He was a highly innovative researcher in the field of human thermal regulation whose pioneering work was recognized and appreciated around the world. Gene was an early and ongoing contributor to the establishing of biomedical engineering as a discipline at The University of Texas and to building the reputation of UT for research excellence in this field. He also served in major administrative roles for in the Department of Chemical Engineering, the College of Engineering, and the Graduate School, leaving a lasting legacy for UT Austin that benefited countless students and colleagues.

Gene had held the Henry Beckman Professorship since 1972. He retired from the University in 1997, remaining in Austin until moving to Bentwater, Montgomery, Texas, in 2004 to be closer to his four young grandsons. He is survived by his wife of sixty-seven years, Pat, his son Gerry, daughter Neysa, and her husband Alan Thorell and their four sons. Gene's son Konrad died in 2012.

Gene graduated from high school in Storm Lake, Iowa, in 1946, where he was an honor student and played football, basketball, and track and field, doing shot put and relay races. On off days, Gene hunted and fished with his father.

The winter he was thirteen, Gene and his six-year-old brother went sledding on a frozen lake. His brother slid onto some thin ice that cracked, sending him into the cold, deep water. Gene heard the cracking of the ice and ran to help. He eased himself out to the hole on some thicker ice

and pulled his brother out of the lake. He took off his jacket and wrapped it around his brother, putting him on his sled then running as fast as he could the several blocks home where his parents cared for the shaking and shivering boys. From an early age, Gene showed concern for others, a trait that carried through in his approach to teaching, advising, and research.

Gene graduated from Iowa State University in 1950 with a degree in chemical engineering. At the University of Minnesota, Gene had two Atomic Energy Commission Graduate Fellowships. Gene's supervisor was Dr. Neil Amundson, who had access to the government's super computer in Washington, D.C., during the war years. Because of Dr. Amundson's connections, Gene was able to use the super computer to complete his complex calculations for his thesis, "The Transient Behavior of A Two-Phase Natural Convection Loop." Gene was the first American student after the war to be allowed to use this computer.

In 1955, after receiving his Ph.D. from the University of Minnesota, he was drafted into the United States Army. Gene did his basic training at the Fort Knox Army Base, Kentucky, and was then assigned to the Army Medical Research Laboratory (AMRL) located on the Fort Knox Base. The lab was mainly operated by civilian government employees. AMRL was doing research on human temperature, but they did not know how to translate their information into computer language. They hoped Gene and his computer knowledge could help them. Dr. Molnar, a physiologist and civilian employee, was his supervisor.

In 1956, Dr. Ken Kobe, Chairman of chemical engineering, contacted Gene about coming to The University of Texas. Dr. Kobe had learned that some universities had obtained early releases for enlisted soldiers to teach. He thought he could get an early discharge for Gene. Several Texas congressmen, Senator Lyndon Johnson, and even President Eisenhower were supportive of the request, acknowledging the need for knowledgeable men to teach America's young people.

The Secretary of the Army did not approve Gene's early release, however, saying that army research was as important as civilian research. Gene withdrew his request.

After Dr. Kobe's efforts on his behalf, Gene felt an ethical obligation to come to The University of Texas. He saved his furlough time and was released from the army in June 1957. That summer he was employed by the Oak Ridge National Laboratory, and in the fall, Gene joined the chemical engineering faculty at UT. He taught one course in the chemical engineering department and one course in the physics department each semester for the next two years. At this time, the College of Engineering was interested in having a nuclear reactor and developing a department of nuclear engineering under the umbrella of one of the existing departments.

In the summer of 1958, Gene attended the Atomic Energy Commission (AEC) Summer Institute of Nuclear Reactor Theory at the University of Michigan. Meanwhile, talks continued at UT regarding the design of a nuclear reactor to be built, and Gene made drawings for a swimming pool reactor. The committee of professors could not agree on what size the reactor should be or where it should be located. These decisions would affect the kind of research that could be done. Gene spent the next three summers working with three companies that were related to reactor theories and nuclear engineering: the General Dynamic Co. Nuclear Division in Fort Worth, Texas; Savannah River National Laboratory in Akin, South Carolina; and General Atomic in San Diego, California. Later, Gene went to Marathon Denver Research Center in Littleton, Colorado.

In 1961-62, Gene returned to the University of Michigan to finish his post-doctoral work in nuclear engineering as a National Science Foundation Science-Faculty Fellow in Nuclear Engineering. On his return to UT, he learned that the selected pool size was small and was to be built between Taylor Hall and the old chemical engineering building. Gene felt that this design was not adequate for important research.

Gene was appointed to be the University's representative to the Oak Ridge Laboratory. Certification was required by the AEC in order for the University to have and use a reactor, requiring him to go to Oak Ridge, Tennessee once a year to maintain the certification for The University of Texas. He did this for ten to fifteen years.

In 1968, when Dr. John McKetta became Dean of Engineering, Gene became Chairman of chemical engineering. In 1970, Dr. Earnest Gloyna became Dean of Engineering, and Gene became the Associate Academic Dean.

Both Dr. Gloyna and Gene worked with Dr. Delco, the President of Huston-Tillotson College in Austin to develop a program where H-T students could take core courses at H-T and then transfer to UT Austin to pursue a degree in engineering. They also developed two new engineering degree programs: the Engineering-Science Program, of which Dr. Wissler was Chairman for two years, and the Bio-Medical Program, which eventually became the Department of Biomedical Engineering. Gene was asked to be the first chairman of the new biomedical department, but he declined.

In 1981, Gene became the Associate Academic Dean of the Graduate School, where he served for twelve years. While Associate Dean, Gene wrote a computer program for UT's faculty leave processes ensuring that leaves would be more evenly distributed. Gene believed that the leave process should be equitable for all, and his computer expertise made this possible.

In 1993, he returned to full-time teaching in the chemical engineering department.

Gene developed his mathematical model of the human thermal system, which he said was "the geometric arrangement of the elements and circulatory system," from his early work at the AMRL when he was a soldier working with Dr. Molnar. In 1957, at UT, Gene began to study

physiology and the human circulatory system. He then applied his math, physics, and computer knowledge to develop his mathematical model.[1]

In the early days of the National Aeronautics and Space Administration (NASA), Gene worked with McDonnell Douglas personnel to design and develop space suits. His mathematical model's calculations were used in the space suits' development. The hot and cold extreme temperatures in space had been a challenge.

Gene's early work also included consulting with Norwegian researchers, who had concerns about deep sea diver survival in frigid ocean water. They wanted to know precisely how long a diver could survive before experiencing hypothermia. Gene's model calculated the time to within two seconds, which greatly impressed the Norwegian researchers.

Gene consulted with personnel at the San Antonio Air Force Burn Center, using his model to make calculations that were helpful in the treatment of severe burn patients. Gene's mathematical model and its application in thermodynamic research have been used beyond the United States on the Arabian Peninsula and in countries such as England, Australia, Norway, Germany, Japan, China, Qatar, Slovina, and Israel, to name a few. Many governmental, military, university, and private institution researchers are aware of his dynamic model and its usefulness in a wide variety of applications.

In 2016-17, Gene's final research project was with the U.S. Navy and highly secret. Using his mathematical model, he wrote a computer program in Fortran language for the project.

In 2011, Gene was the historical keynote speaker at the U.S. Army Medical Research Material Command's Fiftieth Anniversary. He spoke about the research, development, and

[1] References in the publication of *Bulletin of Mathematical Biology* Volume 26, 1964.

refinement of his model. It had been fifty-six years since he had been a private in the army working at the Fort Knox Army Medical Research Laboratory where he began his study of physiology and his human thermal model, which would ultimately consume his professional life.

Gene was a prolific published author, with hundreds of articles in numerous publications. Gene was listed in the 1991 publication of *Who's Who in America*.

In retirement, he contributed a chapter to the book *Protective Clothing: Managing Thermal Stress* (2014) by the Textile Institute. Gene finished writing his book *Human Temperature Control* in 2017 and was in the final stages of proof reading when he died June 26, 2018. Several colleagues and his daughter completed the proof reading. The book was published in September 2018.

In the preface to *Human Temperature Control*, Gene says he wrote the book to help others interested in the subject understand temperature control in humans. Gene also acknowledged the important role of The University of Texas at Austin's libraries played in his pursuit of his research, and he extended his gratitude for their service.

Gene became a member of the Town and Gown Club in 1973 and served as Secretary-Treasurer (1980-93) and President (1993-96). The Town and Gown Club began in 1902 when a group of faculty members and an equal number of men from town (the city of Austin) would get together once a month for food and enlightened discussions. Women are now members of the organization. The group had their Centennial Celebration in 2002. Gene was on the Centennial Committee and was one of the Centennial Book Editors.

Professional societies to which Gene belonged include:

American Institute of Chemical Engineers
American Society of Mechanical Engineers
Aerospace Medical Association
Undersea Medical Society
Texas Registered Professional Engineer

Gene served as one of the faculty members on the selection committees for three Presidents of the University: Lorene Rogers, Peter Flawn, and Stephen Spurr.

When President George H.W. Bush gave the commencement address at UT Austin, Gene was one of the faculty members selected to sit on the stage behind the podium.

Gene came to the University with the goal of teaching young men and women, and his students were always his first concern. He maintained an open-door policy to undergraduates and graduates alike. As the years passed, Gene had more and more foreign students. They were grateful for his patience and encouragement in his role as their advisor and professor.

This is what one former student recently wrote after learning of Gene's death:

> To me, Gene was not only a great advisor, he actually saved my and my family's lives. When in July 1979 I called him from Austria to let him know that I was out of Iran, he immediately said, "We need to get you here right away." He said he will send me an offer for a post-doctoral position so I can get a visa. He did not have a position but said he will work out something. By that afternoon, he had started the paperwork process. Coincidentally that same afternoon, Professor Billy Crynes from Oklahoma State University, who was looking to hire a visiting professor, called to ask him about me. By the next day I received a telegram from Professor Crynes offering me a teaching position at OSU. As they say, the rest is history, but Gene was there for me at the most critical moment of my life.

From the Memorial Resolution Faculty Committee (Professors Kenneth R. Diller (Chair), Thomas F. Edgar, and John S. Swinnea):

> Gene was a true international pioneer in adapting the principles and methods of engineering analysis to understanding the complex and highly nonlinear operation of the human thermoregulation system. He was particularly well-known for the computer simulation model that he developed for human thermoregulation. He continued to expand and refine this extremely complex model for more than a half century, and it was adopted for the design of life-saving devices and techniques by the military in many countries, by diverse industries, and by the National Aeronautics and Space Administration (NASA). Gene had colleagues from around the globe solicit his help as a collaborator or advisor in studying and simulating a wide range of problems with the human thermoregulatory function. He was the acknowledged thought-leader concerning how the body is able to defend its core temperature in the face of extreme, adverse external thermal environments and intense levels of physical exercise. The model was tested for many diverse applications ranging

from mountainous military operations, to sea diving at extreme depths (and pressures), to medical procedures involving internal thermal therapies.

During his career, thermal biology came to be recognized as an important component of medicine and physiology, with increasing numbers of younger colleagues becoming engaged in this field of research. Gene was often called on to provide critical commentary on new theories and analyses postulated by others, which he did with honesty and depth of insight. His own work was characterized by a consistently high level of mathematical rigor and physiological interpretation and was viewed with deep respect throughout the world.

Gregory L. Fenves, President
The University of Texas at Austin

Alan W. Friedman, Secretary
The General Faculty

This memorial resolution was prepared by Pat Wissler and endorsed by a special committee consisting of Professors Kenneth R. Diller (Chair), Thomas F. Edgar, and John S. Swinnea.