Professor ROBERT SKELTON

For decades, Robert E. Skelton’s research has focused on integrating system science with material science to create new material systems.

His contributions to innovative engineering serve humankind in outer space and on Earth.

Skelton joined the faculty at Purdue University in 1975, where he served for twenty-one years as a professor of aeronautics and astronautics. He directed the Structural Systems and Control Laboratory for Purdue’s Institute for Interdisciplinary Engineering Studies from 1991 to 1996. He created the Systems and Control Program there.

In 1996, Skelton moved to the University of California, San Diego (UCSD), where he founded the university’s Systems and Control Program and became director of UCSD’s Structural Systems and Control Laboratory. In 2006, UCSD named Skelton the Daniel L. Alspach Professor of Dynamics Systems and Controls in the Jacobs School of Engineering and professor emeritus in 2009.

Skelton pioneered the mathematical description of tensegrity structures and developed the analytical tools to efficiently model, design, and control them. Derived by combining “tension” and “integrity,” the term “tensegrity” describes materials composed of strings and rods. His papers have helped explain the tensegrity nature of the cytoskeleton of red blood cells and of the molecular structure of nature’s strongest tensile material, the spider fiber. Tensegrity materials can change shape by altering their string tension. They can change shape without changing stiffness. They can change stiffness without changing shape. This ability to adapt allows tensegrity to produce material systems that can modify their acoustic, electromagnetic, or mechanical properties. In addition, tensegrity structures may include embedded actuators, sensors, and power-storage devices. This versatility makes tensegrity an attractive alternative to conventional design.

Skelton earned a bachelor’s degree in electrical engineering from Clemson University in 1963; a master’s degree in electrical engineering from the University of Alabama, Huntsville, in 1970; and a doctorate in mechanics and structures from the University of California, Los Angeles, in 1976.

Skelton received the Japan Society for the Promotion of Science Award in 1986, the Humboldt Foundation Senior US Scientist Award in 1991, the Norman Medal from the American Society of Civil Engineers in 1999, and the Humboldt Foundation Research Award in 2011. The National Aeronautics and Space Administration recognized Skelton in 1974 with the SKYLAB Achievement Award and again in 2005 with a NASA Appreciation Award for his service to the Hubble repair missions.

Skelton became a member of the National Academy of Engineering in 2012. He is a fellow of the Institute of Electrical and Electronics Engineers, a fellow of the American Institute of Aeronautics and Astronautics, and a life member of the Alexander von Humboldt Foundation, a non-profit foundation in Germany established to promote cooperation in international research.

He has published four books: Model Error Concepts and Compensation (1986), Dynamic Systems Control (1988), A Unified Algebraic Approach to Control Design (1996), and Tensegrity Systems (2009).