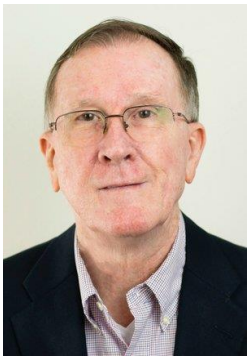
University Professor Emeritus James Faulk Hinton



James Faulk (Jim) Hinton, Jr. was born on May 5, 1938, in Bessemer, Alabama, to James Faulk Sr. and Ouida Elva Hinton. He passed away on July 20, 2019 in Fayetteville, Arkansas. He is survived by his wife, Barbara Elizabeth Hinton; three sons, James David Hinton, Robert Edward Hinton and Thomas Wade Hinton; and five grandchildren. The funeral service was held on July 27 in Fayetteville, Arkansas.

Jim received his B.S. degree in 1960 from the University of Alabama, and his M.S. in 1962 and Ph.D. in 1964 from the University of Georgia working with Professor J.F. Johnson.

Jim joined the Department of Chemistry at the University of Arkansas as a postdoctoral student working with Professor Ed Amis in 1965. He was appointed Assistant Professor in 1967, was promoted to Associate Professor in 1971, Professor in 1975, University Professor in 1989, and University Professor Emeritus in 2016.

Jim Hinton was a pioneer in the development of Nuclear Magnetic Resonance (NMR) techniques to study important chemical and biological systems. He established the NMR Core Facility at the University of Arkansas in 1971 with an NSF grant to purchase the first major NMR spectrometer at UA, a Bruker HFX-90. Jim went on to receive additional grants to fund state-of-the-art NMR spectrometers, including a Department of Education grant to purchase the first high field superconducting NMR at UA, a Bruker 500 MHz NMR. He then wrote the section of the NIH COBRE grant in 2000 to fund and set up 500 and 700 MHz NMR spectrometers with high-sensitivity cryo-microprobes. He was director of the NIH NMR Core facility until his retirement to University Professor Emeritus in 2016.

As director of the NIH NMR Core Facility, Jim worked closely with faculty and students to develop new NMR techniques to address the goals of their projects. He developed new NMR pulse sequences to examine both the structure and dynamics of proteins. These NMR techniques are being used to determine the structure and function of proteins that have important roles in human health, including heart disease, brain function, wound healing, and cancer. As University Professor Emeritus, Jim continued to work closely with students and colleagues to use NMR to address important biomedical problems.

Jim Hinton developed an Immersive 3D Virtual Reality system that allows immersion of an observer into a protein, in order to walk around and inside a protein structure to understand how it functions. UA students and faculty use this system to view the protein structures they have determined by NMR and X-ray crystallography, and to design new experiments to understand the function of the protein. Many students and visitors have experienced this Virtual Reality system and have been fascinated by its potential use in many biomedical fields including drug design.

Jim was a pioneer in the study of the role of monovalent cations such as Na^+ and K^+ in biological systems. He developed the Thallium 205 (Tl^{205}) NMR method to study the binding and transport of monovalent cations across biological membranes by ionophore antibiotics such as valinomycin, monensin, nigericin, nonactin, and dinactin. His studies on the thermodynamics and kinetics of monovalent cation binding to these antibiotics provided greater insight into their mechanism of action, which could lead to the development of improved antibiotics.

Jim and his students and colleagues then focused their research on how monovalent cations are transported across biological membranes by the channel-forming ionophore gramicidin A. Using Tl-205 NMR, they determined the thermodynamics and kinetics of cation binding to gramicidin. Jim developed 2D NMR techniques to determine the complete three-dimensional structure of gramicidin in biological membranes, as well as the backbone and side-chain dynamics. Cation transport is critically important to the transmission of nerve impulses from one brain cell to another, and down the nerve cell axon to stimulate the muscle. Their research provided insight into many neurological and neuromuscular diseases.

Jim Hinton also worked with colleagues to develop improved theoretical methods to study biological systems. One of his papers with Professor Pulay is the most cited scientific article to come from the state of Arkansas. (K. Wolinski, J.F. Hinton and P. Pulay, "Efficient Implementation of the GIAO Method for NMR Chemical Shift Calculations," JACS, 112, 8251 (1990))

Jim Hinton was an outstanding teacher and mentor to undergraduate honors students and graduate students and directed the dissertations of 26 Ph.D. students. His graduate courses were popular and graduate students held him in high esteem. He has published over 150 articles in peer-reviewed journals with his students and colleagues. Jim's students have done exceptionally well in their careers. Richard Briggs, one of Jim's first Ph.D. students, took a postdoctoral position with Professor George Radda at Oxford University where they developed the Magnetic Resonance Imaging (MRI) technique. Richard Briggs went on to become a pioneer in the development of MRI, which is now one of the most powerful methods of medical diagnosis. Dikoma C. Shungu, who received his Ph.D. with Jim in 1986, is now Professor at Weill Cornell Medical College, and has developed advanced MRI techniques to study neurological and metabolic disorders.