

Dr. Joe Dan Bourland Pampa High School Class of 1960



Dr. Joe Dan Bourland was born to Albert R. (Jack) and Marguerite C. Bourland on March 23, 1942 in Kermit, Texas. Dr. Bourland began his education at Woodrow Wilson elementary school, resumed classes there for the 4th grade after spending intervening years in southwestern Kansas and completed pre-college education in Pampa. At the encouragement of Elaine Ledbetter, his chemistry teacher, he entered the National Science Fair competition. Under mentors Mrs. Ledbetter and Mr. Perry Sikes, Dr. Bourland received second place at the National Science Fair competition in Indianapolis, Indiana, 1960. Following graduation from PHS as Valedictorian and Class President (and following the footsteps of his sister, Jackie, who was PHS Valedictorian in 1957), he entered Rice University and received a Bachelor of Arts in 1965 and Bachelor of Science in Electrical Engineering in 1966. After employment in industry and later at Baylor College of Medicine, he entered graduate school there and received a Ph.D. in Physiology in 1974. Shortly thereafter, he left the medical school with his major professor and mentor, Dr. Leslie A. Geddes, and two colleagues, Drs. Willis A Tacker, Jr. and Charles F. Babbs. to establish the Hillenbrand Biomedical Engineering Center at Purdue University, where he has conducted research and taught courses in Biomedical Engineering.

Dr. Bourland's research interests have been primarily in the areas of cardiovascular physiology and biomedical instrumentation. He has lead two major projects in the Center: 1) development of an Automatic Implantable Cardioverter/Defibrillator (AICD) and 2) an investigation of the safety of magnetic resonance imagers (MRI). Ventricular fibrillation is a life-threatening cardiac arrhythmia and frequently causes death in patients suffering a heart attack. An AICD is an electronic device, similar to but larger than a cardiac pacemaker, that can be implanted within the body to constantly monitor cardiac activity. When an AICD detects ventricular fibrillation, it automatically delivers an electrical shock to the heart that terminates the malignant arrhythmia and saves the patient's life. Two patents awarded from the research were sold to a medical device manufacturer for an amount that exceeded the cumulative sum accrued by Purdue University for intellectual property at the time of sale. More importantly, thousands of patients per year experience a much-improved quality of life due to this innovative technology.

Magnetic resonance imagers (MRI) are diagnostic devices that provide exquisite images of the internal structures of the body, normally without invasion or unpleasant sensation. However, prior to 1996, the quality of MRI images was limited by patient motion during data acquisition; in addition, many patients could not be scanned because of the long scan times. Patient costs were high because each MRI scanner could accommodate only a few patients per day. MRI fast-scan techniques promised to overcome these limitations, but could not be introduced because of Federal Drug Administration (FDA) regulations and concern for patient safety in fast-scan imagers. Of paramount concern was alteration of cardiac rhythm in patients by the magnetic fields used by fast-scan imagers. Research results produced by the team lead b@N Dr. Bourland permitted the FDA to relax guidelines and manufactures to introduce fast-scan imagers. Fast-scan systems now available permit evaluation of patients and structures not previously visualized and have given rise to procedures providing new diagnostic and scientific data. An important aspect of Dr. Bourland's efforts is that the educational experience of many students has been enriched by their participation in the research.