Abstract – The first integrated silicon sensors based on microelectronic technology were developed in the 1960s for medical applications. Today, they have evolved into integrated microsystems combining micropower circuits, wireless interfaces, sensors, wafer-level packaging, and energy-scavenging power sources. Catheter-tip pressure sensors have grown into smart cardiovascular stents and 1mm³ wireless devices for treating glaucoma. Neural interfaces are launching revolutionary advances in neuroscience and in prostheses for deafness, blindness, epilepsy, Parkinson’s disease, and other disorders. This talk will examine the factors that limited the development of implantable microsystems in the past and continuing challenges for the future. Such devices are poised at last to provide important breakthroughs in health care. This talk is based on a plenary presentation made at the Solid State Sensors, Actuators, and Microsystems Workshop at Hilton Head Island, SC, in June 2012.

Bio – Kensall D. Wise received the B.S.E.E. degree from Purdue University, West Lafayette, IN, in 1963, and the M.S. and Ph.D. degrees in Electrical Engineering from Stanford University, Stanford, CA, in 1964 and 1969, respectively. From 1963 to 1965 and from 1972 to 1974, he was a Member of Technical Staff at Bell Telephone Laboratories. In 1974, he joined the University of Michigan, where he is now the William Gould Dow Distinguished University Professor of Electrical Engineering and Computer Science, the J. Reid and Polly Anderson Professor of Manufacturing Technology, Professor of Atmospheric, Oceanic, and Space Sciences, and Professor of Biomedical Engineering. He was the founding director of the WIMS Research Center. He holds the 2007 Henry Russel Lectureship at the University of Michigan, is a Life Fellow of the IEEE, a Fellow of the AIMBE, and a member of the United States National Academy of Engineering.