

Munushian Visiting Seminar Series

Friday, November 2, 2007



Dr. Kensall Wise

University of Michigan, Ann Arbor

“Wireless Integrated MicroSystems (WIMS): Coming Revolution in the Gathering of Information”

Hedco Neuroscience Building (HNB 100)

Lecture 3:00 PM

Hosted by Prof. Hossein Hashemi

Abstract

Wireless integrated microsystems promise to become pervasive during the coming decade in applications ranging from health care and environmental monitoring to homeland security. Merging low-power embedded computing, wireless interfaces, and wafer-level packaging with microelectromechanical systems (MEMS), the resulting button-sized modules will serve as smart information-gathering nodes that will effectively wire the planet, extending communication networks to a wide range of new information-gathering applications. These microsystems will be 1cc or less in size, dissipating less than 1mW and communicating over ranges from 1cm to 1km or more. They will be built on generic platforms that are digitally compensated and self-testing, customized by software and by front-end sensor selection. This talk will highlight several emerging microsystems. A wristwatch-size environmental monitor is being developed to measure parameters such as pressure, temperature, humidity, and air quality. The microsystem includes an integrated gas chromatograph capable of analyzing complex gaseous mixtures with sensitivities in the parts-per-trillion range and response times of a few seconds. It offers exciting possibilities for enhancing homeland security and reducing global pollution. A chronically-implantable neural microsystem integrates high-density three-dimensional microelectrode arrays with embedded signal processing and wireless telemetry. Such neural interfaces are creating breakthroughs in neuroscience and offering new hope for the treatment of disorders such as deafness, blindness, paralysis, and Parkinson's disease.

Bio

Kensall D. Wise received the BSEE degree with highest distinction from Purdue University in 1963 and the MS and Ph.D. degrees in electrical engineering from Stanford University 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, where his work was concerned with the exploratory development of integrated electronics for use in telephone communications. From 1965 to 1972 he was a Research Assistant and then a Research Associate and Lecturer in the Department of Electrical Engineering at Stanford, working on the development of micromachined solid-state sensors. In 1974 he joined the Department of Electrical Engineering and Computer Science at the University of Michigan, Ann Arbor, where he is now the J. Reid and Polly Anderson Professor of Manufacturing Technology and Director of the Engineering Research Center for Wireless Integrated MicroSystems. His present research focuses on the development of integrated microsystems for health care and environmental monitoring.

Dr. Wise organized and served as the first chairman of the Technical Subcommittee on Solid-State Sensors of the IEEE Electron Devices Society (EDS). He was General Chairman of the 1984 IEEE Solid-State Sensor Conference, served as IEEE-EDS National Lecturer (1986), and was Technical Program Chairman (1985) and General Chairman (1997) of the IEEE International Conference on Solid-State Sensors and Actuators. Dr. Wise received the Paul Rappaport Award from the EDS (1990), a Distinguished Faculty Achievement Award from the University of Michigan (1995), the Columbus Prize from the Christopher Columbus Fellowship Foundation (1996), the SRC Aristotle Award (1997), and the 1999 IEEE Solid-State Circuits Field Award. In 2002 he was named the William Gould Dow Distinguished University Professor at the University of Michigan. He currently holds the 2007 Henry Russel Lectureship at the University, is a Life Fellow of the IEEE, and is a member of the United States National Academy of Engineering.