

Seminar on

Venturing to Signal Detection Beyond THz On CMOS Technology

by

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Abstract

The advance in terahertz science and technology development has drawn a significant attention recently, as the last frequency spectrum (300 GHz to 10 THz) awaiting human exploration. On the other hand, the Moore's law, which dictates semiconductor technology advancement in speed and miniaturization, may cede to nano-lithography in another decade ahead, suggesting alternative paths to tackle the THz technology barrier a necessity. This presentation sheds a light on the potential use of microelectronics with devices at the moderate speed of 60 GHz, however, capable of detection and processing of signal amplitude beyond THz band, at 28 THz in the far-infrared zone. A synergy in electromagnetic study and thermal behavior investigation will be discussed, enabling a successful detection of 28 THz signals using a 0.18 micron CMOS foundry technology. A brief conclusion will be followed by comments and feedbacks from audiences.

Biography

Ching-Kuang Clive Tzuang (S'80–M'80–SM'92–F'99) received the B.S. degree in electronic engineering from National Chiao Tung University, Hsinchu, Taiwan, in 1977, the M.S. degree from the University of California at Los Angeles (UCLA), in 1980, and the Ph.D. degree in electrical engineering from The University of Texas at Austin, in 1986. From 1981 to 1984, he was with TRW, Redondo Beach, CA, where he was involved in the design of the high-speed analog and digital data converter integrated circuits (ICs). In 1986, he became an Associate Professor with the Institute of Communication Engineering, National Chiao Tung University, and a Full Professor in 1991. In February 2004, he joined the Graduate Institute of Communication Engineering, Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan, where he conducted research on advanced guiding structures for research and development of the RF sensor system-on-chip (SOC), integrating active and passive microwave/millimeter-wave RF signal-processing components into a single CMOS chip. His research activities also involved the field-theoretical analysis and design of waveguide structures and large-array antennas for integrating RF systems in a package. Dr. Tzuang retired as a public servant from National Taiwan University in January 2012, and joined the School of Electronic Information Engineering, Tianjin University, as a distinguished professor, carrying out applications of RF SOC. From 1992 to 1994, he was a team member who supervised the installation of the tracking radar system placed at the Center for Space and Remote Sensing Research, National Central University, Chung Li, Taiwan. He helped execute an eight-year Academic Excellent Program (2000–2008) funded by the Ministry of Education and National Science Council of Taiwan, which focused on the advanced microwave/millimeter-wave RF and communication technology development, leading to the investigation of scaled microwave RF system-on-chip (SOC) technology, and participation in the IEEE 802.15 TG3c 60-GHz wireless personal area network (WPAN) standardization in collaboration with CoMPA, Yokosuka, Japan. He recently explored the feasibility of applying the CMOS technology to the development of terahertz and millimeter-wave SOC, and the RF sensors and system for vehicle detection applications. Since 2007, he has served the Independent Director of the Board of Directors of CyberTAN Technology Inc. He has supervised 29 Ph.D. students and 74 M.S. students. Dr. Tzuang helped establish the IEEE Microwave Theory and Techniques Society (IEEE MTT-S) Taipei Chapter, and was secretary, vice chairman, and chairman in 1988, 1989, and 1990, respectively. Since January 2010, he has been the editor-in-chief for the IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS. He was the recipient of the 2008 Excellent Project Award presented by the Ministry of Transportation and Communications for practically demonstrating the real-time multilane traffic sensor using a CMOS-based lightweight radar.

Date : 27 Apr., 2012 (Friday)
Time : 4:00pm – 5:00pm
Venue : G6302, Academic 1 Building,
City University of Hong Kong

*** ALL ARE WELCOME ***