Karlsruhe Institute of Technology

Institute of Radio Frequency
Engineering and Electronics (IHE)

Researches of Microwave and Millimeter-Wave Integrated Circuits and System Applications

Talk by Prof. Huei Wang, Dept. of Electrical Engineering and Graduate Institute of Communication Engineering, National Taiwan University, Taipei, Taiwan
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In this talk, a brief introduction of semiconductor MMIC/RFIC technologies will be presented. The recent researches of microwave and millimeter-wave (MMW) integrated circuits and system applications at National Taiwan University (NTU) will be described. Based on our development of III-V and silicon-based monolithic microwave/MMW integrated circuits (MMICs), several applications have been conducted. Our MMICs supported a couple of radio telescope systems, namely, Array for Microwave Background Anisotropy (AMiBA), and Atacama Large Millimeter Array (ALMA) systems. A pair of CMOS based 38-GHz transmit/receive chips, together with GaAs pHEMT LNA and PA, have also been developed to support the 38-GHz fifth-generation wireless front-end system, and the electronic beam steering function was successfully demonstrated using a pair of 32-element Tx/Rx phased arrays. The similar 38-GHz transmit/receive chips have modified for an application on the drone to transmit the 8K/4K video in real time for wild animal monitoring. Another developed microwave system is a harmonic radar for the tracking of bees in order to help entomologists to identify the cause of colony collapse disorder (CCD) of the bees. Brief descriptions of each system and application will be presented, along with the microwave/MMW circuit development.

Huei Wang was born in Tainan, Taiwan, in 1958. He received the B. S. degree in electrical engineering from National Taiwan University, Taipei, Taiwan, ROC, in 1980, and the M. S. and Ph. D. degrees in electrical engineering from Michigan State University, East Lansing, Michigan in 1984 and 1987, respectively.

During his graduate study, he was engaged in the research on theoretical and numerical analysis of electromagnetic radiation and scattering problems. He was also involved in the development of microwave remote detecting/sensing systems. Dr. Wang joined Electronic Systems and Technology Division of TRW Inc. since 1987. He has been an MTS and Staff Engineer responsible for MMIC modeling of CAD tools, MMIC testing evaluation and design and became the Senior Section Manager of MMW Sensor Product Section in RF Product Center. He visited the Institute of Electronics, National Chiao-Tung University, Hsin-Chu, Taiwan, in 1993 to teach MMIC related topics and returned to TRW in 1994. He joined the faculty of the Department of Electrical Engineering of National Taiwan University, Taipei, Taiwan, as a Professor in February 1998. He served as the Director of Graduate Institute of Communication Engineering of National Taiwan University from Aug. 2006 to July 2009. He also served as the Associate Dean of the College of Electrical Engineering and Computer Science from Aug. 2016 to July 2018.

Dr. Wang is a member of the honor society Phi Kappa Phi and Tau Beta Pi. He received the Distinguished Research Award of National Science Council, Taiwan, at 2003. He was the Richard M. Hong Endowed Chair Professor of National Taiwan University in 2005-2007. He was elected as an IEEE Fellow in 2006, and has been appointed as an IEEE Distinguished Microwave Lecturer for the term of 2007-2009. Dr. Wang received the Academic Achievement Award from Ministry of Education, Taiwan, in 2007, and the Distinguished Research Award from Pan Wen-Yuan's Foundation in 2008. He has been Life National Chair Professor of Ministry of Education, ROC since 2013. He also has been appointed as the NTU Chair Professor from 2016.

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