

**THURSDAY, MAY 3, 2012****1:30 PM, 260 DREESE LABORATORIES****Dr. Kevin Chen***Distinguished Professor**The Hong Kong University of Science and Technology***Extending the Functionalities of AlGaIn/GaN Heterojunction Devices**

Abstract: AlGaIn/GaN heterojunction devices are the most mature wide band gap GaN-based electron devices in terms of material quality and stability, processing technology, performance and reliability. These devices are already being exploited in commercial products such as RF/microwave power amplifiers and power switches. Meanwhile, the AlGaIn/GaN heterostructures provide such a robust and unique platform that many new device and circuit functions can be implemented, and high-level integrations can be realized.

In this talk, several approaches of extending the functionalities of AlGaIn/GaN heterojunction devices will be presented. A smart power chip technology is developed to demonstrate on-chip mixed-signal sensing/protection/control circuits that promise to provide optimized performance, increased functionality and enhanced reliability to power modules. A lateral field-effect rectifier (L-FER) is shown to enable the single-chip switch-mode power converters. The L-FER is also used for zero-bias microwave mixers and power detectors. To demonstrate the unique physical properties of AlGaIn/GaN heterostructures, a new power transistor, namely the metal-2DEG tunnel junction FET, has been developed for achieving normally-off operation and low OFF-state leakage current.

Bio: Prof. Chen received his B.S. degree from Peking University (1988) and PhD degree from University of Maryland (1993). He has extensive experience in corporate R&D, mainly focusing on compound semiconductor device technologies. He was a research engineer in NTT LSI Labs, Japan from 1994 to 1995, and Agilent Technologies from 1999 to 2000. He is currently a fulltime professor at the Hong Kong University of Science and Technology (HKUST). At HKUST, he has carried out research in GaN electron devices and ICs, GaN-based MEMS, silicon-based microwave passive components and 3D through-silicon-via (TSV) interconnects, and multi-band reconfigurable microwave filters. Currently, his group is focused on developing GaN device technologies for power management and high-temperature electronics applications.

Prof. Chen has more than 250 publications in international technical journals and conference proceedings, and 4 U.S. patents. Prof. Chen is a distinguished lecturer for IEEE Electron Device Society. He is also an associate editor of IEEE Transactions on Microwave Theory and Techniques and Japanese Journal of Applied Physics.

Hosted by: Paul R. Berger

