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HKUST Postgraduates Shine at Chip Olympics

Three postgraduate students from the Department of Electrical and Electronic Engineering at the Hong Kong University of Science and Technology (HKUST) have been invited to present two papers at the International Solid-State Circuits Conference (ISSCC)-also known as the "Chip Olympics"-to be held in San Francisco from 7 to 9 February 2000. This is the third time, and second year running, the research works of Hong Kong researchers are presented at the Conference.

While both papers have different orientations, they involve the design and fabrication of integrated circuits for application such as mobile phones. Postgraduate student Vincent Sin-Luen Cheung's work is an innovative implementation technique that enables analog circuits to achieve high performance under a low voltage supply. Mahender Kumar and Yue Tan's paper demonstrates how a low-cost microfabrication technology can be used to implement the circuitry of a radio frequency (RF) power amplifier, the mobile phone component that is the most difficult one to be integrated onto a single chip.

"For compatibility to the digital part in a system, the analog part needs to be operated at a low supply voltage. In addition, as electronic devices continue to shrink, the electric voltage supplied has to be reduced to keep the devices from being damaged. The industry expects that the supply voltage will drop to one volt by the year 2009," said Dr Howard Luong, Assistant Professor and Vincent Cheung's thesis supervisor. "Today's implementation technologies cannot provide feasible solutions at such a low voltage. The performance of analog circuits drops drastically when the supply voltage is decreased. Vincent's innovative technique enables the industry to develop analog circuits to operate at high speed and at supply voltages below one volt."

For Mahender Kumar and Yue Tan's work, their breakthrough is to use the so-called silicon-on-insulator (SOI) technology to integrate both active (such as transistors) and passive (such as inductors) components for RF integrated circuits implementation. "We choose RF power amplifier to demonstrate our technology because it is the most challenging component to be integrated on a single chip," said Dr Johnny Sin, Associate Professor and thesis supervisor of Mahender Kumar and Yue Tan. "Our success in implementing the RF power amplifier onto a single chip will enable the industry to further shrink the size of a mobile phone by several times. That's why the organizers of ISSCC are interested in our breakthrough."

"Our continued success in getting papers selected by the Conference testifies to HKUST's status as a world-renowned institution," added Dr Sin.

ISSCC is the premier international event in the solid-state circuits field. Semiconductor industry leaders such as Fujitsu, Hitachi, Intel, Motorola, Philips, and Texas Instruments will be using this opportunity to showcase their latest research and technology breakthroughs. Thus, only those papers which generate a high level of industry interest will be accepted for presentation to the Conference.