SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: https://cde.nus.edu.sg/ece

Area: Integrated Circuit & Embedded System (ICES)

Host: Assoc Prof Heng Chun Huat

TOPIC	:	**900-nW 876-MHz -79-dBm-Sensitivity Pulse-Driven MEMS Oscillator based Sub-Sampling OOK/FSK WuR**
SPEAKER	:	**Mr He Zhenbo** **Graduate student, ECE Dept, NUS**
DATE	:	**Monday, 28 April 2025**
TIME	:	**10:00AM-11:00AM**
VENUE	:	**Join Zoom Meeting** **https://nus-sg.zoom.us/j/86398742644?pwd=1CrQjlliYbXwrbqYVSpEwM5wjViuRa.1** **Meeting ID: 863 9874 2644** **Passcode: 472011**

ABSTRACT

This work presents an 876-MHz pulse-driven MEMS oscillator based sub-sampling wake-up receiver (WuRx) to achieve both low power and higher sensitivity. It employed 1) pulse-driven MEMS oscillator to lower the LO power; 2) 12-path sub-sampling mixer-first architecture to lower the energy needed for down- conversion; 3) baseband complex filter to support OOK/FSK modulation with good SIR rejection; 4) transformer-based matching network to achieve passive gain. The WuRx is fabricated in TSMC 40nm CMOS technology, occupying a core area of 1.73 mm2 (excluding MEMS resonator), and it realizes a sensitivity of -79/-73 dBm for OOK/FSK demodulation, respectively, while limiting the system power consumption to 579.5 μW at the continuous mode with the data rate of 160 kbps, and only 900 nW with the duty cycle ratio of 0.14% at 64 bps under 0.8-V supply voltage. In addition, the best SIR of - 20 dB at an offset frequency of 1 MHz is achieved.

BIOGRAPHY

Zhenbo He is currently pursuing his Ph.D. degree under the supervision of Associate Professor Heng Chun Huat in the Department of ECE, NUS. His current research interest is in low-power transceiver design.

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