

SESSION 8 – TAPA III
Data Converters and Biomedical Circuits

Thursday, June 19, 8:30 a.m.

Chairpersons: L. Breems, NXP Semiconductors
M. Ito, Renesas Technology Corporation

8.1 – 8:30 a.m.

A 1.2V 30mW 8b 800MS/s Time-Interleaved ADC in 65nm CMOS, W.-H. Tu, T.-H. Kang, MediaTek Inc. Taiwan

An 8-bit 800MS/s time-interleaved pipeline ADC with SNDR of 47.8dB and 44.2dB for 1MHz and 400MHz inputs is presented. The techniques of Sub-ADC preamp sharing and reference voltage buffer current-reusing are proposed to minimize power consumption. The ADC implemented in 65nm digital CMOS process with an active area of 0.12mm² consumes 30mW from a 1.2V supply and achieves a FOM of 0.28pJ/conversion-step.

8.2 – 8:55 a.m.

A 1.2V 250mW 14b 100MS/s Digitally Calibrated Pipeline ADC in 90nm CMOS, H. Van de Vel, B. Buter, H. van der Ploeg, M. Vertregt, G. Geelen, E. Paulus, NXP Semiconductors, The Netherlands

A 14b pipeline ADC is realized in 90nm CMOS at a 1.2V supply. Enabling techniques are range-scaling in the first pipeline stage with charge-reset and digital background calibration of non-linearity. The ADC achieves 73dB SNR and 91dB SFDR at 100MS/s sampling rate and 250mW power consumption. The 73dB SNDR performance is maintained within 3dB up to a Nyquist input frequency and the FOM is 0.7pJ/conv.

8.3 – 9:20 a.m.

A 64 Channel Programmable Closed-loop Deep Brain Stimulator with 8 Channel Neural Amplifier and Logarithmic ADC, J. Lee, H.-G. Rhew, D. Kipke, M. Flynn, University of Michigan, USA

We describe a 64 channel closed-loop deep brain stimulator IC for use in research and treatment of Parkinson's disease. The system generates programmable stimulation currents and senses and filters neural activity recorded with an 8 channel preamplifier and 200kS/s 8bit logADC. The entire system implemented in 0.18μm CMOS, occupies 2.67mm², and consumes 271μW from a 1.8V supply. In-vivo test data is presented.

8.4 – 9:45 a.m.

A 1-V 450-nW Fully Integrated Biomedical Sensor Interface System, X. Xu, X. Zou, L. Yao, Y. Lian, National University of Singapore, Singapore

This paper presents a 1-V 450-nW fully integrated bio-signal acquisition IC in 0.35-μm CMOS technology which includes a tunable band-pass filter, a variable gain amplifier, and a 12-bit ADC. The ultra-low power is achieved by using an energy-efficient system architecture and a novel tunable band-pass filter. The measurement shows that the overall system draws only 445-nA current from a 1-V supply in the detection mode and 895-nA in the diagnosis mode for electrocardiogram (ECG) applications.