

## **\*Research in Analog Circuits at the University of Michigan\***

This presentation begins with an overview of the research of the analog group at the University of Michigan. The group's work on analog-to-digital conversion circuits, wireless interfaces and serial links is outlined. The second part of the talk focuses on recent work on on-chip serial signaling and on power efficient super-regenerative receivers.

We describe an interconnect scheme based on lossy transmission lines, compare this scheme with traditional bus based links, and present performance data. Unlike some other schemes there is no requirement for up-conversion, equalization, or special metal processing. In preliminary work, we have measured data rates of 14 Gbps (limited by test equipment) over a 7.2 mm interconnection, implemented in 0.18  $\mu$ m CMOS. For active links signaling over a single serial link, is more power efficient than over traditional parallel buses, does not require repeaters and is less affected by noise and coupling.

A fully integrated 2.4-GHz ISM band super-regenerative receiver implemented in 130 nm CMOS is also presented. Several new design features, that take advantage of digital processing, are proposed. A synthesizer scheme tunes the circuit for multi-channel operation. Frequency selectivity is improved through Q-enhancement. The entire receiver occupies less than 1 mm<sup>2</sup>, and consumes 2.5 mA from a 1.2 V supply, with a data rate of up to 500 Kbps, an energy per received bit of 5 nJ/bit, a channel spacing of 10 MHz, and a sensitivity of -80 dBm.

## **\*Biography of Michael P. Flynn\***

Michael P. Flynn was born in Cork, Ireland. He received the B. E. and M. Eng. Sc degrees from the National University of Ireland at Cork, in 1988 and 1990 respectively. He received his Ph.D. degree from Carnegie Mellon University in 1995. From 1998 to 1991, he was with the National Microelectronics Research Centre, Cork. He was with National Semiconductor in Santa Clara, California, from 1993 to 1995. From 1995 to 1997 he was a Member of Technical Staff with Texas Instruments, DSP R&D lab, Dallas, Texas. During the four year period from 1997 to 2001, he was with Parthus Technologies, Cork. Dr. Flynn joined the University of Michigan in 2001.

Dr. Flynn received the 1992-93 IEEE Solid-State Circuits Pre-doctoral Fellowship and the NSF Early Career Award in 2004. He was Associate Editor of the IEEE Transactions on Circuits and Systems II from 2002 to 2004. He serves on the Technical Program Committees of the International Solid State Circuits Conference and the Asia Solid State Circuits Conference. He is Thrust Leader responsible for Wireless Interfaces at Michigan's Wireless Integrated Microsystems NSF Engineering Research Center.

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