

SEMINAR

Room 164 BLOC

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**New Ingredients in the Pot
- Rethink Analog IC Design -**
by

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Abstract: In this talk, I will present several unconventional analog IC design techniques. First, I will talk about how we can make use of noise, which is usually deemed as an undesirable thing, to estimate the conversion residue and increase the SNR of a SAR ADC. It is an interesting example of stochastic resonance, in which the increase in noise can lead to not SNR degradation but SNR enhancement. Second, I will talk about how we can perform data conversion below the Nyquist rate by exploiting the sparsity of the input signal. I will show two examples compressive sensing ADCs and how the effective ADC conversion rate can be reduced by 4 times but without losing information. Third, I will discuss the challenges of the classic opamp-based analog signal processing (ASP) framework in advanced nanometer CMOS processes. I will then present novel phase-domain ASP techniques and show how to use them to build scaling-friendly and power efficient mixed-signal circuits.



Nan Sun is Assistant Professor in the Department of Electrical and Computer Engineering at the University of Texas at Austin. He received the B.S. degree from Tsinghua University, Beijing, China in 2006, where he ranked top in Department of Electronic Engineering and graduated with the highest honor and the Outstanding Undergraduate Thesis Award. He received the Ph.D. degree from Harvard University in 2010. Dr. Sun holds the AMD Development Chair at UT Austin. He received the NSF Career Award in 2013 and Jack Kilby Research Award from UT Austin in 2015. He also received Samsung Fellowship, Hewlett Packard Fellowship, and Analog Devices Outstanding Student Designer Award in 2003, 2006, and 2007, respectively. He won Harvard Teaching Award in three consecutive years: 2008, 2009, and 2010. He serves in the TPC of *IEEE Custom Integrated Circuits Conference* and *Asian Solid-State Circuit Conference*. He is Associate Editor for *IEEE Transactions on Circuits and Systems – I: Regular Papers*.