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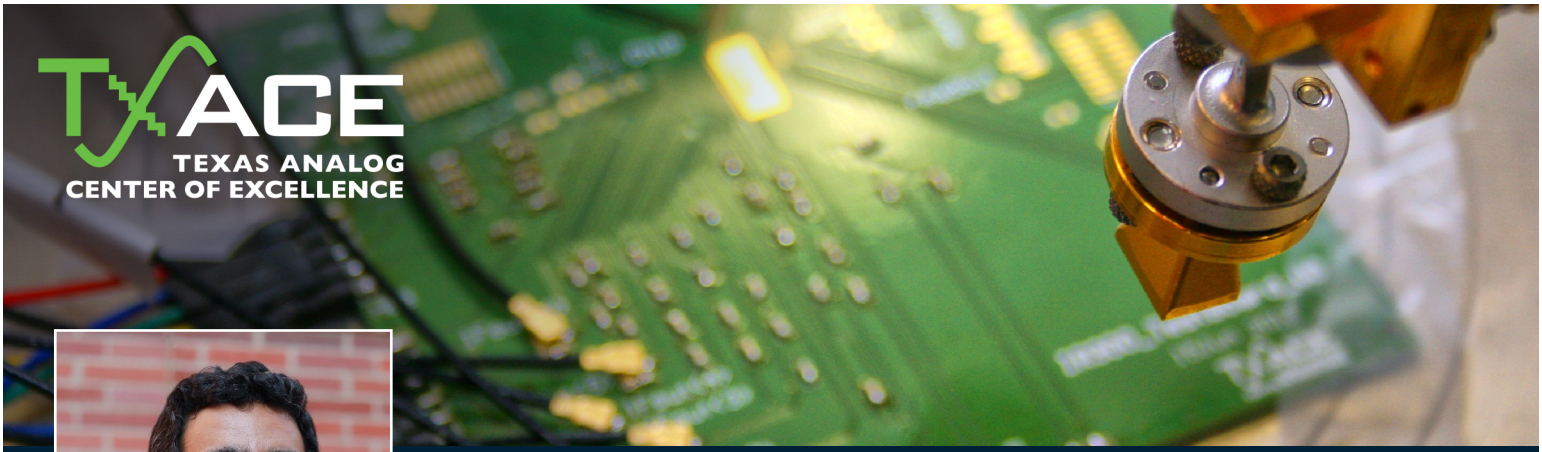

Low power clocking for energy conscious IoT systems

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BIO

Dr. Sudhakar Pamarti is a Professor of Electrical and Computer Engineering at the University of California, Los Angeles. He received the Bachelor of Technology degree from the Indian Institute of Technology, Kharagpur in 1995, and M.S. and Ph.D. degrees in electrical engineering from the University of California, San Diego in 1997 and 2003 respectively. He has either worked for, or consulted with, both software and hardware companies such as Hughes Software Systems, Rambus Inc., SiTime, Texas Instruments, Alterra, on various aspects of wireless and wireline communications, and analog, mixed-signal, and RF integrated circuit (IC) design.

His research focuses on developing various techniques, especially signal processing ones, to overcome common impairments in ICs. This includes both establishing the theoretical basis of such techniques as well as demonstrating their efficacy using record setting prototype ICs. Dr. Pamarti is a recipient of the National Science Foundation's CAREER award. He currently severs as an IEEE Solid State Circuits Society Distinguished Lecturer and on the technical program committees of *IEEE Custom Integrated Circuits Conference* and *IEEE International Solid State Circuits Conference*, and has, in the past, served as an Associate Editor for both *Parts I* and *II* of the *IEEE Transactions on Circuits and Systems.*

ABSTRACT

Many IoT devices, especially those with very stringent energy constraints, operate in an intermittent manner. The device wakes up infrequently, performs a burst of activity, and goes back to a sleep/inactive mode. Clocking serves multiple functions in such devices. For example, during the burst of activity, a high frequency stable crystal oscillator may be required for the operation of a wireless transceiver. Alternatively, a low frequency real time clock (RTC) that is always ON may be needed to provide crucial sleep and wakeup timer functionality. As such, overall energy consumption in such IoT devices will remain high unless the clocks themselves consume very little energy. This talk describes two complementary approaches: (a) a rapid startup technique for high-Q crystal oscillators, and (b) a low power crystal oscillator sustaining circuit. While the latter reduces the power consumption of always ON oscillators, the former allows the clocks themselves to be aggressively duty cycled along with the other circuitry.

Friday, September 25, 2020 at 1:00 – 2:00 p.m.
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