

**THURSDAY
JANUARY 22, 2004**

**Scaife Hall Auditorium
Room 125**

**4: 00 PM
Refreshments—3:30 PM**



Patrick Yue

CMU ECE DEPARTMENT

C. Patrick Yue (S' 93-M' 98) received the B.S.E.E. degree from the University of Texas at Austin in 1992, M.S. and Ph.D. degrees in E.E. from Stanford University in 1994 and 1998, respectively. He is currently an Assistant Professor in the Department of Electrical and Computer Engineering at Carnegie Mellon University, Pittsburgh, PA. His research interests include high frequency integrated circuit design, device modeling, and related CAD tools.

He was a Consulting Assistant Professor in the Electrical Engineering Department of Stanford University from 2001 to 2003. From 2002 to 2003, he was with [Aeluros](#), a startup company in Mountain View, CA, where he focused on signal integrity and modeling issues at the chip, package and board level for low power 10-Gbps SERDES IC's. From 1998 to 2002, he worked at [Atheros Communications](#), Sunnyvale, CA, where he assisted in founding the company and contributed in various aspects to developing the world's first IEEE 802.11a RF transceiver for volume production. In summer 1998, he was a Research Associate in the EE Department of Stanford conducting research on high frequency interconnect and passive modeling.

He worked as a summer intern on chemical mechanical polishing of inter-level dielectrics at Texas Instruments and CMOS device matching characterization at Hewlett Packard Labs in 1993 and 1994, respectively.

He was awarded the Solid-State Affiliate Fellowship by Stanford's EE department in 1992 and was the National Semiconductor Fellow at the Center for Integrated Systems in 1996. He has published over thirty technical articles, one book chapter, and holds five patents. He is a member of the Technical Program Committee for the [IEEE RFIC Symposium](#).

For more information:

<http://www.ece.cmu.edu/seminar/index.php>

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BEHIND THE BITS: ANALOG CIRCUITS AT THE FOREFRONT OF THE DIGITAL INFORMATION AGE

The digital information age is being fueled by the ever-increasing desire for more computing power and higher data bandwidth. While the electronics around us are seemingly all digital systems nowadays, behind all the bits and pixels, analog circuits remain at the center stage as a key enabler to virtually every advanced system. In addition to the countless novel applications, technology evolution (specifically, transistor scaling for integrated circuits) has made analog circuit design a more challenging and rewarding field than ever before.

This talk begins with a brief survey of the analog circuits inside some of today's high-performance electronic systems. The demand for low cost, low power, and small form factor RF and high-speed integrated systems are highlighted. The development of a 5-GHz transceiver for IEEE 802.11a WLAN in a 0.25um foundry CMOS process will be reviewed. The importance of device modeling as well as novel analog circuit techniques is emphasized. The advantages and difficulties related to inductor and transformer integration will be addressed. To demonstrate the importance of analog circuit techniques for cutting edge digital systems, a 10-GHz global clock generator for microprocessors using coupled standing-wave oscillators will be described. Finally, some future trends for analog design, especially for the next generation RF and high-speed communication systems, will be projected.