

# ECE Distinguished Lecture

2019 ECE SPEAKER SERIES

## Peter R. Kinget

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Electrical Engineering  
Columbia University



**Thurs. Sept. 26, 2019 @ 11 AM**

**110 Cummington Mall, ENG 245**

**Faculty Host: Rabia Yazicigil**

*Light refreshments will be available  
outside of 245 at 10:45 AM*

## CONNECTING BITS TO THE PHYSICAL WORLD

**Abstract:** Analog, RF and power integrated circuits are the key connectors between the physical world and the digital or cyber world. In this talk I will give my perspective on broader research trends in analog integrated circuit design research and illustrate several of these trends with results from my research group. The analog circuit design discipline emerged in conjunction with electronics and as such has many decades of history. At the same time, electronics are constantly undergoing tremendous changes. In recent decades the key platform for integrated circuits has been CMOS. Under the impetus of "Moore's Law," CMOS transistors have scaled by orders of magnitude, which drove the necessity of a constant rejuvenation of analog design techniques. Innovations in analog design are an intricate interplay between novel devices, novel circuit paradigms and novel signal processing. Recently we have been experiencing a shift from traditional analog-to-digital conversion, to analog-to-information conversion (based on compressive sampling), and now to analog-to-feature conversion. This is an example of a top-down shift driven by changing application needs, in particular emerging machine-learning systems. Scaling transistors does not only allow for higher system integration, but also enables significant power reductions. Combining advanced transistors with novel circuit design paradigms encoding analog information in the time domain makes it now possible to design integrated circuits that require less than 1 nanoW to operate. These innovations, in turn, create bottom-up opportunities for entirely new classes of systems, e.g., for the Internet of Things.

**Bio:** Peter R. Kinget received an engineering degree in electrical and mechanical engineering and the Ph.D. in electrical engineering from the Katholieke Universiteit Leuven, Belgium. He has worked in industrial research and development at Bell Laboratories, Broadcom, Celight and Multilink before joining the faculty of the Department of Electrical Engineering, Columbia University, NY in 2002, where he currently is the Department Chair and Bernard J. Lechner Professor in Electrical Engineering. He is also a consulting expert on patent litigation and a technical consultant to industry. His research interests are in analog, RF and power integrated circuits and the applications they enable in communications, sensing, and power management. Peter is widely published and received several awards. He is a Fellow of the IEEE. He is a "Distinguished Lecturer" for the IEEE Solid-State Circuits Society (SSCS), and has been an Associate Editor of the IEEE Journal of Solid State Circuits (2003-2007) and the IEEE Transactions on Circuits and Systems II (2008-2009). He has served on the program committees of many of the major solid-state circuits conferences and has been an elected member of the IEEE SSCS Adcom (2011-2013 & 2014-2016).