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**Reliable operation despite ultra low power -
the ultimate quest in wireless sensor
networks**

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Abstract

Wireless sensor networks are rapidly gaining major traction in a wide range of application areas. To be successful in the commercial arena, it is essential that the individual transceiver nodes are tiny, easily integratable into the environment, and have negligible cost. Most importantly, the nodes must be self-contained in terms of energy via a one-time battery charge or a replenishable supply of energy scavenged from the environment. The good news is that the realization of sub-mW nodes is indeed possible through a combination of advanced technology and clever design techniques, as will be illustrated in this presentation. Unfortunately, ultra low-power has an adverse impact on the system reliability. Rather than compromising the energy-efficiency of the individual nodes, a system-level solution provides a way out. Exploiting the redundancy typical at hand in sensor networks, overall reliability can be ensured even in the presence of failure of links and nodes.

About the speaker:

Jan M. Rabaey received his EE and Ph.D degrees in applied sciences from the Katholieke Universiteit Leuven, Belgium, in 1978 and 1983, respectively. From 1983 to 1985, he was connected to the University of California, Berkeley as a Visiting Research Engineer. From 1985 to 1987, he was a research manager at IMEC, Belgium. In 1987, Dr. Rabaey joined the faculty of the Electrical Engineering and Computer Science department of the University of California, Berkeley, where he is now holds the Donald O. Pederson Distinguished Professorship. He has been a visiting professor at the University of Pavia (Italy), Waseda University (Japan), and Victoria University and the University of New South Wales (Australia). He was the associate chair of the EECS Dept. at Berkeley from 1999 to 2002, and is currently the Scientific co-director of the Berkeley Wireless Research Center (BWRC), as well as the director of the GigaScale Silicon Research Center (GSRC). He is an IEEE Fellow. His current research interests include the conception and implementation of next-generation integrated wireless systems. This includes the analysis and optimization of communication algorithms and networking protocols, the study of low-energy implementation architectures and circuits, and the supporting design automation environments.