

Mixed-signal technologies for ultra-wide band signal processing systems

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Abstract: Demand for ultra-wideband data acquisition and real time processing systems handling analog signals in the GHz range comes from applications in high performance instrumentation, defense and infrastructure communication systems among others. In these cases, front-end circuitry and ADCs/DACs are rapidly getting integrated together with front-end digital processing, preferably in mixed-signal CMOS systems-on-a-chip. This lecture will briefly review some of the technical challenges faced by analog designers developing such systems along with some the technologies behind that. The performance demands, coupled together with limitations of the underlying technologies such as those of nanometer CMOS processes and die packaging, require a comprehensive design approach combining circuits and architectural innovation with algorithmic techniques. This lecture introduces some of the present engineering approaches being developed to tackle such challenges.

Biography:



Dr. Gabriele Manganaro is (S'95, M'98, SM'03, F'16) holds a Dr.Eng. and a Ph.D. degree in Electronics from the University of Catania, Italy. Starting in 1994, he did research with ST Microelectronics and at Texas A&M University. He worked in data converters' IC design at Texas Instruments, Engim Inc, and as Design Director at National Semiconductor. Since 2010 he has been with Analog Devices, first as an Engineering Director for High Speed Data Converters, and more recently as a Technology Director in the Wireless Communication Products Division. He served in the technical sub-committee for Data Converters of the ISSCC for seven consecutive years. He was Associate Editor for IEEE Trans. On Circuits and Systems - Part II and then Associate Editor, Deputy Editor in Chief and finally Editor in Chief for IEEE Trans. On Circuits and Systems - Part I. He is presently the Editor in Chief for the IEEE Open Journal of Circuits and Systems. He authored/co-authored more than 60 peer-reviewed papers, three books (notably "Advanced Data Converters", Cambridge University Press, 2011) and has been granted 17 US patents, with more pending. He was recipient of scientific awards, including the 1995 CEU Award from the Rutherford Appleton Laboratory (UK), the 1999 IEEE Circuits and Systems Outstanding Young Author Award and the 2007 IEEE European Solid-State Circuits Conference Best Paper Award. He is an IEEE Fellow (since 2016), a Fellow of the IET (since 2009), Member of the scientific honor society Sigma Xi, and was a member of the Board of Governors for the IEEE Circuits and Systems Society (2016-18). He is a Distinguished Lecturer for the IEEE Solid-State Circuits Society (term 2019-20) and an industry advisory member for Proceedings of the IEEE. Gabriele has received international technical & leadership recognition; he is often invited to speak on technical subjects at key conferences and top universities and developed and taught graduate professional courses in data converters design and mixed-signal design at the University of Oxford (UK).