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Biography:

Cam Nguyen is the Texas Instruments Endowed Professor of Electrical and Computer Engineering at Texas A&M University, College Station, Texas. He was Program Director at the National Science Foundation during 2003-2004, leading and managing the Foundation's research programs in RF and wireless technologies. Over the past 36 years, including 12 years at TRW (now Northrop-Grumman), Hughes Aircraft (now Raytheon), Martin Marietta (now Lockheed-Martin), Aeroject Electrosystems, and ITT Gilfillan, he has led numerous RF projects for wireless communications, radar and sensing up to 220 GHz. He has published 6 books, six book chapters, over 270 papers, and given more than 160 conference presentations. He is a Fellow of the IEEE.

Millimeter-wave multiband RFIC chips for next-generation communications and sensing systems

Wireless communications and sensing have become an indispensable part of our daily lives from communications, public service and safety, consumer, industry, sports, gaming and entertainment, asset and inventory management, banking to government and military operations. As communications and sensing are poised to address challenging problems to make our lives even better under environments that can potentially disrupt them, like highly populated urban areas, crowded surroundings, or moving platforms, considerable difficulties emerge that greatly complicate communications and sensing. Significantly improved communication and sensing technologies become absolutely essential to address these challenges. Typical millimeter-wave communications and sensing systems are operated in a single frequency band. As the millimeter-wave technology and systems are being pushed further to produce next-generation versatile low-cost miniature systems that could accommodate not only existing and emerging but also future applications and needs, the demand of multiband millimeter-wave technology in general and systems in particular is no longer "luxury," but is a "necessity." Millimeter-wave systems working over multiple bands provide significant advantages in terms of cost, size, operation, versatility, and could open up many applications that have been prohibited due to the unavailability of such systems. Particularly, a multiband millimeter-wave system that integrates "electrically" the functions at multiple bands into a single system, effectively allowing a single system to function as multiple distinct systems, each operating in a separate band, together is doubly significant. These unique features, not currently available in systems operating at millimeter-wave frequencies, will push the system performance to a next level for communications and sensing, where multiband and multifunction, and multi-operation with low-cost miniature systems become essential. Silicon-based Radio-Frequency Integrated Circuits (RFICs) are the backbone of advanced wireless communication and sensing systems, enabling low-cost, small-size, and high-performance system-on-chip solution that facilitates the realization of low-cost miniature systems and large system networks consisting of thousand or more elements. Research in millimeter-wave multiband RFIC technology and systems provides significant benefits. Multiband RFICs are inevitable in current and future advanced wireless communication systems, such as mobile phones, and sensing systems such as medical/healthcare devices. In this talk, we will present our research in millimeter-wave multiband RFIC chips for communications and sensing systems and some of the recent developments that we achieved with unprecedented performance.

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