Keynote speaker:

Name: P M Raj
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Title of the Presentation:
Heterogeneous System Component Integration with Nanopackaging

Biography: Dr. P. M. Raj's expertise is in packaging of electronic and bioelectronic systems, with emphasis on nanoscale RF, power and bioelectronic components, and active and passive integration in ultrathin embedded modules. He is an Associate Professor in Biomedical Engineering and Electrical and Computer Engineering at Florida International University, and Adjunct Professor at Georgia Institute of Technology, Atlanta. His research led to 330 publications, which include 8 patents. He received more than 25 best-paper awards. He is the Chair of Nanopackaging Technical Committee, EPS Representative of IEEE Nanotechnology Council, IEEE Distinguished Lecturer in Nanotechnology for 2020, Associate Editor for IEEE Nanotechnology Magazine and Transactions of Components, Packaging and Manufacturing Technologies (CPMT).

Abstract: Heterogeneous component integration with seamless and 3D connectivity between digital, RF, analog and passive components in a single package with unlimited bandwidth at lower power is the key to realize future electronic and bioelectronic systems. This talk describes the recent nanomaterial and nanoscale component integration breakthroughs that are making heterogeneous integration a reality. Nanomagnetic inductors, high surface area nanocapacitors and innovative 3D component designs will be described for integrated power modules. The second part focuses on material and component integration technologies for high-bandwidth 5G-6G communications. include high-gain antenna arrays in a package with integrated power dividers and combiners, low-loss THz interconnects with substrate-integrated low-loss waveguides, integrated electromagnetic interference isolation structures between power amplifier (PA) and low-noise amplifier (LNA) interconnects and integrated nanomagnetic and nanodielectrics for nonreciprocal and tunable components. The last part of the presentation describes nanopackaging technologies to enable bioelectronic systems with seamless integration between neural recording arrays, active devices and wireless interfaces for ultra-miniaturized wearable and implantable bioelectronic systems.