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SPEAKER SERIES

PRESENTS

Heterogeneous Component Integration for Power, RF and Bioelectronic Systems

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Friday, Oct. 15, 10:00 am US CST
Room: Zoom*
https://uofh.zoom.us/j/845619943?pwd=QlZvYUV6M2dxNDkvNWxBd3F2YzdJZz09
Meeting ID: 845 619 943, Passcode: 016104

LECTURE ABSTRACT

Heterogeneous component integration with seamless and 3D connectivity between digital, RF, analog and passive components in a single package with high 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 delivery. The second part focuses on material and component integration technologies for high-bandwidth 5G communications. include high-gain antenna arrays in a package with integrated power dividers and combiners, 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. Specific advances in system-in-flex packages for wearable electronics, miniaturized power telemetry and low-impedance electrodes will be discussed.

SPEAKER BIOSKETCH

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. He demonstrated several electronic packaging technologies, working with the whole electronic ecosystem, which include several semiconductor, packaging and material, tool, and end-user companies. He co-led the development of world's first 3D glass LTE diversity module, and 3D glass antenna-integrated package module for 5G mm wave applications. He developed advanced substrate-integrated power inductors and power capacitors for integrated power modules and voltage regulators. He is widely recognized for his contributions in integrated passive components and technology roadmapping, component integration for bioelectronic, power and RF modules, and also for promoting the role of nanomaterials and nanostructures for electronics packaging applications through IEEE NTC and EPS. His research led to 340 publications, which include 8 patents. He received more than 30 best-paper awards. He is the Chair of Nanopackaging Technical Committee, EPS Representative of IEEE Nanotechnology Council, IEEE Distinguished Lecturer in Nanotechnology for 2020 and 2021, Associate Editor for IEEE Nanotechnology Magazine and Transactions of Components, Packaging and Manufacturing Technologies (TCPMT). He earned his BTech from IIT Kanpur (1993), ME from IISc, Bangalore (1995) and PhD from Rutgers University (1999).

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