

IEEE Miami Section Invited Webinar Announcement

“High-Density 3D Power Packaging with Heterogeneous Passive-Active Integration”

Speaker: Dr. Pulugurtha Markondeya Raj

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Zoom Link: TBA

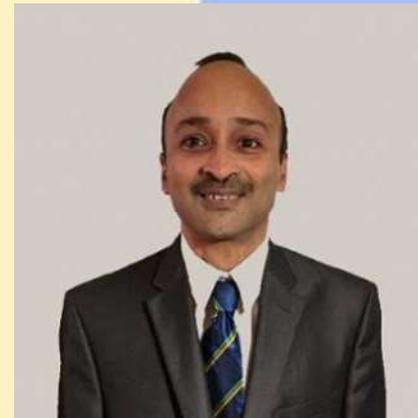
Abstract:

Power supply is becoming a key performance limiter in all electronic systems. This includes power conversion, regulation and noise suppression. Current approaches have many challenges including: 1) power conversion far from the load, limiting response time, 2) stages of conversion, reducing efficiency, 3) low-density inductors and capacitors and 4) large losses due to long interconnections through the board. Advanced substrate-compatible thin film or thick film package integration processes are being developed to achieve higher power handling with thinner form-factors. The first part of the talk focuses on emerging 3D power packaging for low- to high-power applications. It will point to the common aspects and key differentiators that shift the technology focus in each case. Heterogeneous package integration trends in 3D power packaging for future computing and automotive power electronic needs will be highlighted through specific examples.

Capacitors and inductors are key storage components in power conversion. Their low storage densities and efficiency along with the associated parasitics and reliability limitations have been the key bottlenecks towards advances in packaging. The second part of the talk highlights magnetic components with nanocrystalline, nanogranular and composites with 2D flake morphologies. These material and package integration advances are driving transformers with high efficiency, and high-density power inductors with current-handling and smaller footprints. By providing ultra-short interconnect lengths, these components can suppress DC power losses and high-frequency parasitics to result in higher power efficiency and power densities. Key magnetic component technologies in high power electronics will be highlighted in the final part.

Speaker's Bio

P. M. Raj's expertise is in packaging of electronic and bioelectronic systems, with emphasis on nanoscale RF, power (magnetic and capacitive) 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 340 publications, which include 8 patents. He received more than 25 best-paper awards. He led several industry consortia programs, working with major part of the electronics industry supply-chain, which includes device, substrates, assembly, material and tool companies. He gave more than 25 invited talks in IEEE and other technical society events and industry technical boards of several fortune 500 companies. He is the Chair of Nano packaging Technical Committee of IEEE Packaging Society (EPS) and Nanotechnology Council, EPS Representative of IEEE Nanotechnology Council, IEEE Distinguished Lecturer in Nano packaging, Associate Editor for IEEE Nanotechnology Magazine and Transactions of Components, Packaging and Manufacturing Technologies (CPMT). He actively participated in technology road mapping for Heterogeneous Integration (IEEE EPS) – Power passives components and materials, Printed Circuit Boards (IPC), 3D Power Packaging (PSMA). He received his BTech from IIT Kanpur (1993), ME from IISc (1995) and PhD from Rutgers University (1999).



For more information, please contact:

Professor Osama Mohammed, Vice Chair of IEEE Miami Section, mohammed@fiu.edu

Hassan Eldeeb, Secretary of IEEE Miami Section, helde002@fiu.edu

Alejandro Aguilera, Webmaster of IEEE Miami Section, aaguiler@fiu.edu