Keynote speaker:

***Name*:** **Rajen Murugan**
***Job position*:** **Engineering Manager**
***Company*:** **Texas Instruments, Inc.**
***e-mail*:** rajenm@ieee.org

Title of the presentation:

Multiphysics Modeling of Semiconductor IC Packaging and Systems

Short CV:

Dr. Rajen Murugan specializes in developing multiphysics simulation and modeling methodologies for advanced semiconductor IC packaging and systems. He is currently a Distinguished Member of the Technical Staff (DMTS) with Texas Instruments, Inc. He has 24 patents (68 pending) and has published over 75 papers in peer-reviewed IEEE journals and conferences. Dr. Murugan holds a Ph.D. in Applied Electromagnetics from the University of Manitoba, Canada. He is an Affiliate Assistant Professor with the University of Washington EE Department, a Distinguished Lecturer for the IEEE Electronics Packaging Society (EPS), an Associate Editor for the IEEE Transactions on CPMT journal, a Senior Member of IEEE, the founder of the IEEE EPS Dallas Chapter, and the Chair of the IEEE Dallas Section.

Abstract:

Transistor/chip scaling has reached the point of diminishing returns and is becoming more complex and expensive at each node. Advanced packaging technologies show promise by bridging the gap in the "More than Moore" Era. However, advanced packaging technologies challenge traditional package design verification tools and methodologies. Complex miniaturization and integration exacerbate coupled interactions with multiphysics (e.g., electrical, thermal, mechanical) and multidomain (chip-package-PCB system). As such, without a paradigm shift in the traditional design verification modeling approach, potential business impacts are highly likely (viz costly re-spins, increased design cycle time, and time-to-market). Coupled multiphysics and system co-design (MSC-D) is emerging as the renewed modeling methodology to ensure first-pass design success.

This presentation reviews developing and implementing a multiphysics system co-design methodology for designing high-performance, cost-effective IC packaging solutions. The methodology is validated against silicon laboratory measurements on two IC current sensor types - a precision shunt resistor sensor and a high-precision, high-voltage (600V) Hall-Effect current sensor. State-of-the-art challenges and opportunities in multiphysics system co-design are also discussed.