

ABSTRACT:

Integrated Circuits in Extreme Environments of Automotive, Satellite, and
Field-deployed Electronics

Muhammad A. Alam, Purdue University (alam@purdue.edu)

To meet the growing demand for integrated circuits (ICs) in increasingly complex and demanding applications, the semiconductor industry has evolved dramatically over the past few decades. Automotive, space, avionics, and field-deployed smart electronics must survive harsh environmental conditions, requiring highly reliable, specialized packaging such as 2.5D/3D hetero-integration (HI) for greater functionality, device density, and speed. Cross-coupled chip-package-board interactions (CPBIs) result from the proximity of various active and passive components, material stacks, and processes. This presentation will focus on the emerging electrical reliability challenges for integrated circuits operating in harsh environments, encourage a rethinking of traditional qualification standards, and present potential solution schemes to ensure reliable IC operation under the most stringent conditions.