

18th International School on the Effects of Radiation on Embedded Systems for Space Applications (SERESSA)

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Modeling Cumulative Radiation Effects in Semiconductor Devices and Integrated Circuits

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Designing integrated circuits requires accurate models to capture the physics of a circuit's fundamental device, the transistor. Successful modeling of transistor operation has been one of the great achievements in physics and engineering in the past 100 years. Models are particularly important when we consider the challenges posed by cumulative radiation damage. Accurate modeling at the device-level is critical to helping us simulate radiation effects in circuits, through compact models that are radiation-aware. In this course, Professor Barnaby will review models for Complimentary MOS (CMOS) field-effect transistors (FETs) and Bipolar Junction Transistors (BJT). Once the mechanisms of radiation damage in these transistors have been presented, he will describe, the various methods used to model these cumulative effects, from devices to integrated circuits.

Presenter: BARNABY, Hugh (ASU)