**Moore's Law and Radiation Effects on Microelectronics**

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52 years ago Gordon Moore postulated that the number of components in an integrated circuit would double every 1-2 years. This trend still holds, making it one of the longest, sustained geometric progressions in the history of the industrialized world, enabling revolutions in computing and in virtually every aspect of technology that is enabled or enhanced by computing. Transistor dimensions have decreased from tens of microns ~ 10 nanometers over this time period. In this presentation, we will examine the effects of Moore's Law size and voltage scaling of transistors and integrated circuits on the vulnerability of microelectronics to ionizing radiation effects in near-Earth space and terrestrial applications. We will also discuss limitations that these vulnerabilities place on future highly-scaled integrated circuit technologies.

Daniel M. Fleetwood received his Ph. D. degree in Physics from Purdue University in 1984. Dan joined Sandia National Laboratories in Albuquerque, New Mexico, in 1984, and was named a Distinguished Member of the Technical Staff in the Radiation Technology and Assurance Department in 1990. In 1999 he left Sandia to accept the position of Professor of Electrical Engineering at Vanderbilt University in Nashville, Tennessee. In 2003 he was named Chair of the Electrical Engineering and Computer Science Department. Dan is the author of more than 500 publications on radiation effects in microelectronics, 12 of which have been recognized with Outstanding Paper Awards. These papers have been cited more than 17,000 times (citation h factor = 74, Google Scholar). In 2009, he received the IEEE Nuclear and Plasma Sciences Society's Merit Award, which is the society's highest individual technical honor. Dan is a Fellow of both the Institute for Electrical and Electronics Engineers and The American Physical Society.