



## AEROSPACE ENGINEERING SCIENCES

# Seminar



**Robert C. Singleterry, Jr.**

NASA Radiation Engineer

## Space Radiation Engineering

Ionizing radiation is one of the central concerns for astronaut health during long-term missions in space. Solar particle events have the potential to cause deterministic radiation effects in astronauts, including those associated with acute radiation syndrome. By contrast, galactic cosmic rays can increase the likelihood of stochastic radiation effects, including cancer incidence, cardiovascular disease, and cataract formation. All of these effects not only threaten the health and welfare of astronauts, but also the success of the missions themselves.

This seminar will provide an overview of engineering practices that are designed to meet the challenges posed by the space radiation environment. Radiation engineering affects both spacecraft and mission design by ensuring that astronaut radiation exposure is as low as reasonably achievable for a given set of mission requirements. The relationship between radiation exposure and health risks dictates how effective an overarching mitigation strategy must be in order to adequately protect astronauts. Ultimately, this presentation highlights the ways in which space radiation engineering represents a multifaceted optimization problem – radiation engineers must use ongoing physics and biology research in order to design spacecraft that are capable of meeting mission requirements for the lowest monetary cost.

**Wednesday, April 19, 2017**

**12:00 - 1:00 pm**

**DLC Collaboratory**

### Biography:

**Dr. Singleterry** is currently working at the NASA Langley Research Center in Hampton, VA in the Durability, Damage Tolerance and Reliability Branch. Currently, he is working on space radiation engineering and related issues (1997-present). He has a BS, MS, and PhD in Nuclear Engineering, with a PhD minor in Mathematics, from the University of Arizona (1984; 1990; 1993). He is a NASA Administrator's Fellow (Cohort 6, 2002-2004). Currently, he is a team member creating a webbased, integrated radiation design tool and is responsible for innovative ways of carrying out particle transport and computing faster to include reconfigurable computing techniques. Also, he is researching material layups for spacecraft design, advanced particle transport methods, and high productivity computing techniques. He was a Reactor and Software Engineer at the E.I. Hatch Nuclear

Power Plant (1984-1985) for Georgia Power. He was a staff member at EI International (1985-1989) developing Safety Parameter Display Systems for nuclear power plants. He worked at Argonne National Laboratory West as a Summer intern (1989-1993) and Staff Engineer (1993-1997) performing various tasks working on the Experimental Breeder Reactor II (EBR-II) and the Integral Fast Reactor (IFR) Concept. He is very active in the American Nuclear Society (ANS) both local and national and was the point of contact for the creation of the Aerospace Nuclear Science and Technology Division within the ANS. His main interest there is the utilization of high performance computing in space radiation analysis.