PURDUE UNIVERSITY | Nuclear Engineering
COLLEGE OF ENGINEERING

Nuclear Engineering Seminar

Edward Cazalas, Ph.D.

Air Force Institute of Technology

Monday, February 19, 2018

3:30pm | GRIS 103

Radiation Detection with Graphene Field Effect Transistors

Abstract

2-D materials, such as graphene, are making their way into a wider array of applications with fast charging batteries, or stronger running shoes as examples. One interesting nuclear and radiation related area of application is the integration of these materials into electronic structures, including transistors or radiation detectors. Here, we will explore some of the promising advancements of graphene field effect transistors (GFETs) for radiation detection, such as the potential for spatially sensitive architectures, and responsivity of GFETs to a variety of radiation fields. We will also examine some of the challenges of graphene and GFET application in electronics. Finally, the study of radiation effects on GFET architectures will be discussed. The entailed research provides an underlying foundation to the development of a potentially new generation of detectors and electronic devices based on essential concepts and tools within nuclear and radiation physics and engineering.

Edward Cazalas is currently a postdoctoral researcher at the Air Force Institute of Technology where he participates in research efforts that include understanding the electrical properties of UO2 crystals, use of CLYC material for nuclear detection, radiation damage to graphene -based devices, and the protection of personnel and electronics in vehicles against nuclear weapons radiation. Edward was also a former Stanton Nuclear Security Postdoctoral Fellow at RAND Corporation where he studied the technical and policy related aspects of the detection and interdiction of nuclear and radiological materials in the context of homeland security and countering nuclear terrorism. Edward holds a Ph.D. in Nuclear Engineering from the Pennsylvania State University and an M.S. in Nuclear Engineering from Oregon State University.