



Science of Signatures Advanced Studies Scholars Program 2014



Speaker: Pete J. Karpus

Title: Gamma-Ray Flux Uncertainty Analysis for Emergency Response Applications

Abstract: A key part of the nuclear emergency response mission is the creation of valid models of radiation source geometries. Integral to bounding these models is a complete understanding of the uncertainty in the analysis of the gamma-ray flux measured in the field. Specifically this problem can be stated in the following way. Given a gamma-ray spectrum, an intrinsic detector efficiency characterization, and a measurement distance and live time, determine the photon rates into 4π for a set of energies and conduct a full error analysis to provide a realistic range of uncertainties on those rates. To aid in addressing this problem, gamma-ray spectra (and measurement conditions) from high-purity germanium detectors and the LANL-developed spectrum-viewing/analysis tool PeakEasy will be provided.

Bio: Pete is a gamma-ray spectroscopist with the Advanced Nuclear Technology Group (NEN-2) at Los Alamos National Laboratory. He is a qualified analyst with the DOE Radiological Triage program and involved at varying levels with other emergency response positions. Pete creates software-based tools, conducts a variety of gamma-ray measurements, and provides instruction to DOE, DOD, DHS, and DOJ personnel in support of the emergency response mission. Furthermore, Dr. Karpus continues to be a gamma-ray analysis instructor for the assay of plutonium and uranium items in several foreign and domestic nuclear safeguards schools as well as the International Atomic Energy Agency inspector courses at LANL. He has also collaborated with the Chinese Institute of Atomic Energy on a segmented gamma-ray scanning uranium waste counter. Prior to joining LANL in January 2006, he completed his doctoral studies at the University of New Hampshire with research conducted in electron scattering from light nuclei.