Project Title
Sensor Array for Modeling Urban Search and Experiments

Project Reference Code: DNDO-NSTec-McLean

Hosting Site
National Security Technologies
Joint Base Andrews, MD

Project Description
The Modeling Urban Scenarios & Experiments (MUSE) project seeks to provide fundamental science to inform research efforts in: ionizing radiation anomaly detection and classification, monitoring systems architecture, and concept of operations (CONOPS) for nuclear counterterrorism and counterproliferation. MUSE addresses these needs through the creation of validated models, careful collection and management of data, and enabling the application of the tools of data science to the information gathered.

Numerous efforts across the nonproliferation and Preventive Rad/Nuke Detection (PRND) enterprise rely on a limited supply of relevant, benchmark-quality data with which the associated prototype systems can be trained and evaluated. This truth limits the confidence in, and effectiveness of, the technologies that should, in principle, be increasing the enterprise's collective capability to detect and localize illicit sources of radiation.

To address this shortfall, the MUSE project takes a new approach to informing systems and algorithm development. First, MUSE will produce an operationally relevant, validated urban simulation environment based upon radiation transport calculations rooted in detailed ground-truth measurements of radiation emissions in the real target environment.

Second, MUSE will create the scalable data infrastructure required for extended experimental campaigns. As many other technologies in play (detector materials and electronic miniaturization for example) are evidently on development plateaus, any truly transformational technologies that arrive in the near term for the nonproliferation and nuclear counterterrorism missions will almost certainly be the result of the application of data science and/or data fusion. MUSE will leverage recent advances in software, storage, networking and computational tools to harness both radiation data and other contextual information to inform the coming generation of nuclear radiation detection systems for counterterrorism and counterproliferation applications.

Specific opportunities for intern involvement include: applications of data science methods to ensembles of radiation sensor data, spectroscopic evaluation of collected spectra and assisting with the testing, fielding and management of the radiation sensor array.

Disciplines

Information Science and Technology
Nuclear Engineering
Probability and Statistics
Applied Mathematics
Engineering (General)

Mentor(s)

Lance McLean, mcleanms@nv.doe.gov, 301-817-3332
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Internship Coordinator

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The name and contact information of the hosting site internship coordinator is provided for further assistance with questions regarding the hosting site; local housing availability, cost, or roommates; local transportation; security clearance requirements; internship start and end dates; and other administrative issues specific to that research facility. If you contact the internship coordinator, identify yourself as an applicant to the DNDO Summer Internship Program.

Interns will not enter into an employee/employer relationship with the Hosting Site, ORAU/ORISE, DHS, DNDO or DOE. No commitment with regard to later employment is implied or should be inferred.