Pacific Northwest
NATIONAL LABORATORY

PNNL-31103

Fiscal Year 2020 Report for the Radiation Detection for Nuclear Security Summer School

March 2021

BS McDonald

U.S. DEPARTMENT OF ENERGY

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Pacific Northwest National Laboratory
Richland, Washington 99354

Summary

The Pacific Northwest National Laboratory (PNNL) planned to hold its 6th Radiation Detection for Nuclear Security Summer School 15-26 June 2020. The COVID-19 pandemic prevented an in-person school from happening, and PNNL staff did not have adequate time to prepare a virtual format school. So, fiscal year 2020 was taken as an off year with the intention of hosting an in-person or online summer school in 2021. As with typical off years, some course materials and activities were refined to better achieve the key objectives of 1) exposing students to the range of nuclear security applications for which radiation detection is necessary, 2) articulating the relevance of student research into the broader context, and 3) growing student interest in careers in nuclear security.

Acknowledgments

We thank the National Nuclear Security Agency's Defense Nuclear Nonproliferation Office of Research and Development for supporting and funding the summer school.

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1.0 Introduction

The Pacific Northwest National Laboratory (PNNL) planned to hold its 6th Radiation Detection for Nuclear Security Summer School 15-26 June 2020. The COVID-19 pandemic prevented an in-person school from happening, and PNNL staff did not have adequate time to prepare a virtual format school. So, fiscal year 2020 (FY20) was taken as an off year with the intention of hosting an in-person or online summer school in 2021, which would have been an off year. As with typical off years, some course materials and activities were refined to better achieve the key objectives of 1) exposing students to the range of nuclear security applications for which radiation detection is necessary, 2) articulating the relevance of student research into the broader context, and 3) growing student interest in careers in nuclear security. This short report describes the activities conducted in FY20.

Most on-site PNNL activities and travel were paused in March 2020 due to the pandemic. This is the timeframe when most RDNS school applications typically arrive. Despite the pandemic, we received 11 applications. By this point we had made many preparations for an in-person school, including booking guest speakers from the Defense Threat Reduction Agency, NNSA, and Homeland Security Customs and Border Protection. We had also promoted the summer school to the NNSA-funded University Consortia and the American Nuclear Society Winter Meeting. By mid-May, it became apparent than laboratory access and travel would not be possible in June, and so we decided to postpone the school to FY21. At this point, activities for this project largely ceased except for a few items below.

2.0 Updates in FY20

Based on feedback from the students in FY19 and the summer school team, several actions were taken to promote and refine the summer school, summarized in Table 2. We also gathered information from other summer schools that switched to an online format to prepare for that possibility in FY21.

Table 1. Summary of FY20 activities to update and promote the summer school.

ACTIVITY	Notes
Updated web site	https://www.pnnl.gov/radiation-detection-nuclear-security
Who Caught the Bad Guy: Radiation Portal Monitors (RPMs)?	Students form teams and develop energy windowing algorithms for an RPM to maximum detection sensitivity and reduce false alarms. Updates include incorporation of receiver operator characteristic (ROC) curve analysis, use of a spectroscopic portal, and a replay tool.
Machine Learning Mini Workshop	Discussed ways to narrow the focus of the activity and make it more accessible for students not familiar with data science.
Gathered feedback from other schools that switched to a virtual (online) format	Lessons learned were obtained from the PNNL course on Safeguards and requested from Brookhaven National Laboratory's course on Nuclear Nonproliferation, Safeguards and Security in the 21st Century. Note that the latter school is now held later in the summer and no longer overlaps with the RNDS summer school.

3.0 Plans for FY21

To mitigate the risk of being unable to host an in-person summer school in FY21, we plan to prepare for the first delivery of the summer school in an online format. Since this will take some extra effort to be successful, we will aim for a shorter summer school that runs ~3 hours per day, both to accommodate students and speakers in different time zones and to keep in line with the length of other successful summer schools. The virtual format will focus on the unique aspects of the school: engaging activities, tours, and group discussions, which are also the consistently highest rated aspects of the school.

Pacific Northwest National Laboratory

902 Battelle Boulevard
P.O. Box 999
Richland, WA 99354
1-888-375-PNNL (7665)

www.pnnl.gov