An Overview of Nonproliferation Workshops at Oak Ridge National Laboratory: 2013–2017

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INTRODUCTION

Following the launch of the Next Generation Safeguards Initiative in fiscal year (FY) 2009, Oak Ridge National Laboratory (ORNL) has hosted 16 universities and 542 students. While the nonproliferation workshops hosted always have safeguards components, this paper will examine how the workshops have changed over time, examine new directions at the laboratory, and discuss success stories of past student attendees at ORNL. Although the program launched in 2009, a paradigm shift at ORNL focusing on nonproliferation workshops for university students during the academic year occurred in FY 2013. This paper will focus on the period from 2013 to FY 2018.

Next Generation Safeguards Initiative

In 2007, the US Department of Energy National Nuclear Security Administration (DOE NNSA) Office of Nonproliferation and Arms Control (NPAC) completed a comprehensive review of the current and potential future challenges facing the international safeguards system. The review examined trends and events that influence the mission of international safeguards; the implications of expanding and evolving mission requirements of the legal authorities and institutions that serve as the foundation of the international safeguards system; and the technological, financial, and human resources required for effective safeguards implementation [1].

The findings and recommendations were summarized in the report International Safeguards: Challenges and Opportunities for the 21st Century (NNSA 2007). One of the key recommendations was for DOE NNSA to launch a major new program to revitalize the international safeguards technology and human resource base.

In 2007, at the International Atomic Energy Agency General Conference, Secretary of Energy Samuel W. Bodman announced the newly created Next Generation Safeguards Initiative. The initiative consists of five program elements, including human capital development [2].

Sponsored University Courses

Since FY 2013, ORNL has led nonproliferation workshops for multiple universities each year. The students attending these workshops range from undergraduate to graduate to military, and from policy to physics to engineering students. Topics vary slightly from group to group, but there are always various sessions at the ORNL safeguards laboratory, including portable nondestructive assay exercises. With the addition of the Safeguards Extension Laboratory in 2016 nondestructive assay of large-scale items is now possible. Because some universities have elected to do exercises and tours at the Y-12 National Security Complex, the courses continuously evolve.

In 2013, ORNL hosted 6 workshops, consisting of 8 universities and 99 student/faculty attendees. These six workshops were spread out over the spring and the fall and typically involve students from a specific course. The universities represented were University of Tennessee, Knoxville (UTK), Texas A&M University (TAMU), Pennsylvania State University, Massachusetts Institute of Technology, Georgia Institute of Technology, University of Florida (UF), North Carolina State University (NCSU), and Clemson University. Each of these universities came with a group of technical students and spent the majority of their time in the Safeguards Laboratory at ORNL. During these visits, there are also typically tours of ORNL facilities (High Flux Isotope Reactor, Radiochemical Engineering Development Center, Graphite Reactor, etc.), and overview lectures pertaining to nonproliferation and safeguards [3].

Fig. 1. Student from UF at an ORNL nonproliferation workshop.

In 2014, ORNL hosted 8 workshops, consisting of 9 universities and a total of 104 students and faculty. The universities represented were UTK, Morehouse College (Fig. 2), UF, NCSU, Clemson University, University of Georgia, Mercyhurst University, University of Utah, and University of Michigan. Although the majority of these groups were technical students, the inclusion of the workshops for Mercyhurst and the University of Georgia had a larger focus on safeguards and nonproliferation policy, as these students were from Mercyhurst's graduate program in applied intelligence and the Center for International Trade and Security. They did spend time in the safeguards lab, but the overall agenda was customized for their group [4].

Fig. 2. Morehouse student attendees in the ORNL Safeguards Laboratory with ORNL staff member, Louise Worrall.

In 2015, ORNL hosted 7 workshops, consisting of 10 universities and totaling 131 participants. Universities included UTK, Morehouse College, UF, NCSU (Fig. 3), Clemson University, University of Georgia, TAMU, Pennsylvania State University, Massachusetts Institute of Technology, and the Triangle Institute for Security Studies (TISS) consortium (NCSU, UNC, Duke, and NCCU). This was the first year TISS participated, and the program consisted of a shorter workshop with a policy focus [5].

Fig. 3. NCSU and UF student attendees in the ORNL safeguards lab with ORNL staff member, Steve Cleveland.

In 2016, ORNL hosted 9 workshops from 9 different universities for a total of 111 participants. Universities included TISS (Duke, UNC, NC State, NCCU), NCSU, University of Michigan, Clemson University, University of Georgia, TAMU, Morehouse College, UTK, and West Point Military Academy (Fig. 4) [6].

Fig. 4. *Left*, Students from NCSU at the High Flux Isotope Reactor. *Right*, Cadets from West Point at the conclusion of their ORNL workshop [7].

In 2017, ORNL hosted 5 workshops for 6 universities with a total of 97 attendees. The universities in attendance were the TISS consortium, UTK, Virginia Commonwealth University (VCU), NCSU, University of Georgia, and Georgia Institute of Technology (Fig. 5). In 2017, ORNL also hosted its first workshop in the Safeguards Extension Lab, which allows students to use rare equipment, including the tomographic gamma scanner and californium shuffler and to conduct two-fold safeguards and waste characterization experiments.

Fig. 5. Students from the University of Georgia's Center for Trade and International Security and the Georgia Institute of Technology at ORNL.

The figures below show the number of attendees at the university workshops from 2013–2017 (Fig. 6) and the breakdown of attendance by the various universities (Fig. 7). UTK and NCSU have attended the most workshops at ORNL, with 5, followed by the University of Georgia and Clemson, with 4.

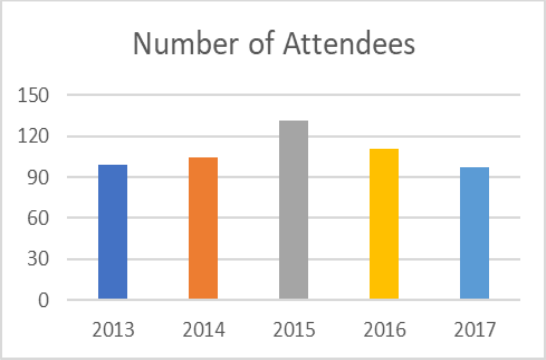

Fig. 6. University attendees at ORNL nonproliferation workshops, 2013–2017.

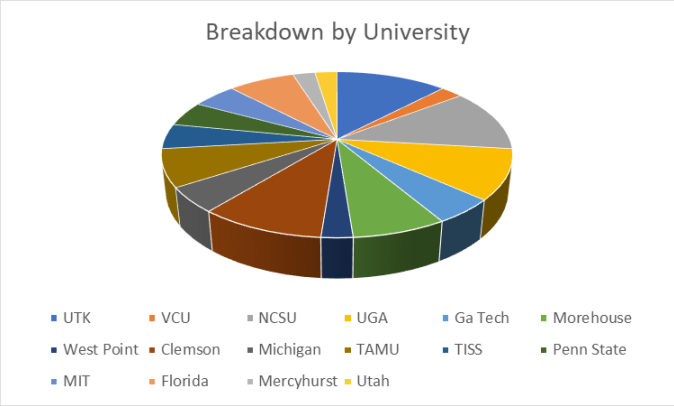

Fig. 7. University attendees at ORNL nonproliferation workshops, broken down by university.

CONCLUSIONS

Over the last 6 years, ORNL has hosted many students in nonproliferation workshops. Although the number of workshops ebbs and flows from year-to-year dependent on funding, the content of the workshops (and the students attending) continues to evolve. The creation of the SEL and the inclusion of more policy students (and the opportunity to visit Y-12) allow for the human capital development team at ORNL to provide a unique experience to each group. The ORNL team has also seen some retention from the workshops in the form of summer interns, and hopes that this trend continues throughout FY 2018 [8].

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