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Sandia National Laboratories Early Career University Faculty Mentoring Program in International Safeguards

Azaree Lintereur[1], Braden Goddard[2],
Natacha Peter-Stein[3], Alexander Solodov[3]

[1]Ken and Mary Alice Lindquist Department of Nuclear Engineering
Penn State University
[2]Mechanical and Nuclear Engineering Department
Virginia Commonwealth University
[3]Sandia National Laboratories*

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Introduction

- Experts in international safeguards are integral to the peaceful use of nuclear energy
- The development of these experts requires dedicated educational and training programs
- University faculty are an essential component of educational opportunities for students

However, there are often limited professional development opportunities for faculty

Faculty Metrics

- Retention of faculty in areas relevant to international safeguards requires mentoring and knowledge transfer programs
- Early career faculty are expected to be proficient in three key areas
  - Scholarly activity
  - Teaching
  - Service

- **Programs that enhance expertise in these areas provide faculty with the tools to be successful**

Faculty Mentoring

- Internal faculty mentoring programs cover a lot of information, but often are not specific to the faculty member's area of expertise

- **Focused mentoring programs are an effective method of concentrated knowledge transfer**

Sandia National Laboratory Mentoring Program

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- Sandia National Laboratories developed a mentoring program to provide opportunities for early career faculty establishing research groups focused on international safeguards
- Two faculty members participated in the inaugural year of the program
  - Individual faculty goals established prior to the start of the mentoring period
  - Faculty members assigned mentors related to their specific areas of interest
  - Intensive knowledge transfer enabled by two week faculty visits
  - Emphasis on research (scholarly activity) and teaching

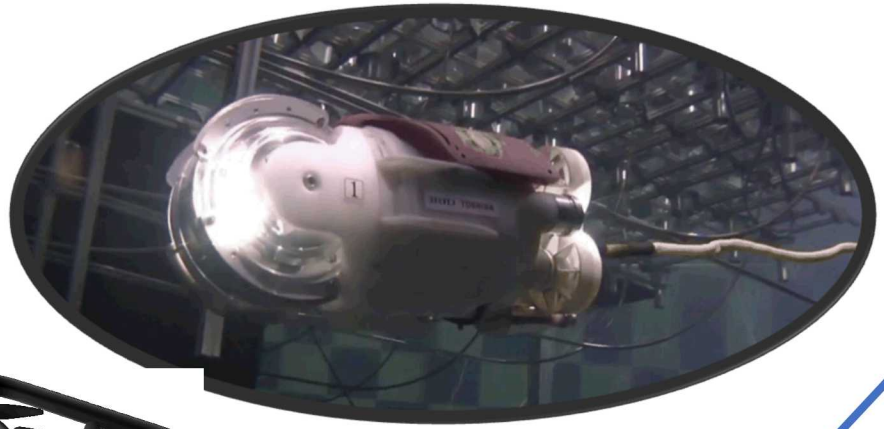
Activities During Visit

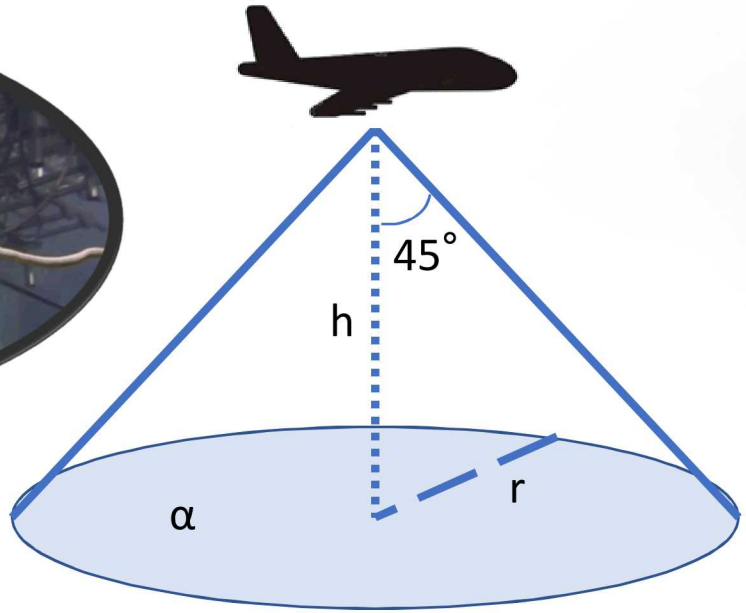
- PSU Faculty
  - Focused on Safeguards by Design
  - Topics relevant to safeguards for MSRs
  - Developed material for a graduate level Safeguards by Design course
    - Offered Fall 2021

Example Topics*
Introduction, Safeguards vs. Security
Policy and Facilities
Safeguards Technology
s Monitoring
ng Example, MUF Calculations
, SBD Case Study
nics
, Simulations Example
ed Facilities (SMR, Molten Salt)
or Advanced Facilities
on, Safeguards and Cyber Security
, Exam 2
E

Activities During Visit

- VCU Faculty
  - Focused on Unmanned Robotic Systems for Safeguards Applications
    - Future technology to potentially improve safeguards while reducing costs
  - Developed material for multiple educational modules
    - Will be incorporated into fall 2020 classes





Activities During Visit

- In addition to individual activities the visit also included tours of relevant facilities and meeting with subject matter experts other then the assigned mentors

Technology and Training Demonstration Center

The National Solar Thermal Test Facility

Outcomes

- This program led to
  - An expanded professional network for two early career faculty
  - International safeguards knowledge transfer from subject matter experts to faculty members
  - Several submitted research proposals
  - The development of safeguards related educational materials
  - Plans for joint PSU/VCU student opportunities

Cohort 2020

- The program is in its second year, with two new early career faculty members

Angela Di Fulvio –
Assistant Professor
University of Illinois
Nuclear, Plasma & Radiological Engineering

Kyle Hartig –
Assistant Professor
University of Florida
Department of Materials Science and Engineering

Conclusions

- Dedicated mentoring programs provide valuable faculty development opportunities
- This program resulted in tangible and intangible benefits
- Lessons learned
  - Early pairing of faculty and mentors was essential for the success of the program
  - Future faculty visits should include opportunities for faculty to showcase their research efforts to laboratory scientists to build additional connections

Year 1 faculty members and two of the laboratory mentors

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