Next Generation Safeguards Initiative

Human Capital Development Program
The **Next Generation Safeguards Initiative (NGSI)** is a robust, multi-year program to develop the policies, concepts, technologies, expertise, and international safeguards infrastructure to strengthen and sustain the international system as it evolves to meet new challenges over the next 25 years.

At the U.S. Department of Energy, we have undertaken a major effort called the Next Generation Safeguards Initiative to identify technology gaps and solutions, train new experts, and develop new concepts and approaches to improve international safeguards.”

- *Secretary of Energy Steven Chu in Vienna, September 2010*
The NGSI HCD Program

The Human Capital Development (HCD) Program is:

• Revitalizing and expanding the international safeguards human capital base in the United States by attracting and training a new generation of talent

• Recruiting high quality candidates for positions in the IAEA’s Safeguards Dept.

• Identifying ways to integrate efforts to promote human capital development in the United States with our international engagement programs
International Safeguards
Human Capital Challenges

The United States

• By 2024, an estimated 82% of international safeguards specialists at the U.S. National Labs will have left the workforce

The IAEA

• In 2008, IAEA officials estimated that more than a third of senior IAEA staff are expected to retire by 2011 and more than 50% by 2013

• The combination of growing workload, increasing complexity of the work, and anticipated retirements pose particular challenges to the IAEA Department of Safeguards.
Estimated Attrition of U.S. Lab International Safeguards Specialists

Source: ORISE workforce staffing study commissioned by NGSI, September 2010
Attrition of IAEA Experience

Source: ORISE workforce staffing study commissioned by NGSI, September 2010

Attrition of 2009 International Safeguards Specialist Lab Staff with IAEA Experience

Source: ORISE workforce staffing study commissioned by NGSI, September 2010
**Facility Level Core Capabilities**

1. Nuclear Materials Accounting  
2. Non-Destructive Assay  
3. Destructive Assay  
4. Containment Technology  
5. Data Authentication  
6. Surveillance Systems  
7. Design Verification Technology  
8. Safeguards Simulation & Modelling  
9. Information Systems  
10. Location-Specific Environmental Sampling & Analysis  
12. Technology-Specific Proliferation Risk Analysis

**State-Wide Core Capabilities**

13. State-Level Approach  
14. State-Level Information Analysis  
15. Satellite Imagery Analysis  
16. Field Assessment Tools  
17. Wide-Area Environmental Sampling  
18. Proliferation Assessment

**International-Level Core Capabilities**

19. Non-proliferation Regime Expertise  
20. Safeguards Agreements and Legal Authorities  
21. Non-proliferation/Safeguards Policy Analysis  
22. Safeguards Infrastructure Development  
23. Safeguards Education and Training
NGSI HCD Program Efforts

- University engagement and coursework development
- NNIS Graduate Fellowship
- Short safeguards courses
- Safeguards internships at National Labs
- Post-Doc positions at the National Labs
- Professional Development opportunities for young and mid-career professionals
Lab - University partnerships

• Promoting an interdisciplinary (technical/policy) approach
• Targeting universities
  – With large nuclear engineering programs and/or strong nonproliferation policy programs
  – Which have a close working relationship and geographic proximity to a National Lab
• Identifying university faculty champions
• Encouraging regional networks of Lab-university partnerships
Lab – University Engagement

• Developing new undergraduate and graduate level coursework for academic credit in international safeguards and nonproliferation

• Funding guest lectures by National Lab experts at a number of U.S. universities

• Nuclear Nonproliferation and International Safeguards (NNIS) Graduate Fellowship Program
• Clemson University
• University of California, Berkeley
• University of Florida
• Georgia Institute of Technology
• University of Illinois
• Massachusetts Institute of Technology
• University of Michigan
• University of Missouri
• North Carolina State University
• Oregon State University
• University of Tennessee
• University of Texas
• Texas A&M University
Short safeguards courses

- Brookhaven National Lab
  - 3 week course on nuclear nonproliferation and safeguards policy
- Monterey Institute / Lawrence Livermore National Lab
  - 1 week course on international safeguards policy and information analysis
- Texas A&M / Los Alamos National Lab
  - 1 week technical safeguards course
- Oak Ridge National Lab
  - 3 day NDA courses for university groups
- Pacific Northwest National Lab
  - 1 week intensive safeguards overview course for interns
- UC San Diego Institute for Global Conflict and Cooperation
  - 3 week Public Policy and Nuclear Threats course
- Idaho National Laboratory
  - 2 week Pre-Inspector Equipment Training course
- Lawrence Livermore National Lab
  - 1 week course for the USG interagency
From 2008 – 2010, NGSI sponsored 297 safeguards internships and post-docs for students from 73 different universities at 9 National Laboratories

- 23% have transitioned to Laboratory staff
- 36% returned for another internship in summer 2011
- 19% are now pursuing Masters or PhD degrees with a nonproliferation focus
- 5% are now in JPO positions at the IAEA
Student and Intern Demographics

Breakdown by Degree Program
- Masters 40%
- Undergraduate 40%
- Ph.D. 20%

By Background
- Technical 66%
- Policy 34%

Breakdown by Laboratory
- ORNL 22%
- PNNL 21%
- BNL 15%
- LLNL 20%
- SRNL 4%
- INL 4%
- LANL 13%
- SNL 1%
Towards the Future

- Integrate efforts to promote human capital development in the United States with our international engagement programs
  - Open to Foreign Nationals:
    - Safeguards internships at U.S. National Labs
    - Short safeguards courses at U.S. National Labs
    - Post-doctoral fellowships at U.S. National Labs
- Place special focus on mid-career professionals and new safeguards staff
- Complete a follow-up workforce staffing study
I. NGSI Sponsored Programs

NGSI Paid Internships at the National Laboratories

**Description:** paid internship working on safeguards projects at a DOE National Laboratory; paired with a team and/or mentor; possibility to attend and present work at the Institute of Nuclear Materials Management (INMM) annual conference

**Timeline:** most positions are approximately 2 to 3 months in the internship; application deadlines vary but most are open early tr

**Who qualifies:** undergraduate and graduate students (masters or doctoral applicants welcome); most positions are technical (engineering, physics, chemistry, computer science)

**BNL:** contact Susan Pepper
**LANL:** https://exportlibriumreporter/server.ppt/community/educat
**ORNL:** http://cos.mns.edu/edu/internship_nugutsaf.htm
**SNL:** contact Danna Blair
**SNS:** http://www.savannahnvensolutions.com/careers

NGSI Short Courses

**MRS/LANL:** International Safeguards Policy and Information Ana http://cos.mns.edu/edu/course_nugs.htm
**Timeline:** 3 weeks in June/July
**Who qualifies:** university students at any level or young profession

**Timeline:** abstracts due early in the calendar year; papers due in June in
**Who qualifies:** students at any level or young professio

UCSD-SSC: Public Policy and Nuclear Threats
http://pose.ucsd.edu/PNNL.hnp

NGSI Nuclear Nonproliferation and International Safeguards (NNIS) Fellowship

**Description:** graduate school fellowship (full tuition plus stipend) to support highly talented students focusing on nonproliferation or safeguards applications in their studies and research; fellowship includes summer employment at a DOE National Laboratory

**Timeline:** application due in early March each year; fellowship funds 1-4

**Who qualifies:** U.S. citizens who are nuclear engineering or physical science universities

**BNL:** contact Susan Pepper
**LANL:** https://exportlibriumreporter/server.ppt/community/educat
**ORNL:** http://cos.mns.edu/edu/internship_nugutsaf.htm
**SNL:** contact Danna Blair
**SNS:** http://www.savannahnvensolutions.com/careers

NGSI Post-Masters or Post-Doctoral positions at U.S. National Labs

**Contact Melissa Schott for Lab POC information
**Description:** full-time paid positions at DOE National Laboratories works

**Timeline:**滚动
**Who qualifies:** primarily post-doctoral researchers in technical discipline participating Labs are INL, LANL, ORNL, SNL, and SNS

JD Williams Student Paper Award

http://www.inmm.org/Scholarships_and Awards.htm

**Description:** a paper/poster award sponsored by NGSI at the Annual Management (INMM); $1000 first prize paper, $500 second prize paper.

**Timeline:** abstracts due early in the calendar year; papers due in June in

**Who qualifies:** any full-time student at an accredited educational institutions required deadlines and attend the INMM annual meeting to present hi

II. Non-NGSI programs in the field of nuclear non

Nonproliferation Graduate Fellowship Program (NGFP)

http://waffi.mntau.com

World Nuclear University (WNU)

http://www.world-nuclear-university.org/about.aspx?id=17688

**Description:** a six-week leadership development program held annually at the University of Oxford in Christ Church, UK

**Timeline:** applications due in November for the course the following July/August

**Who qualifies:** qualifications include current employment in the industry (3+ years relevant work experience in the nuclear industry or government); master’s degree in science, engineering, or business— or reactor operator’s license — or equivalent experience; knowledge of nuclear fundamentals; maximum age of 37 (see website for application form)

Project on Nuclear Issues (PONI) Nuclear Scholars Initiative at CSIS

http://csis.org/program/nuclear-scholars-initiative

**Description:** a program for up-and-comers in the field to add depth and breadth to their understanding of nuclear weapons issues and to publish their original work

**Timeline:** six-month program (once per month workshops in Washington, DC)

**Who qualifies:** graduate students and young professionals from around the country with a demonstrated interest and/or experience in nuclear issues

NNSA Future Leaders Program

http://nnsa.energy.gov/futureleaders

**Description:** Two-year entry-level program at the National Nuclear Security Administration (NNSA) for bachelor’s or master’s degree graduates; programs for all of NNSA and not just the Office of Defense Nuclear Nonproliferation (i.e., some positions are in nonproliferation).

**Timeline:** 2 year placement in 2 rotational positions (one in Washington, DC and one at a field site)

**Who qualifies:** Graduates with a bachelor’s and/or master’s degree in engineering, science, business, or other disciplines; benefits include a student-loan payback program and federal-employee status; about 30 recent graduates are hired as Future Leaders each year

Center for Nonproliferation Studies Nonproliferation Internships
http://cos.nns.edu/edu/internship_summer.htm
http://cos.nns.edu/edu/internship_ds.htm

**Description:** Internships at the James Martin Center for Nonproliferation Studies (CNS), Monterey Institute of
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