

Domestic Nuclear Detection Office (DNDO)

Efforts and Challenges for Nuclear Forensics R&D in the United States

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Domestic Nuclear Detection Office

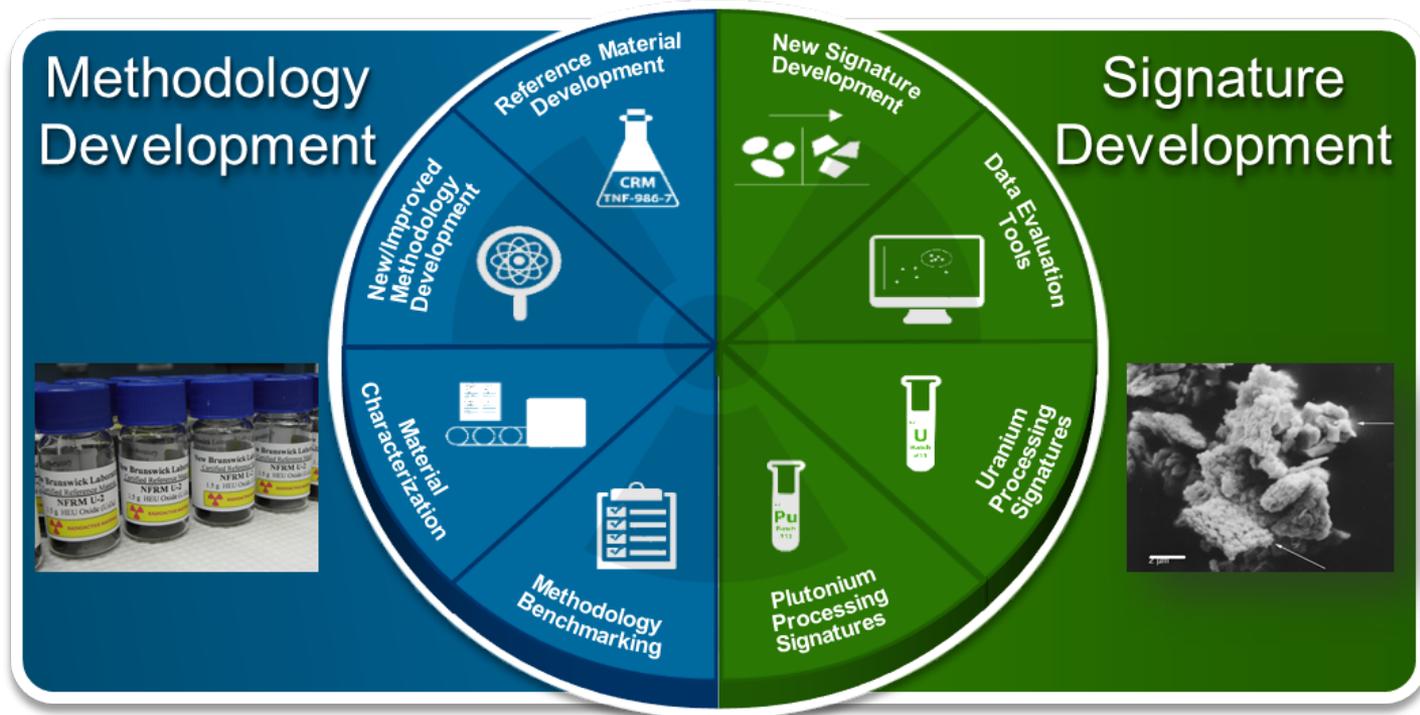
U.S. Department of Homeland Security



Homeland
Security

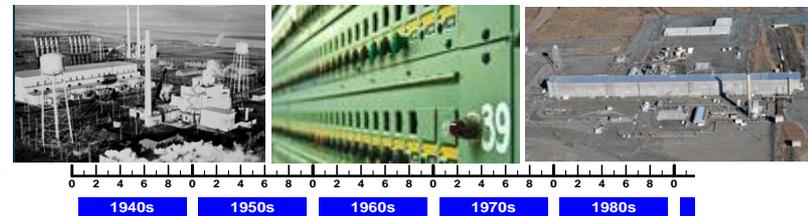
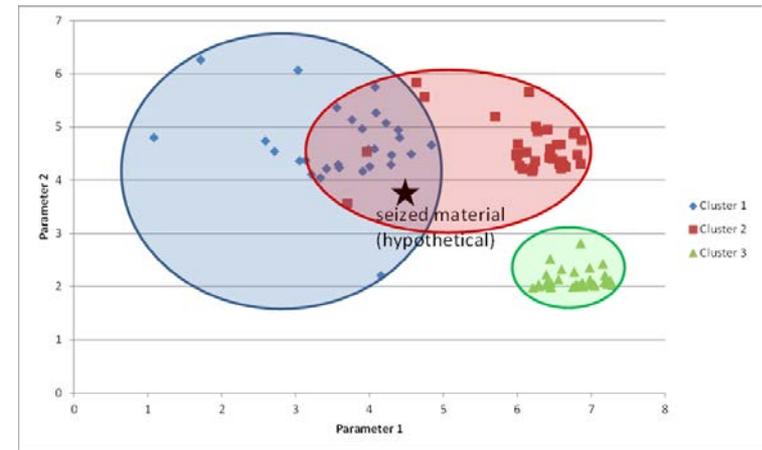
Nuclear Forensics Research & Development

- The Technology Advancement Program **closes gaps** in operational capabilities and **increases performance** (speed, accuracy, and confidence) of established analytical capabilities through two portfolios:
 - **Methodology Development** produces certified reference materials integral to nuclear forensic analyses, advances and improves laboratory methods, and demonstrates these methods through characterization of properties of materials in the US inventory.
 - **Signature Development** advances data evaluation tools, develops models to predict signatures, and develops processes to distinguish characteristic material signatures.



Technology Advancement Challenges

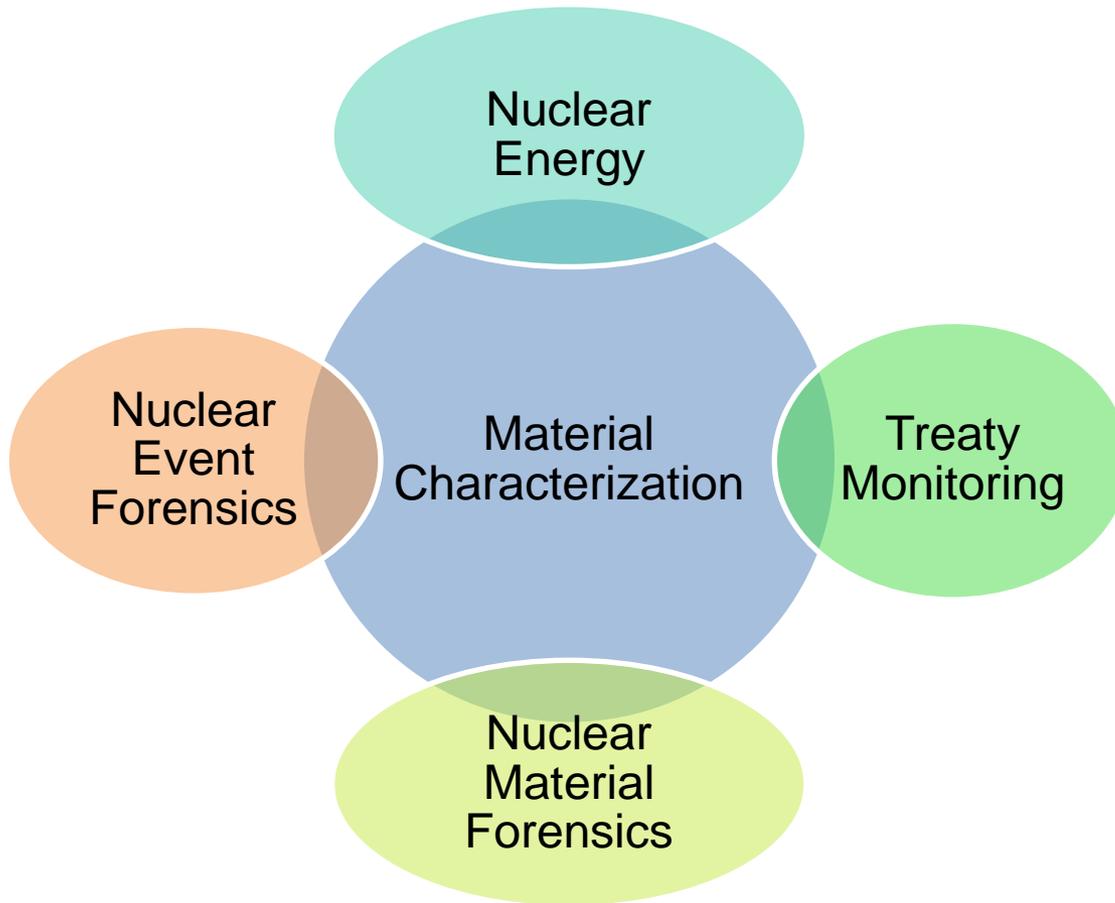
- **Methodology Development**
 - Developing Certified Reference Materials for nuclear forensics takes time
 - International Collaborations will help
- **Signature Development**
 - National Nuclear Forensic Library: Algorithms to link material characteristics to class clusters
 - Material Science: Microstructure analysis for nuclear forensics, including “smart” image analysis tools
- **Preparing the Next Generation of Nuclear Forensics Scientists**



Material Production Timelines



Nuclear Forensics Expertise

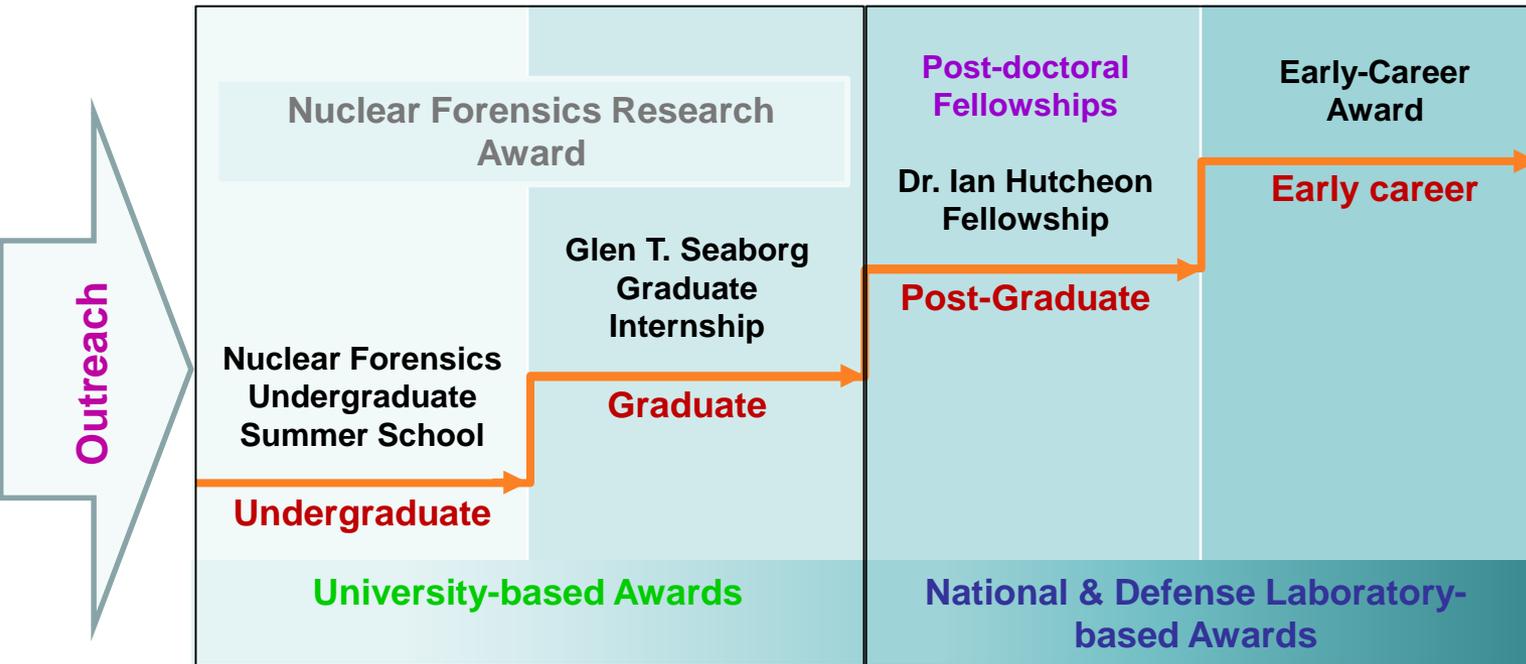


Relies on Multi-Disciplinary Expertise

- Radiochemists
- Geochemists
- Analytical Chemists
- Nuclear Engineers
- Reactor Engineers
- Process Engineers
- Physicists
- Nuclear Physicists
- Statisticians
- Metallurgists



National Nuclear Forensics Expertise Development Program



*Thank You and
Looking Forward to
Our Discussion*