

# Nuclear Structure Evaluators Traineeship at Lawrence Livermore National Laboratory

**Workshop for Applied Nuclear Data (WANDA) 2025**

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# The Team

(NNDC/BNL)



Libby McCutchan (PI)

Manager of XUNDL Database  
Manager of ENSDF Database  
10+ years as ENSDF evaluator



Chris Morse (Co-I)

Lead on ENSDF modernization  
project and ENSDF evaluator



Vincent Cheung  
(Theory)

Expertise in nuclear data  
library management and  
radiation detection

(LLNL)



Anthony Ramirez  
(Experiment)

Specializes in fission (FPY),  
nuclear reactions



Kay Kolos (LLNL-PI)

Expert in fission, nuclear decay  
mechanisms, and radiation studies



# Importance of ENSDF

ENSDF is the **ONLY** comprehensive repository for nuclear structure and decay data

## Nuclear Structure Data

### Discrete Quantized States

- Excitation Energy
- Half-life
- Angular Momentum
- ...

### Emitted Radiation

- Energy
- Intensity
- Dipole, Quadrupole, ...
- ...

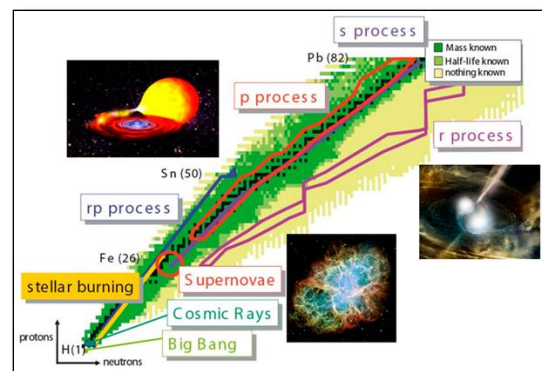
## Nuclear Decay Data

### For each decay type:

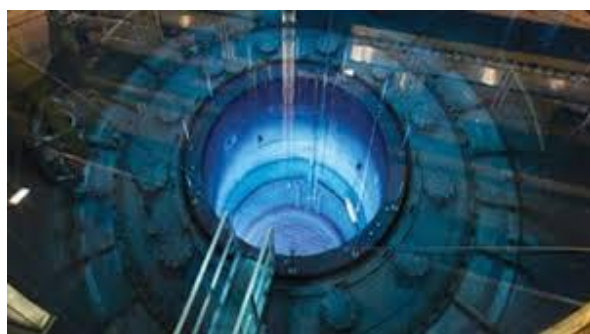
- Half-life
- Branching ratio
- ...

Basic Science

Applications



Astrophysics



Nuclear Energy

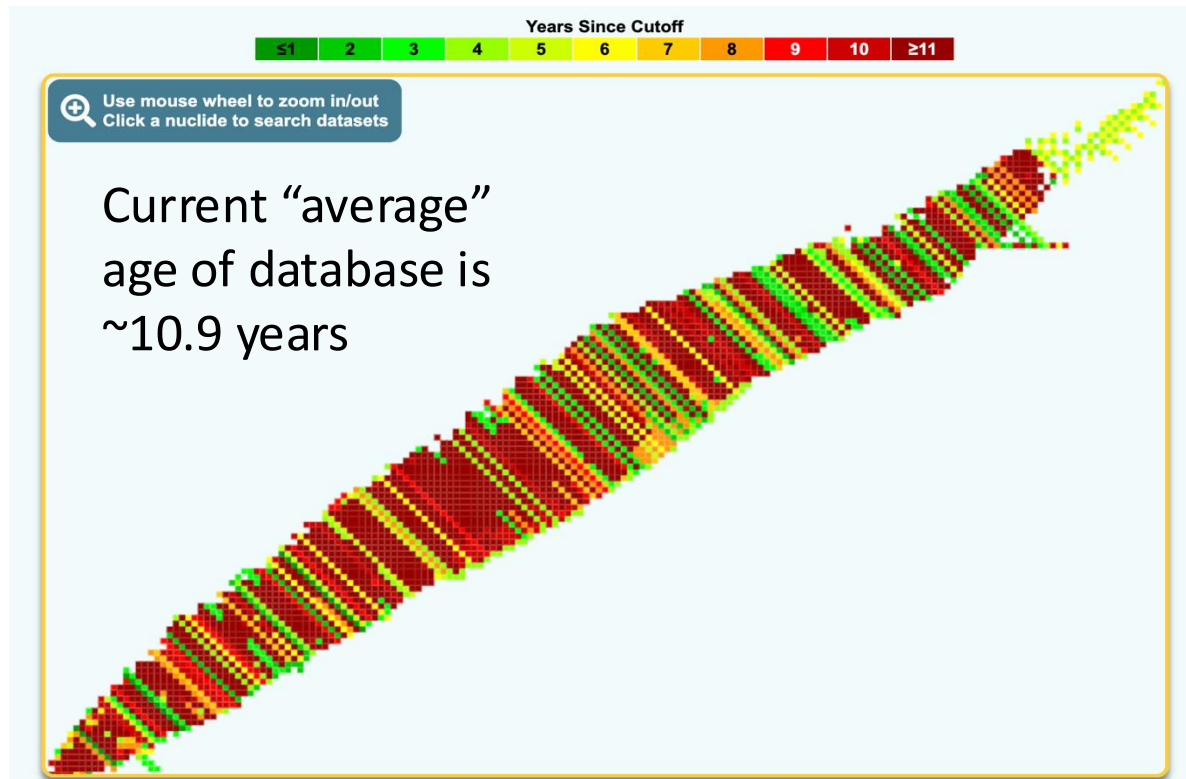
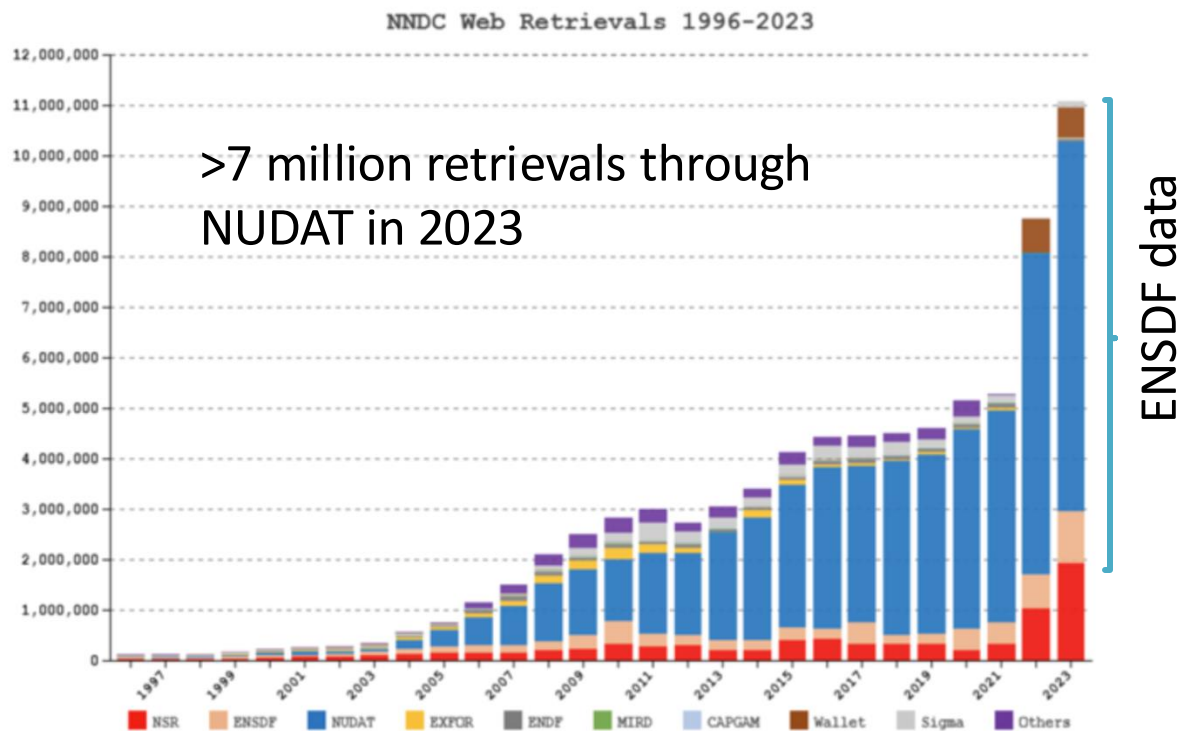


Homeland Security



Stockpile Stewardship

# Challenges and Need



Aging Database + Growing Volume of Data (new RIB facilities + WANDA-driven measurements) = Demand for New Evaluators

# Project Objectives and Training Structure

## Objective 1: Training for XUNDL Database Compilations

- Familiarize trainees with the XUNDL database structure
- Extract and vet experimental data from publications
- Learn tools and codes for data extraction and conversion

## Objective 2: Training for Decay Data Evaluations

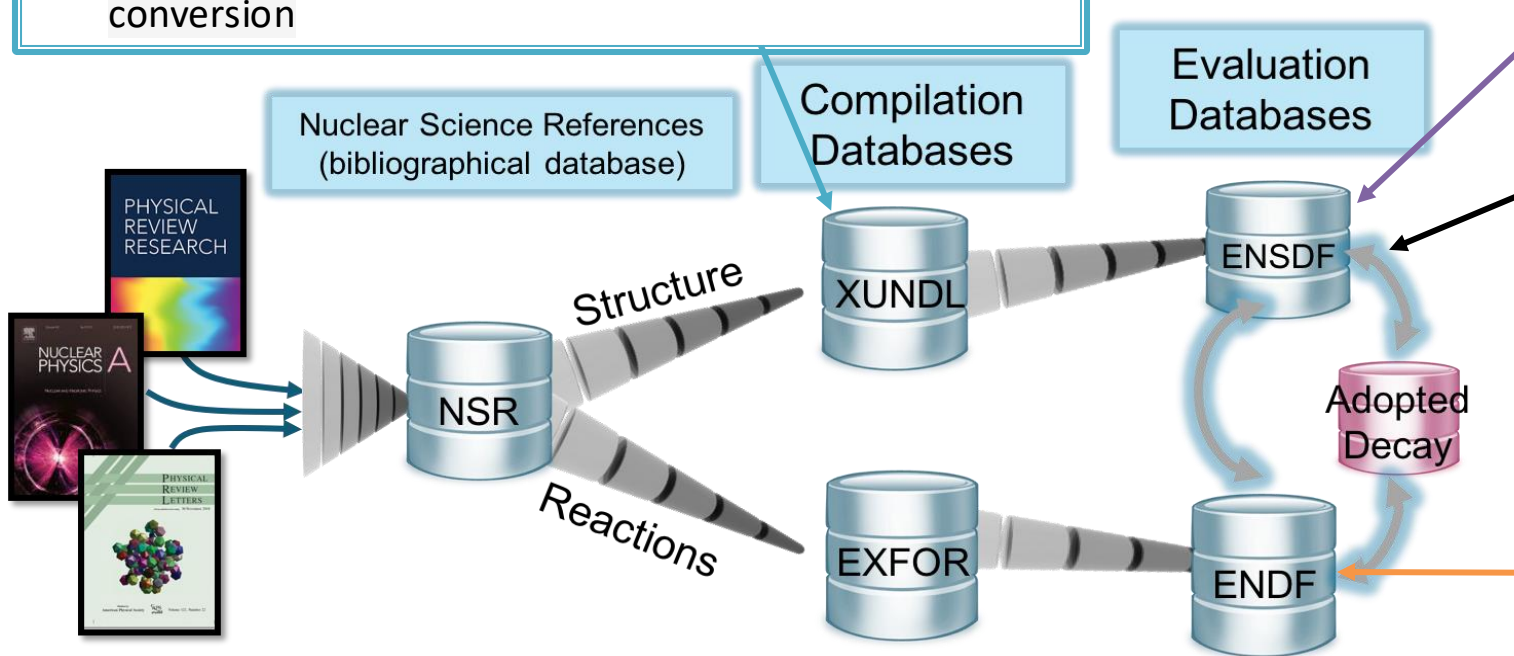
- Focus on specific ENSDF and radioactive decay datasets

## Objective 3: Training for ENSDF Database Evaluations

- Full nuclide evaluations for the ENSDF database

## Objective 4: Training for ENSDF to ENDF Decay Data Translation

- Converting ENSDF decay data to the ENDF Decay Sublibrary



# Year 1 – First Quarter Progress

- Attended the Cross Section Evaluation Working Group (CSEWG) meeting in November 2024
- Participated in an intensive, in-person training at BNL
  - Learned to use tools and codes for data extraction and evaluation
- Began performing XUNDL database compilations
  - Compiled 30 datasets; roughly 10% of yearly XUNDL effort

## Next Steps:

- Continue working closely with mentors to ensure completeness and accuracy of compilations
- Gradually expand to more complex datasets



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