The Naval Nuclear Laboratory is operated for the U.S. Department of Energy by Fluor Marine Propulsion, LLC, a wholly owned subsidiary of Fluor Corporation.

Stumbling Blocks, Needs, and Available Resources for Creating Adjusted Libraries

Amanda Lewis
The process of data adjustment

**Theory**
- Differential data

**Integral data**
- Fast reactors integral data, sensitives, models
- Criticality safety integral data, sensitives, models
- Other applications

**General purpose differential library**
- Fast reactor-constrained library
- Criticality safety-constrained library
- Other application-constrained library

**Adjustment procedure**
- Physics constraints
- Methods
For a trusted, consistent framework for developing constrained libraries, we want:

- **Differential Data Inputs**
  - Reasonable covariances for all relevant observables
  - Understanding of how integral data has been used in differential evaluations

- **Adjustment Methods**
  - Physics constraints
  - Good fitting methods
  - Available tools?

- **Integral Data Inputs**
  - Impactful integral data
  - Sensitivity profiles
  - Database and formats
  - Accurate models and uncertainties

- **Adjusted Libraries**
  - Formats and database?
  - Understanding of applicability
  - Methods and tools for verification, validation and comparison
This session will cover all of the major topics

- Ian Hill – Integral data databases and missing uncertainties
- Catherine Percher – Assessing past data and designing new experiments
- William Marshall – TSUNAMI and concerns with adjustment
- Andrew Holcomb – SCALE and data adjustment
- Amanda Lewis – Summary of remaining stumbling blocks
Differential Nuclear Data Issues

- We want reasonable covariances for all relevant observables in the integral experiments.
  - How to assess impact when relevant observables don't have covariances?

- How do we incorporate the information that integral data were used in differential evaluations?
  - Covariances between isotopes may be important, how do we determine them?
Adjustment Method Issues

- How can physics constraints be incorporated consistently and accurately into the adjustment method?

- Should the nuclear data community create a set of widely available tools that ensure correct methods and constraints?

- What are the best fitting methods?
Integral Data Issues

- How do we ensure that we have impactful integral data for the wide variety of applications?

- Do we need a single consistent database for integral data?
  - Can we develop a format that will allow for full documentation of integral experiments?
  - How can we improve the user interaction with the integral data models?

- How do we get (and store) sensitivity profiles?

- How do we ensure that we are using accurate models of the integral experiments and have accurate uncertainties on the models and observables?
Adjusted Library Issues

- Should we develop a consistent format for adjusted libraries?
  - What is the minimum level of documentation needed?
  - How do we store the correlations between isotopes?

- How do we define and understand the limits of applicability for each adjusted library?

- How can we develop tools for verification and validation of the adjusted libraries, and how can we effectively check and compare them?