The National Nuclear Data Center as a Public Reusable Research (PuRe) Data Resource

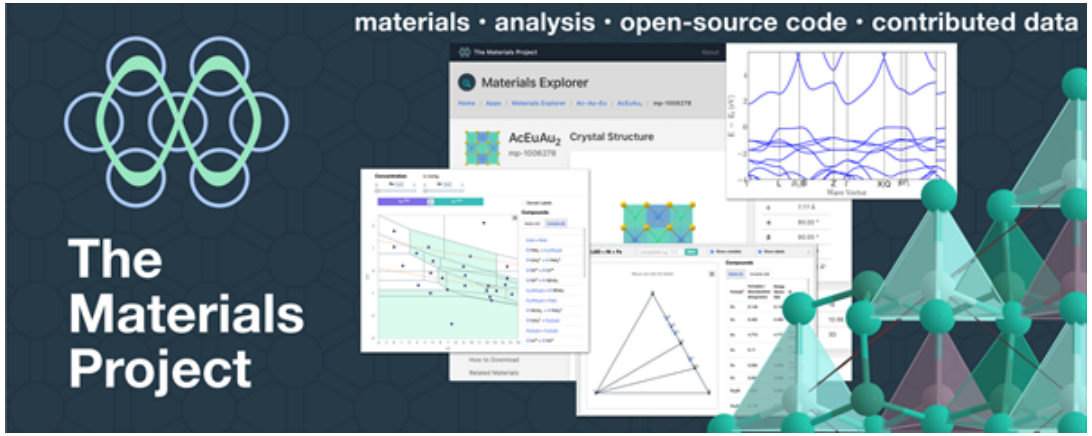
Libby Ricard – on behalf of the National Nuclear Data Center

What is PuRe?

(https://science.osti.gov/Initiatives/PuRe-Data/Policies-and-Procedures/Definition)

A Department of Energy Office of Science Public Reusable Research Data Resource (SC PuRe Data Resource) is a **data repository**, **knowledge base**, **analysis platform** or **other such activity** sponsored by the Office of Science for the **purpose of making data reusable and publicly available to advance scientific or technical knowledge**.

Initial cohort of PuRe data resources



KBase
PREDICTIVE BIOLOGY
DOE Systems Biology Knowledgebase

JGI JOINT GENOME INSTITUTE
A DOE OFFICE OF SCIENCE USER FACILITY

ARM

Brookhaven National Laboratory

Most PuRe resources from DOE-BES & DOE-BER

Initial cohort of PuRe data resources

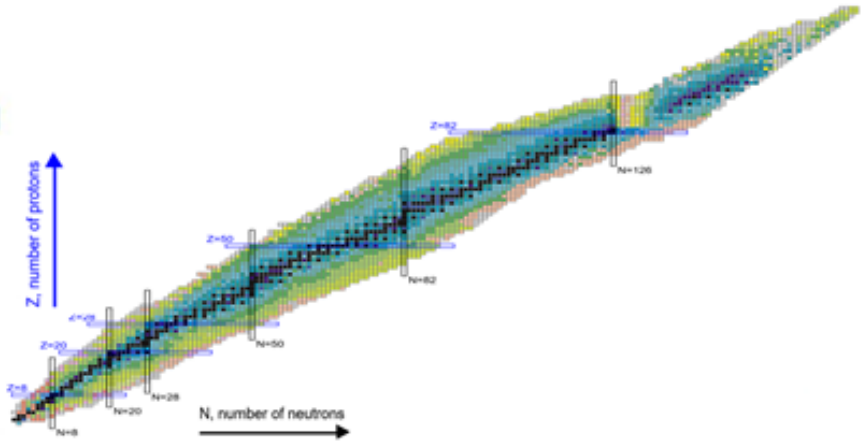
PDG particle data group

DOE-HEP: Particle Data Group

Review of Particle Properties
Elementary particles & hadron properties
Small overlap with ENSDF (n, p)

In June 2021, the NNDC was designated as a PuRe data resource

NNDC

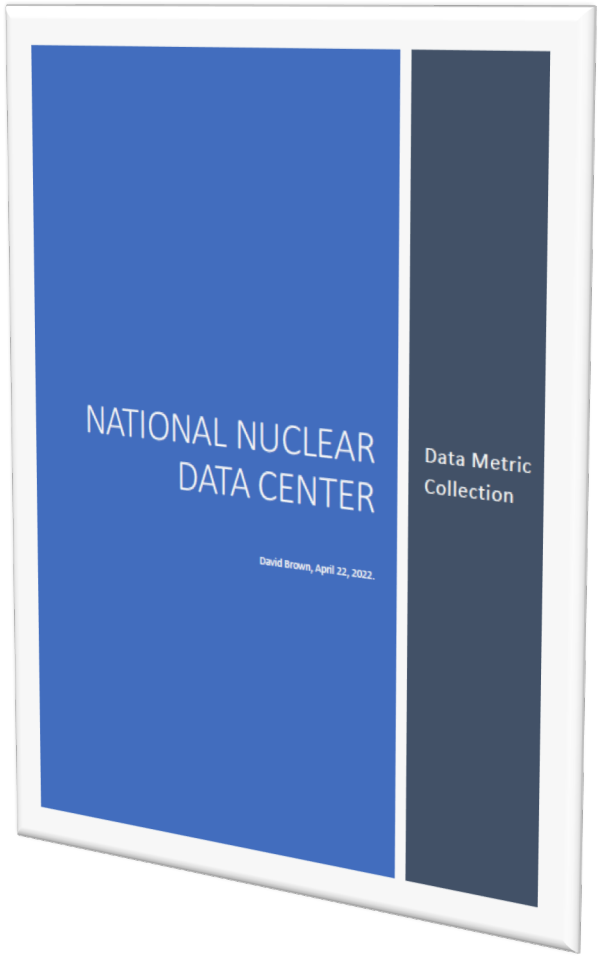


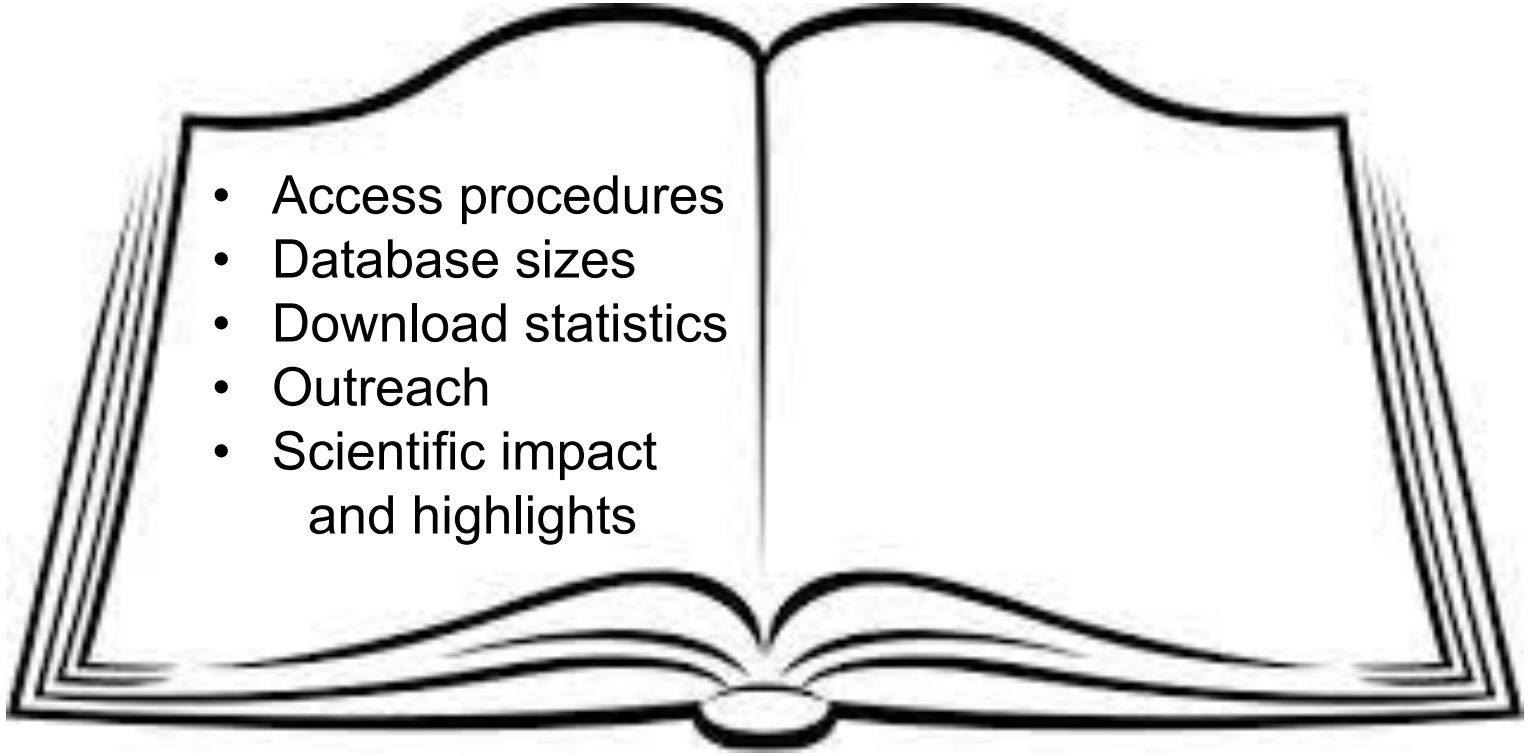
DOE-NP: National Nuclear Data Center

Nuclear structure (experimental & evaluated)
Nuclear reactions (experimental & evaluated)
Bibliographic data

Brookhaven National Laboratory

Data Metrics Document Available on Indico





- Some aspects will be covered in talks
  - Web Dissemination
  - DEI Activities
  - Open Data

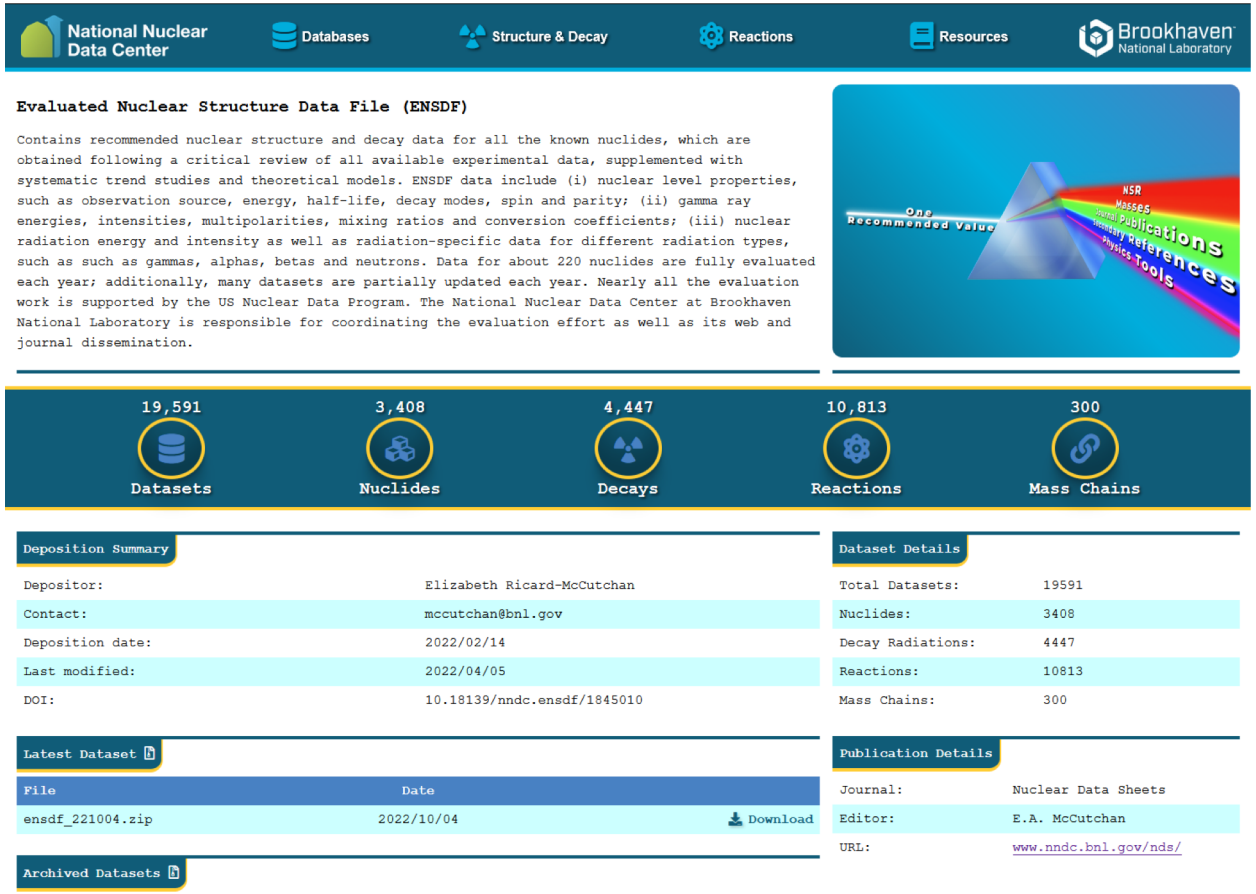
Digital Object Identifiers (DOIs)

As a **Public Reusable Research (PuRe) Data Repository** the NNDC strives to make data publicly available to advance scientific knowledge

3 major libraries now have library-wide DOIs:

- ENSDF
- XUNDL
- NSR

ENDF is next!



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Archival pages to move towards FAIR

Deposition Summary

Depositor:	Elizabeth Ricard-McCutchan
Contact:	
Deposition date:	
Last Modified:	2022/04/05
DOI:	10.18139/nndc.ensdf/1845010

FINDABLE : DOI assignment

Dataset Details

Total Datasets:	19591
Nuclides:	3408
Decay Radiations:	4447
Reactions:	10813
Mass Chains:	300

Latest Dataset

File	Date	
ensdf_230901.zip	2023/09/01	Download

Publication Details

Journal:	Nuclear Data Sheets
Editor:	E.A. McCutchan
URL	www.nndc.bnl.gov/nds/

Archived Datasets

2023

File	Date	
ensdf_230109.zip	2023/01/09	Download
ensdf_230201.zip	2023/02/01	Download
ensdf_230301.zip	2023/03/01	Download
ensdf_230403.zip	2023/04/03	Download
ensdf_230501.zip	2023/05/01	Download

ACCESSIBLE : Versioned files for download

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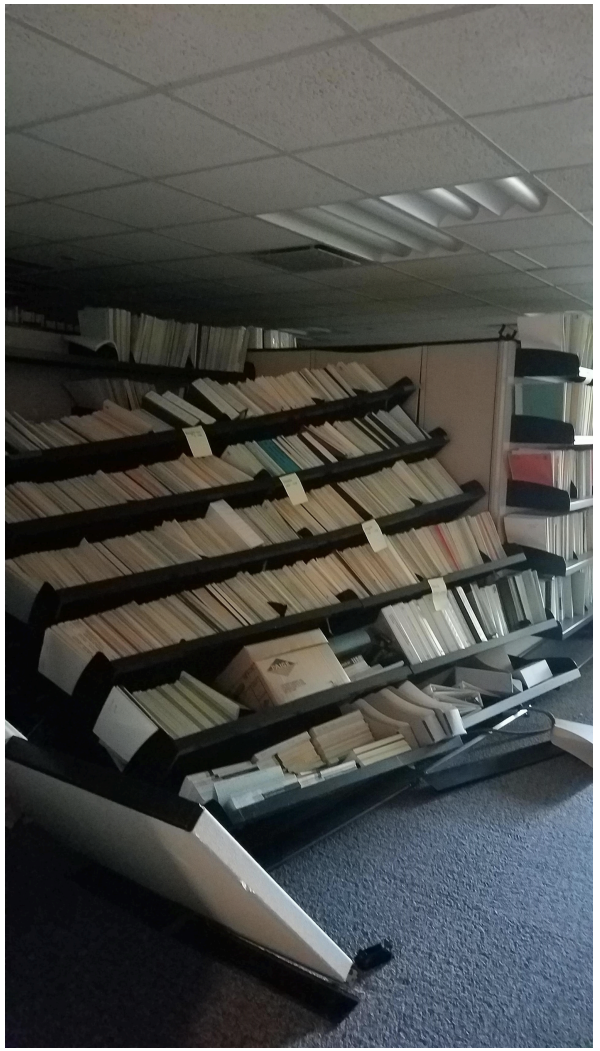
NNDC Library Transformation

Pre-COVID

During COVID



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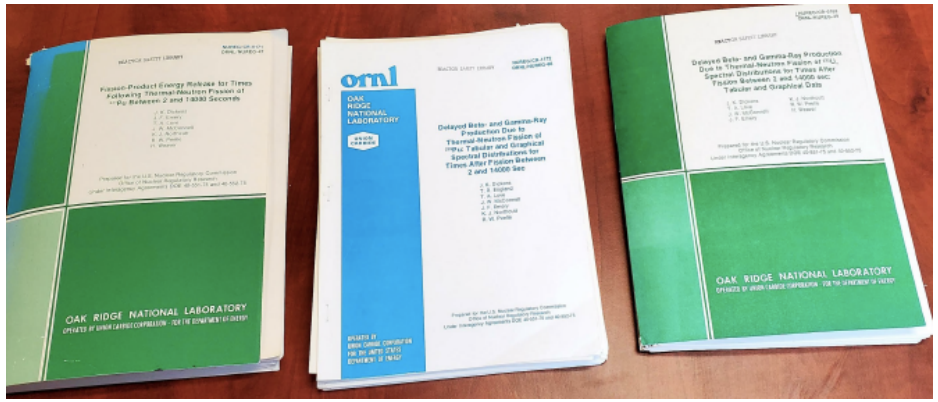
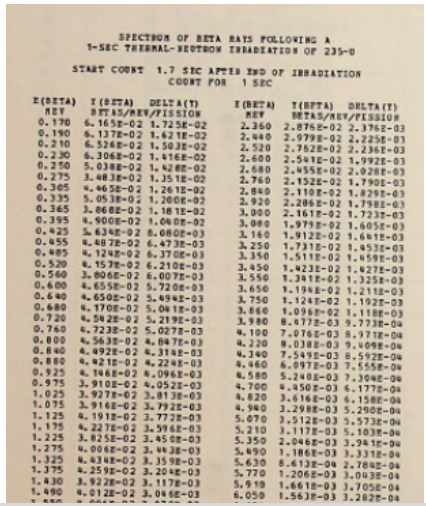
Library Disaster Solves 12 year old scientific puzzle



ORNL reports by Dicken's et al.,
Delayed gamma and electron data following thermal fission of ^{235}U, and $^{239,241}Pu$

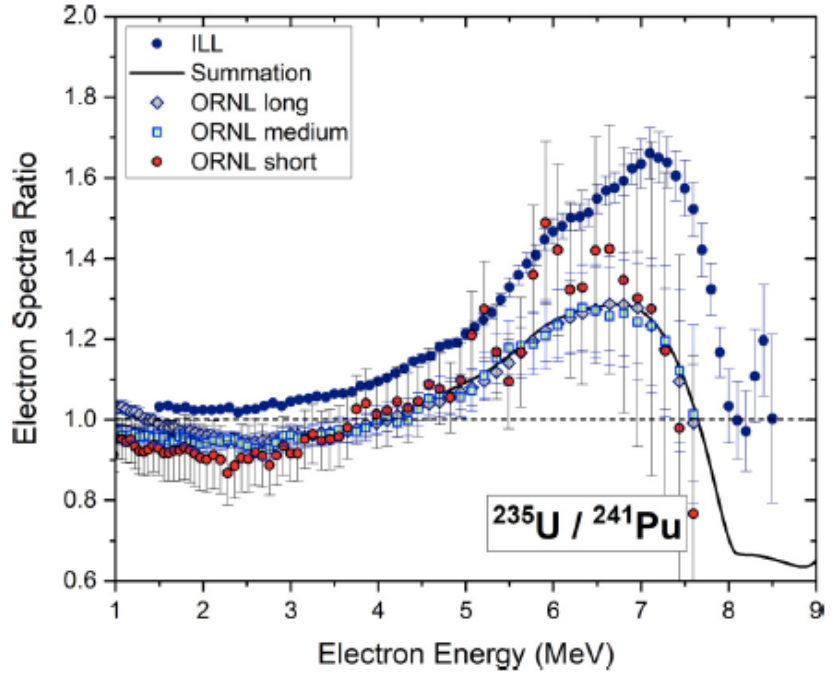

SPECTRUM OF BETA RAYS FOLLOWING A
1-SEC THERMAL-NEUTRON IRRADIATION OF 235-U

START COUNT 1.7 SEC AFTER END OF IRRADIATION
COUNT FOR 1 SEC

E(BETA) MEV	Y(BETA) BETAS/MEV/FISSION	DELTA(Y)	E(BETA) MEV	Y(BETA) BETAS/MEV/FISSION	DELTA(Y)
0.170	6.165E-02	1.725E-02	2.360	2.876E-02	2.376E-03
0.190	6.137E-02	1.621E-02	2.440	2.979E-02	2.225E-03
0.210	6.526E-02	1.503E-02	2.520	2.762E-02	2.236E-03
0.230	6.306E-02	1.416E-02	2.600	2.541E-02	1.992E-03
0.250	5.038E-02	1.428E-02	2.680	2.455E-02	2.028E-03
0.275	3.483E-02	1.351E-02	2.760	2.152E-02	1.790E-03
0.305	4.465E-02	1.261E-02	2.840	2.110E-02	1.829E-03
0.335	5.053E-02	1.260E-02	2.920	2.286E-02	1.798E-03
0.365	3.868E-02	1.181E-02	3.000	2.161E-02	1.723E-03
0.395	4.900E-02	1.040E-02	3.080	1.979E-02	1.605E-03
0.425	5.634E-02	8.080E-03	3.160	1.912E-02	1.681E-03
0.455	4.487E-02	6.473E-03	3.250	1.731E-02	1.453E-03
0.485	4.124E-02	6.370E-03	3.350	1.511E-02	1.459E-03
0.520	4.157E-02	6.210E-03	3.450	1.423E-02	1.427E-03
0.560	3.806E-02	6.007E-03	3.550	1.341E-02	1.325E-03
0.600	4.655E-02	5.720E-03	3.650	1.194E-02	1.211E-03
0.640	4.650E-02	5.494E-03	3.750	1.124E-02	1.192E-03
0.680	4.170E-02	5.041E-03	3.860	1.009E-02	1.118E-03
0.720	4.542E-02	5.219E-03	3.980	8.877E-03	9.773E-04
0.760	4.723E-02	5.027E-03	4.100	7.076E-03	8.971E-04
0.800	4.563E-02	4.847E-03	4.220	8.038E-03	9.409E-04
0.840	4.492E-02	4.318E-03	4.340	7.549E-03	8.592E-04
0.880	4.421E-02	4.224E-03	4.460	6.097E-03	7.555E-04
0.925	4.346E-02	4.096E-03	4.580	5.240E-03	7.304E-04
0.975	3.910E-02	4.052E-03	4.700	4.450E-03	6.177E-04
1.025	3.927E-02	3.813E-03	4.820	3.616E-03	6.158E-04
1.075	3.916E-02	3.792E-03	4.940	3.298E-03	5.290E-04
1.125	4.191E-02	3.772E-03	5.070	3.512E-03	5.573E-04
1.175	4.227E-02	3.596E-03	5.210	3.117E-03	5.103E-04
1.225	3.825E-02	3.452E-03	5.350	2.046E-03	3.941E-04
1.275	4.006E-02	3.443E-03	5.490	1.186E-03	3.331E-04
1.325	4.434E-02	3.359E-03	5.630	8.613E-04	2.788E-04
1.375	4.259E-02	3.204E-03	5.770	1.206E-03	3.043E-04
1.430	3.922E-02	3.117E-03	5.910	1.661E-03	3.705E-04
1.490	4.012E-02	3.018E-03	6.050	1.563E-03	3.282E-04

Digitized 260 tables !!
Created EXFOR entries

Summation calculations in good agreement with ORNL data



PHYSICAL REVIEW C **108**, 024617 (2023)

Examination of decay heat measurements and their relevance for understanding the origin of the reactor antineutrino anomaly

A. A. Sonzogni,[1,*] R. J. Lorek,[2] A. Mattera,[2] and E. A. McCutchan[2]
[1]*Nuclear Science & Technology Department, Brookhaven National Laboratory, Upton, New York 11973-5000, USA*
[2]*National Nuclear Data Center, Brookhaven National Laboratory, Upton, New York 11973-5000, USA*

Brookhaven National Laboratory

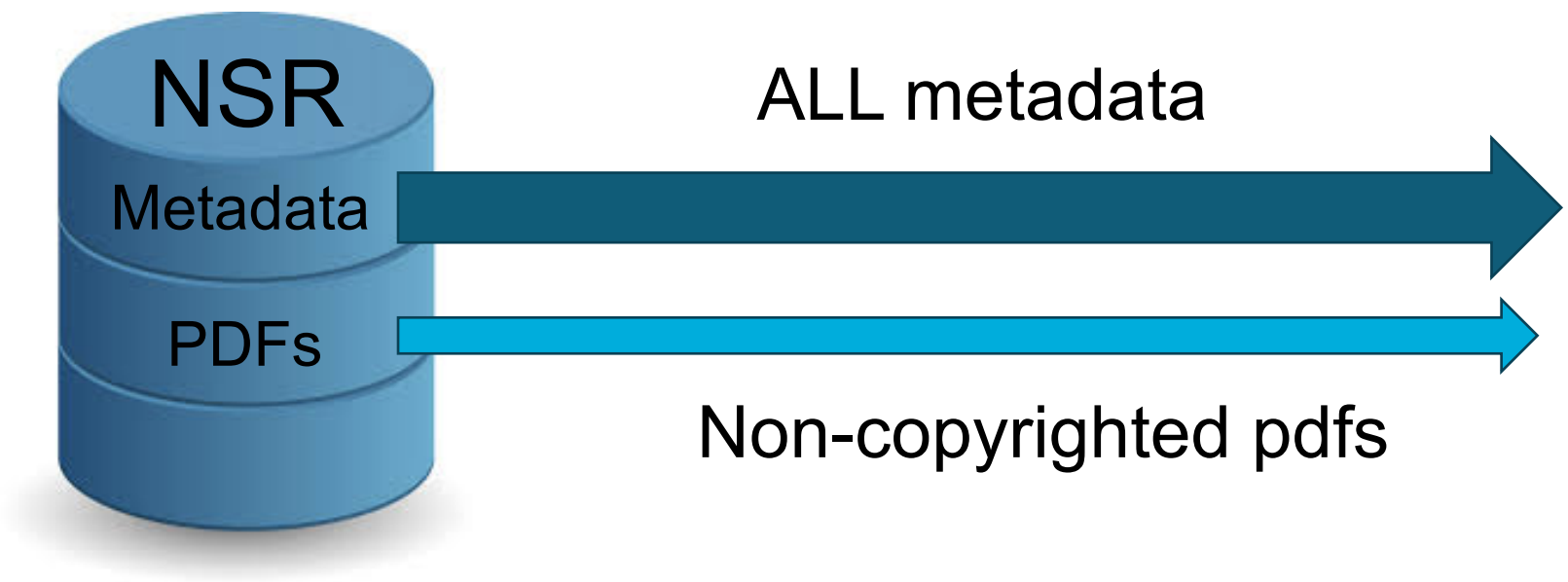
Optimal Downsizing of Library

Cat Dunn

- Cross referenced paper material with online availability
- Downloaded pdfs of material available on-line, added to NSR
- Scanned missing NSR refs

Stacy Kuczewski

- Cataloged and searched >2,000 books and conference proceedings
- BNL librarian – effort at no cost to USNDP



More than 2 year project – highly leveraged by support from BNL main library

Data management plan

Robust cloud backup since Sep. 2021

One of a kind at BNL

Backup of up to 15 TB of data from on-premise, mission-critical servers to AWS GovCloud

Continuous replication

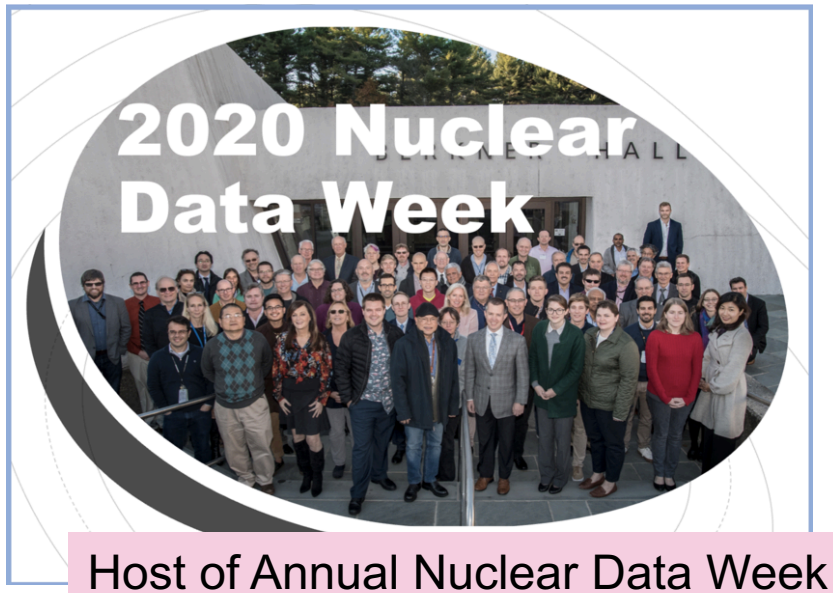
During a disaster:

1. Server backup restored from AWS GovCloud to create production-ready instance.
2. Accessible within 2 hours.

Annual cost: ~$30k fully burdened

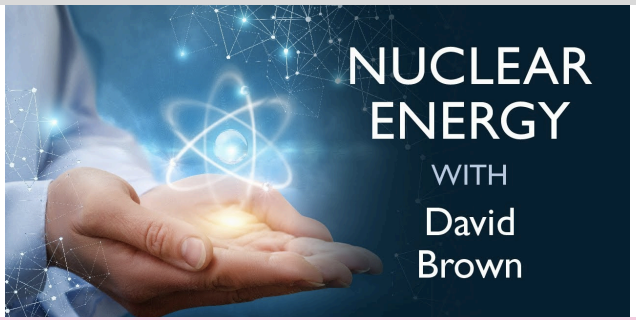
Outreach

Booth at April and October APS meetings
Virtual booths at ND2022, INMN, …



Host of Annual Nuclear Data Week including CSWEG and USNDP

www.youtube.com/watch?v=PI7UnRYaIVA

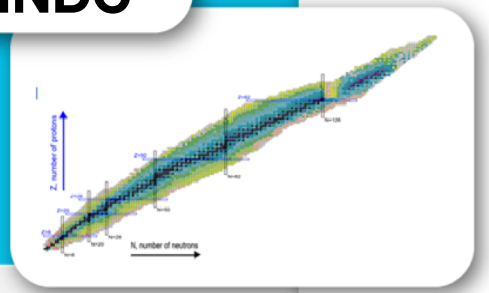


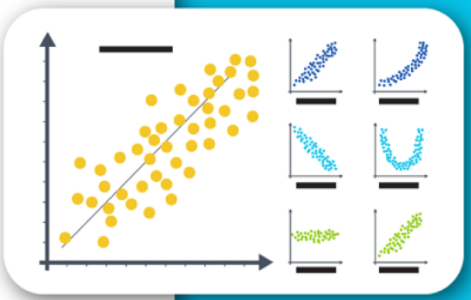
General public science talks, summer school seminars, nuclear data colloquiums

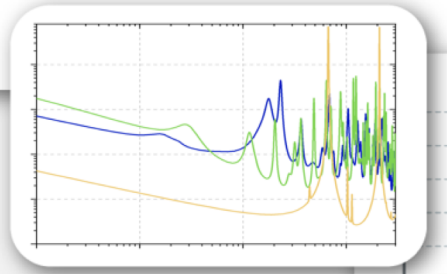
NATIONAL NUCLEAR DATA CENTER

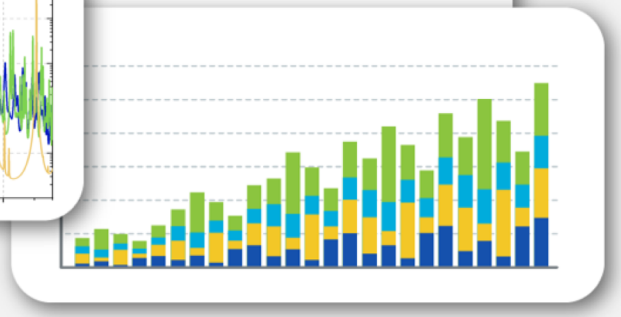
NNDC

Current, accurate, authoritative data in areas of nuclear science and engineering









PuRe Data Resources

Office of Science designated PuRe Data Resource | open data | data repositories, knowledgebases, analysis platforms