FRIENDS Data Support to FRIB Users

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Nuclear Data Working Group

2022 NSAC Long-Range Plan Town Hall Meeting on
Nuclear Structure, Reactions and Astrophysics
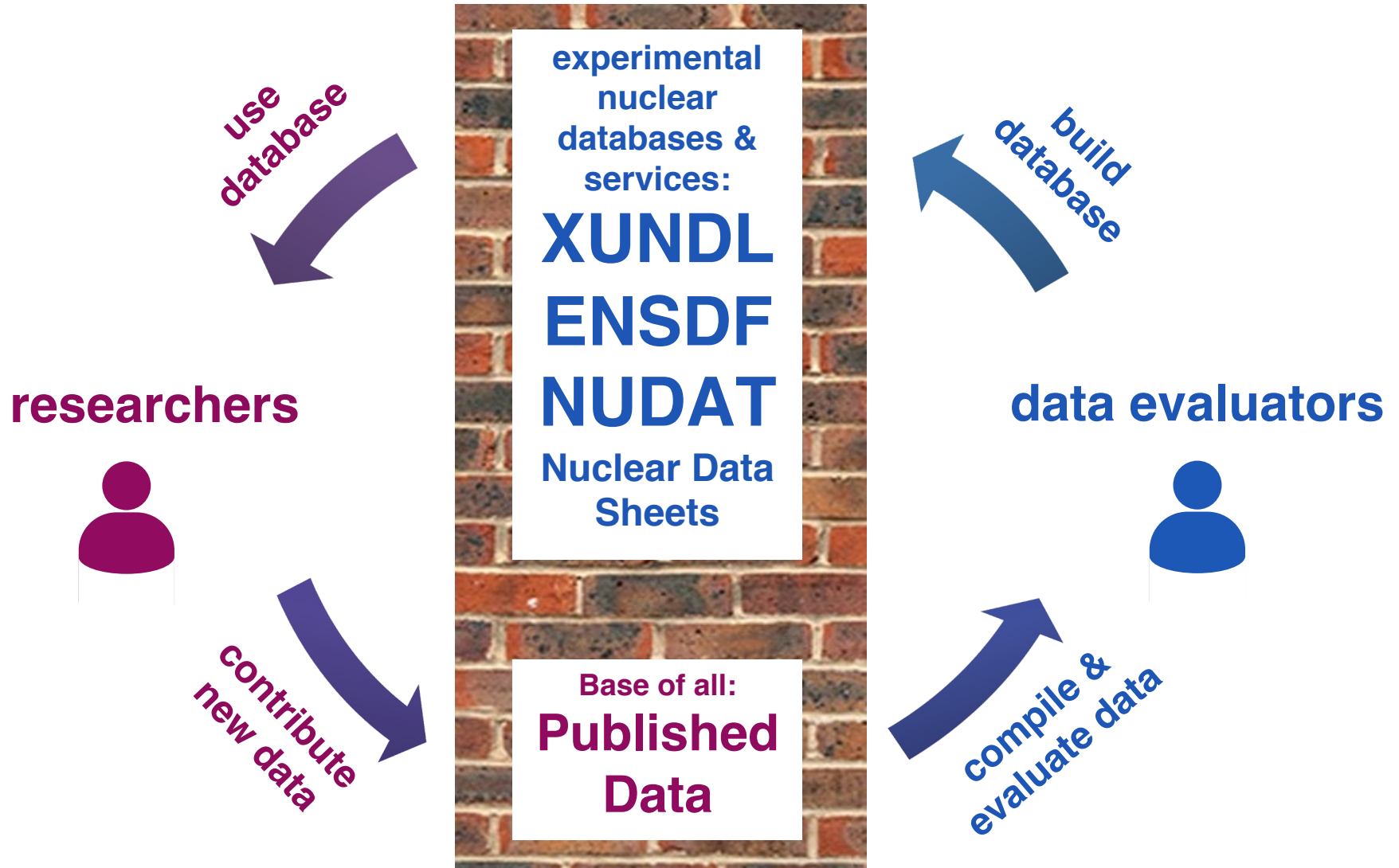
November 14-16, 2022, ANL

MICHIGAN STATE
UNIVERSITY

U.S. DEPARTMENT OF
ENERGY | Office of Science

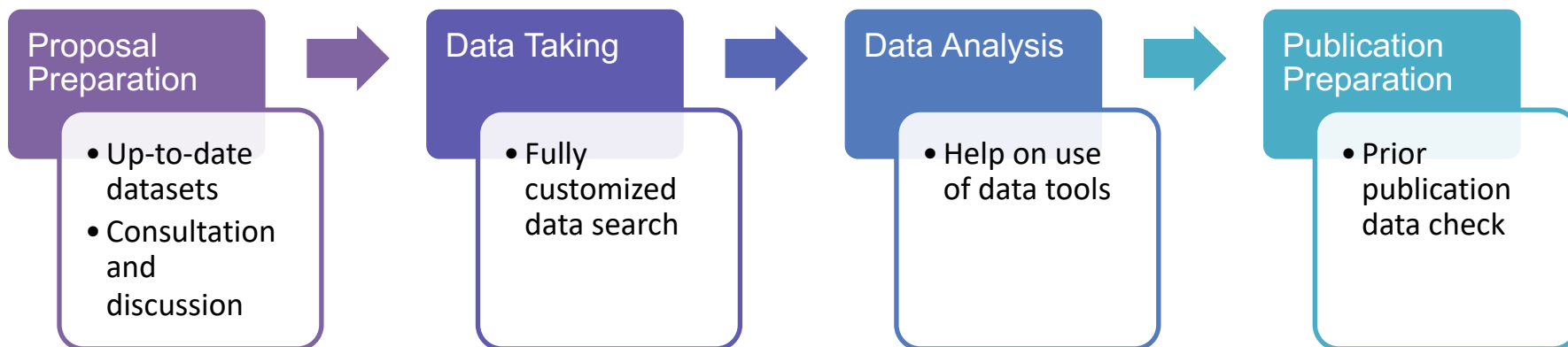# Current cycle of experimental nuclear structure & decay data

researchers

use database

contribute new data

experimental nuclear databases & services:

XUNDL
ENSDF
NUDAT

Nuclear Data Sheets

Base of all:
Published Data

build database

compile & evaluate data

data evaluators

FRIB

Facility for Rare Isotope Beams
U.S. Department of Energy Office of Science
Michigan State University

Better cycle of experimental nuclear structure & decay data

experimental nuclear databases & services

researchers

data evaluators

FRIENDS

Base of all:
Published Data

The FRIENDS project at FRIB

FRIB Integral Experimental Nuclear Data Services

aiming to provide seamless support for data needs to FRIB experimenters throughout all stages of an experimental work
as an integral part of the FRIB experimental support

Proposal Preparation
- Up-to-date datasets
- Consultation and discussion

Data Taking
- Fully customized data search

Data Analysis
- Help on use of data tools

Publication Preparation
- Prior publication data check

researchers
FRIENDS
data evaluators

The FRIENDS project at FRIB

*FR*IB *I*ntegral *E*xperimental *N*uclear *D*ata *S*ervices

Proposal Preparation → Proposal Preparation → Data Taking → Data Analysis → Publication Preparation

FRIENDS

❑ provides users with up-to-date data sets and references for nuclides of interest:
- all evaluated (ENSDF) and unevaluated (XUNDL) data up to date, covering most recent published data compiled but not included in the databases yet.
- data copies from references not available online (old journal papers, proceedings, lab reports, theses).

❑ provides users with consultation and discussion on issues and gaps in existing data and on other data needs, such as survey of experimental methods, uncertainty budgets.

The FRIENDS project at FRIB

FRIB Integral Experimental Nuclear Data Services

Data Taking

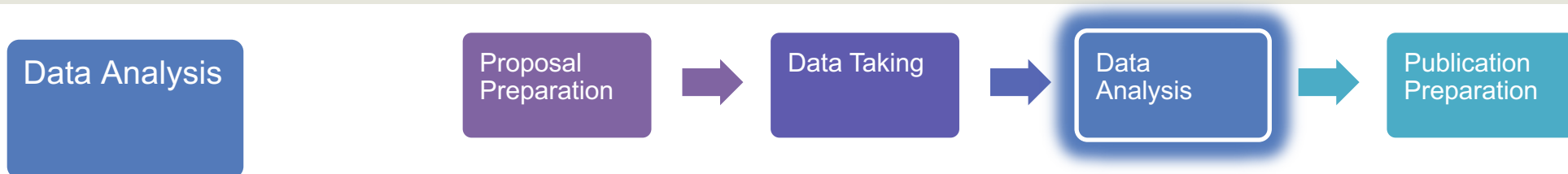Proposal Preparation → Data Taking → Data Analysis → Publication Preparation

FRIENDS

❑ provides users with customized search for any existing structure and decay data in ENSDF and XUNDL, like,
- spectroscopic properties (level, gamma and decay properties, such as T1/2, Mult.)
- experimental methods (for lifetimes, B(E2), spin-parity assignments)
- experiment facilities and reaction types

This service will be available once the experimental schedule is published on the FRIB webpage and the spokespeople will be contacted for their needs by the data scientist at FRIB.

The FRIENDS project at FRIB

FRIB Integral Experimental Nuclear Data Services

Data Analysis

Proposal Preparation ➡ Data Taking ➡ **Data Analysis** ➡ Publication Preparation

FRIENDS

❑ provides help on use of data tools useful for data analysis
- *GLSC (Gamma to Level Scheme Computation code)*
- *Java-RULER (gamma-transition strength calculator)*
- *RadiationReport (beta decay and electron capture log ft and radiation energy calculator)*
- *AlphaHF (alpha decay hindrance-factor and charge radius calculator)*
- *AME_NUBASE (Atomic Mass Evaluation and NuBASE retrieval tool)*
- *other tools:* see all ENSDF analysis and utility tools hosted at the IAEA Nuclear Data Services webpage: https://wwwnds.iaea.org/public/ensdf_pgm/

The FRIENDS project at FRIB
FRIB Integral Experimental Nuclear Data Services

Publication Preparation

Proposal Preparation → Data Taking → Data Analysis → Publication Preparation

FRIENDS

- ❑ provides users with prior-publication check on data to be published for consistency, correctness, validity, currency, format and presentation, in comparisons with existing data in ENSDF and XUNDL databases, for fast publication

- ❑ provides users with explanations on rules, policies and procedures for evaluated and recommended data, such as, rules and arguments (strong and weak) for spin-parity assignments, gamma-ray multipolarity assignments, averaging methods, uncertainty propagation approaches.

FRIENDS has also served to review experimental structure and decay data in proposals submitted to FRIB PAC1

Thank You !

researchers FRIENDS data evaluators