Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

NDWG & USNDP

David Brown

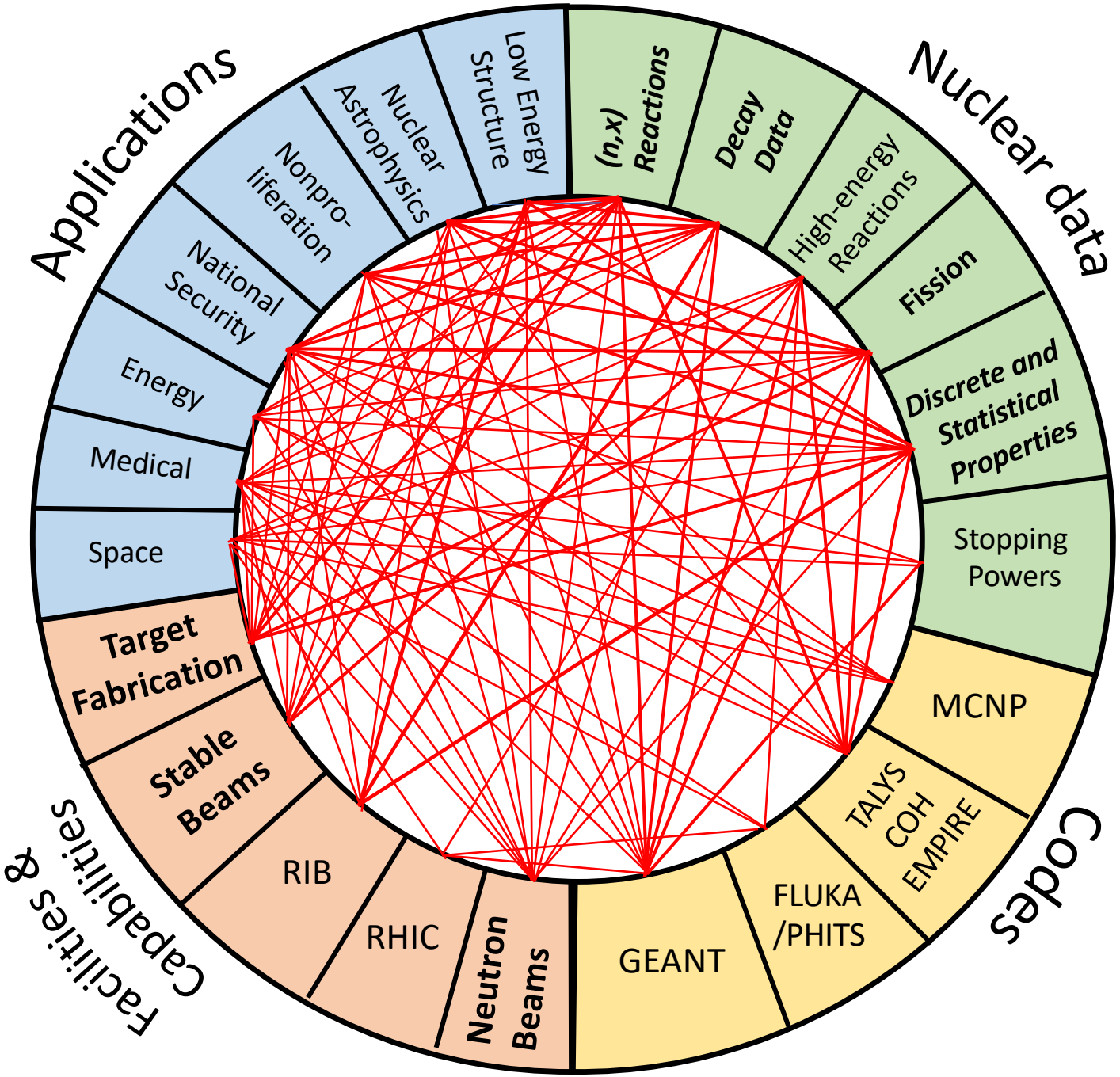
Chair of too many things

National Nuclear Data Center

@BrookhavenLab

USNDP Meeting, 13 Nov. 2023

Nuclear Data Week 2023, 13-17 Nov. 2023



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NDWG MISSION STATEMENT

The goal of the Nuclear Data Working Group (NDWG) is to facilitate communication, collaboration, coordination and prioritization of nuclear data efforts across multiple program offices, the national laboratories, universities, and industry.

- NDWG was founded in 2015 to identify cross-cutting nuclear data needs
- WANDA workshops are the mechanism used to obtain community consensus and to promote outreach

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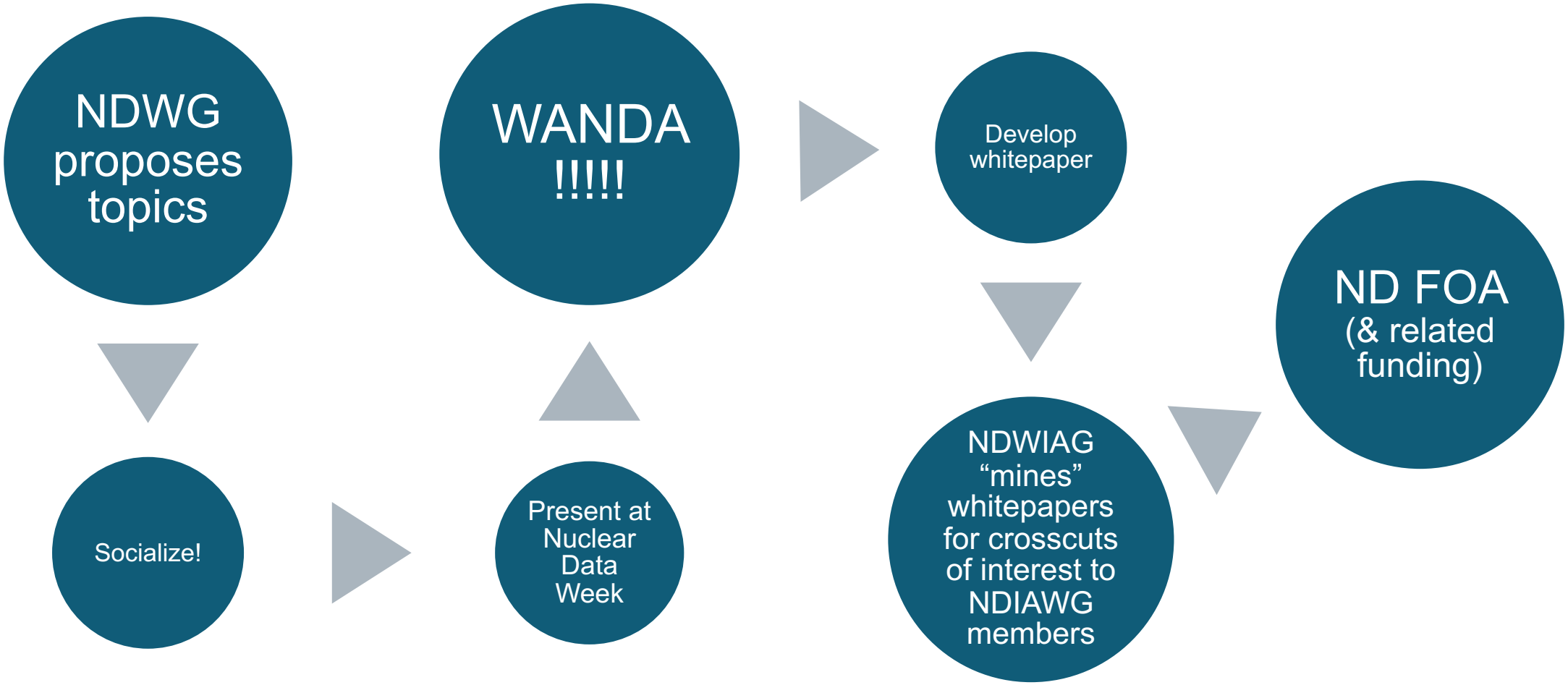
Slide from Cathy Romano

WANDA “process”



Past Workshop Topics That Have Been Funded

NDNCA (2015) Cross-cutting recommendations	
Dosimetry Standards	
Fission	x
Decay Data and g-Branching Ratios	x
Neutron Transport Covariance Reduction	
Expanded Integral Validation	
Antineutrinos from Reactors	x

NDEM (2016) Cross-cutting Recommendations	
Improving the Pipeline infrastructure	x
Improved Covariance Data	
Inelastic Scattering on actinides	x
Capture gamma spectra	x
Improved Fission yields	x
Target Production to Support Nuclear Data Experiments	x

NDREW (2018) Topics	
Uncertainty, Sensitivity, and Covariance	
Neutron Capture and Associated Spectra	x
Fission I, Independent and Cumulative Yields	x
Gamma-Induced Reactions	x
Inelastic Neutron Scattering and Associated Spectra	x
Fission II, Prompt Gammas and Neutrons	x
(α,n) Reactions	x
Targets, Facilities and Detector Systems	x
Fission III, Decay Data	x
Development of Benchmark Exercises	
Data Processing & Transport Code Needs	
Actinide Cross Sections	x

WANDA2019 Topics	
Nuclear Data for Isotope Production	x
Safeguards	x
Materials Damage	
Nuclear Data for Nuclear Energy	x
(n,x) Reactions	x
Atomic Data, NRF Data	

WANDA2020 Topics	
Covariance/Uncertainty/Sensitivity/Validation	
Nuclear Data for Isotope Production and Targetry Needs	x
Machine Learning/AI	
Detector Models, Atomic Data and Stopping Powers	
Scattering, Transport and Shielding	x
Neutron induced gammas and gamma decay	x

WANDA2021 Topics	
Advanced Computing for Nuclear Data	
Predictive Codes for Isotope Production	
Expanded Benchmarks and Validation for Nuclear Data	
Nuclear Data for Space Applications	
Nuclear Data for Advanced Reactors and Security	
The Human Pipeline for Nuclear Data	

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Slide from Cathy Romano

Over $44M of nuclear data projects funded through the NDIAWG FOA since FY18

START	TITLE	LEAD LAB	Collaborators	PI
FY18	Novel Approach for Improving Antineutrino Spectra Predictions for Nonproliferation Applications	ANL		Kondev, Filip
FY18	Improving the Nuclear Data on Fission Product Decays at CARIBU	ANL		Savard, Guy
FY19	Independent Fission Product Yields from 0.5 to 20 MeV	LANL		Winkelbauer, Jack
FY19	Energy Dependent Fission Product Yields	LLNL	LANL, TUNL	Tonchev, Anton
FY19	Measurements of Independent Fission Product Yields	LANL	LLNL	Duke, Dana
FY19	Beta-strength function, reactor decay heat, and anti-neutrino properties from total absorption spectroscopy of fission fragments	ORNL	BNL	Rykaczewski, Krzysztof
FY19	Integral Measurements of Independent and Cumulative Fission Product Yields Supporting Nuclear Forensics and Other Applications	LANL	LLNL, PNNL, NNSS	Bredeweg, Todd
FY19	Evaluation of Energy Dependent Fission Product Yields	LANL	BNL, LBNL, PNNL, LLNL	Kawano, Toshihiko
	Improving the double-differential 238U(n,n'g) cross section using neutron-gamma coincidences	LBNL		Bernstein, Lee
FY20	Scoping Study of the Impact of (alpha,n) Reactions and Yields of Nonproliferation Applications	ORNL		Romano, Catherine
FY20	Assessment of Nuclear Data Needs for Neutron Active Interrogation	ORNL		McConchie, Seth
FY20	Fission product yield measurements using 252Cf spontaneous fission and neutron-induced fission on actinide targets at CARIBU	ANL		Savard, Guy
FY20	Modernization and Optimization of the Evaluated Nuclear Structure Data File	BNL		McCutchan, Elizabeth
	238U(p,xn) and 235U(d,xn) 235-237Np Nuclear Reaction Cross Sections Relevant to the Production of 236gNp	LBNL		Bernstein, Lee
FY21	Neutron Scattering Cross Sections: (n,n'), (n,n'g), and (n,g) Measurements	USNA		Vanhoy, Jeff
	State-of-the-art Gamma-ray Spectroscopy to Enhance the ENSDF	BNL		McCutchan, Elizabeth
FY22	Gamma Rays Induced by Neutrons	BNL	LLNL, LBNL/UCB	Brown, Dave
FY22	White-source neutron-gamma coincidence measurements of gamma production cross sections at LANSCE	LANL		Kelly, Keegan
FY22	Evaluation of Gamma-ray Production	LANL	LLNL, Notre Dame, NC State	Kawano, Toshihiko

Slide from Cathy Romano

NDIAWG FOA's have focused much of USNDP member effort

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FY22	ß-energy spectral shapes in fission products affecting reactor decay heat and anti-neutrino flux	ORNL	Charlie Rasco
FY22	Two and Three-body Photodisintegration of the Triton at Energies Below 30 MeV	Duke Univ	Calvin Howell
FY22	Designing Nuclear-data Measurements that Resolve Discrepancies in Existing Data	LANL	Denise Neudecker
FY22	Modern Structure-based Nuclear Data Evaluations for Basic Science, Nuclear Safety & Security	LANL	Mark Paris
FY22	Solving the ^{56}Mn puzzle	Univ. of Mass-Lowell	Marian Jandel

PI:	8	33%
Co-I:	10	42%
Involved in	18	75%

The NDWG seeds the topic areas

PARTNERS	NDWG Member	Organization
DOE/SC/Nuclear Physics	Lee Bernstein Catherine Romano	LBNL IB3 Global Solutions
NNSA/DNN R&D/PD/NA-22	Fredrik Tovesson	ANL
NNSA/DNN R&D/Forensics	Todd Bredeweg Jason Harke	LANL LLNL
NNSA/DNN R&D/SNDD	Ron Soltz David Gerts	LLNL LANL
NNSA/NCSP/NA-511	Mike Zerkle Marco Pigni	NNL ORNL
NNSA/NR/NA-30	Mike Zerkle Tim Trumbull	NNL NNL
NNSA/Defense Prog./NA-113	Jo Ressler Shea Mosby	LLNL LANL
NNSA/Defense Prog./NA-114	Nathan Gibson Robert Casperson	LANL LLNL
DOE/Nuclear Energy	Matthew Jesse Javier Ortensi	ORNL INL
NRC	Will Wieselquist	ORNL
NNSA/Office of Nuclear Forensics/NA-83	Corey Keith Chris Krenn	LANL LLNL
DOE/SC/Isotope Office	Etienne Vermeulen	LANL
NNSA/Emergency Response/NA-82	John Koglin Pete Jaegers	LLNL LANL
NIST	Brian Zimmerman	NIST
US Nuclear Data Program	Dave Brown	BNL
NNSA/Nuclear Safeguards and Security/NA-24	Young Ham	Tech Advisor
Missile Defense Agency/Rad Hardness	Courtney Matzkind	MDA

The NDWG has 50 Members Representing 17 Programs and 10 Labs

LAB	NDWG Member
ANL	Filip Kondev
ANL	Guy Savard
BNL	Alejandro Sonzogni
INL	Sebastian Schunert
LANL	Mark Chadwick
LANL	Robert Little
LBNL	Brian Quiter
LBNL	Bethany Goldblum
LLNL	Michael Buchoff
LLNL	Tim Rose
ORNL	Susan Hogle
ORNL	Mike Dion
PNNL	Stephanie Lyons
PNNL	Bruce Pierson
SNL	Pat Griffin
SNL	Phil Dreike
SRNL	Kalee Fenker
SRNL	Chris McGrath

AT LARGE MEMBERS	
Jim Koster	LANL
Patrick Talou	LANL
John Engle	Univ. WISC
Teresa Bailey	LLNL
Morgan White	LANL

Slide from Cathy Romano

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NNSA/D		
NNSA		
NNS		
NN		
NNSA/D		
NNSA/Defense Prog./NA-114	Nathan Gibson Robert Casperson	LANL LLNL
DOE/Nuclear Energy	Matthew Jesse Javier Ortensi	ORNL INL
NRC	Will Wieselquist	ORNL
NNSA/Office of Nuclear Forensics/NA-83	Corey Keith Chris Krenn	LANL LLNL
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We have representation, but we are a "small" part of the community

Prog. Reps:	2/27	Dave, Lee
Lab Reps:	3/18	Alejandro, Bethany, Filip
At-large:	0/5.	
Total:	5/50	10%

The NDWG has 50 Members Representing 17 Programs and 10 Labs

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We have friends

Prog. Reps:	27/27	
Lab Reps:	18/18	
At-large:	5/5	
Total:	50/50	100%

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Takeaways

NDWG full of customers. Pure science has representation, but it is not especially big and topics are skewed towards applications

Our options:

- we can complain
- we can take advantage of this: many science topics also have applications

partnering with application lab means leveraging their resources

Make sure our friends understand:
science enables applications and sets the stage for future application

Tomorrow will be an “implementation plan” discussion, based in part on NSAC reports

So, I have homework for you:

What do you think is important/fun science to do?

How does it tie to applications? How does it help society?

Do you have applied friends who can support and/or work with you?

Be creative: Often that basic science topic has an analog in an application