National Science Foundation – Nuclear Physics

Outline
• Nuclear Physics Info
• FY22 & FY23 Budget Info
• Funding Announcements and Successes
• LRP Comments

Allena K. Opper
August 2022
NSF/MPS/PHY Personnel

• Sethuraman Panchanathan – Director
• Sean L. Jones – Assistant Director for MPS
• Denise Caldwell – Physics Division Director
• Jean Cottam Alan – Deputy Division Director
• Bogdan Mihaila – Nuclear Theory Program Director
• Alfredo Galindo-Uribarri – Expt’l Nuclear Physics Program Director
• Allena Opper – Expt’l Nuclear Physics Program Director
Proposal Trends in Experimental Nuclear Physics

ENP Funding Trends
New awards only

ENP Proposal Trends

Submitter and Awarded
FY22 Budget Proposals – NSF
$ in ( ) = FY21 estimates

FY22 Appropriation
- $8.8B
- 4% over FY21 est

- NSF Total ($8.49 B)
  - President’s Request: 14%
  - House Bill: 12%
  - Senate Bill: 20%

- Research & Related Activities ($6.88 B)*
  - President’s Request: 12%
  - House Bill: 11%
  - Senate Bill: 18%

- Education & Human Resources ($1.11 B)*
  - President’s Request: 16%
  - House Bill: 15%
  - Senate Bill: 15%

- Major Research Equipment & Facilities Construction ($0.24 B)
  - President’s Request: -1%
  - House Bill: 3%
  - Senate Bill: 3%

- Agency Operations & Award Management ($0.37 B)
  - President’s Request: 4%
  - House Bill: 3%
  - Senate Bill: 19%

* Figures account for consolidation of the Graduate Research Fellowship Program budget in the EHR directorate.
FY23 Budget Proposals
% change from FY22 enacted
$ in ( ) = FY22

* Excludes funds from the Infrastructure Investment and Jobs Act
** Includes funds for ARPA-H
*** Excludes earmarks
FY23 Budget Proposals
% change from FY22 enacted
$ in ( ) = FY22

*USGS ($1.4 B)
NSF ($8.8 B)
NOAA Research [OAR] ($0.6 B)

- President’s Request
- House Bill
- Senate Bill

* Excludes funds from the Infrastructure Investment and Jobs Act
** Includes funds for ARPA-H
*** Excludes earmarks

American Institute of Physics | aip.org/fyi
Director’s vision points to opportunities we must seize:

• Strengthening Established NSF
  • NSF’s central focus = accelerate discovery and enhance state of the art research capabilities

• Bringing the “Missing Millions” into the STEM Workforce
  • There is tremendous untapped STEM potential throughout the nation

• Accelerating Partnerships
  • NSF will foster partnerships with other agencies, private industry, philanthropy, like-minded countries – and thriving partnership environments
## FY23 President’s Budget Request – NSF ($M)

<table>
<thead>
<tr>
<th>NSF by Account</th>
<th>FY 2021 Actual</th>
<th>FY 2021 ARP</th>
<th>FY 2022 Enacted</th>
<th>FY 2023 Request</th>
<th>FY 2023 Request change over:</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FY 2021 Actual</td>
</tr>
<tr>
<td></td>
<td>Amount</td>
<td>Percent</td>
<td>Amount</td>
<td>Percent</td>
<td>Amount</td>
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<td>BIO</td>
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<td>CISE</td>
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<td>ENG</td>
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<td>GEO</td>
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<td>MPS</td>
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<td>20.33</td>
<td>1,746.847</td>
<td>153.54</td>
<td>N/A</td>
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<tr>
<td>SBE</td>
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<td>18.16</td>
<td>330.21</td>
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<tr>
<td>TIP²</td>
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<td>19.87</td>
<td>879.87</td>
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<td>TIP Programs</td>
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<tr>
<td>SBIR/STTR, including Operations</td>
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<td>OISE</td>
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<td>IA³</td>
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<td>545.86</td>
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<tr>
<td>U.S. Arctic Research Commission</td>
<td>1.60</td>
<td>-</td>
<td>1.72</td>
<td>0.12</td>
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<tr>
<td>Research &amp; Related Activities</td>
<td>$6,761.35</td>
<td>$195.54</td>
<td>$7,159.40</td>
<td>$1,664.63</td>
<td>24.6%</td>
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<td>STEM Education³⁴</td>
<td>$1,110.85</td>
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<td>$1,006.00</td>
<td>$1,377.18</td>
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<td>Major Research Equipment &amp; Facilities</td>
<td>$161.27</td>
<td>$8.95</td>
<td>$249.00</td>
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<td>Agency Operations &amp; Award Management</td>
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<td>Office of Inspector General</td>
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<td>$19.00</td>
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<td>Office of the National Science Board</td>
<td>$4.43</td>
<td>-</td>
<td>$4.60</td>
<td>$5.09</td>
<td>$0.66</td>
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<tr>
<td>Total, NSF Discretionary Funding</td>
<td>$8,440.03</td>
<td>$240.48</td>
<td>$8,838.00</td>
<td>$10,492.08</td>
<td>$2,052.05</td>
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<tr>
<td>STEM Education - H-1B Visa</td>
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<td>162.47</td>
<td>158.86</td>
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<td>Donations</td>
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<td>10.00</td>
<td>10.00</td>
<td>-15.94</td>
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<td>Total, NSF Mandatory Funding</td>
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<td>-</td>
<td>$172.47</td>
<td>$168.86</td>
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<td>Total, NSF Budgetary Resources</td>
<td>$8,612.48</td>
<td>$240.48</td>
<td>$9,010.47</td>
<td>$10,660.94</td>
<td>$2,048.47</td>
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</tbody>
</table>
## FY23 President’s Budget Request – MPS ($M)

<table>
<thead>
<tr>
<th>Program</th>
<th>FY 2021 Actual</th>
<th>FY 2021 ARP Actual</th>
<th>FY 2022 Request (TBD)</th>
<th>Change over FY 2021 Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astronomical Sciences (AST)(^1)</td>
<td>$289.27</td>
<td>-</td>
<td>$294.05</td>
<td>$4.78 1.7%</td>
</tr>
<tr>
<td>Chemistry (CHE)</td>
<td>259.60</td>
<td>-</td>
<td>284.14</td>
<td>24.54 9.5%</td>
</tr>
<tr>
<td>Materials Research (DMR)</td>
<td>330.07</td>
<td>-</td>
<td>349.92</td>
<td>19.85 6.0%</td>
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<tr>
<td>Mathematical Sciences (DMS)</td>
<td>243.66</td>
<td>-</td>
<td>259.47</td>
<td>15.81 6.5%</td>
</tr>
<tr>
<td>Physics (PHY)</td>
<td>304.42</td>
<td>-</td>
<td>316.59</td>
<td>12.17 4.0%</td>
</tr>
<tr>
<td>Office of Multidisciplinary Activities (OMA)</td>
<td>166.29</td>
<td>20.33</td>
<td>242.677</td>
<td>76.39 45.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1,593.31</strong></td>
<td><strong>$20.33</strong></td>
<td><strong>$1,746.847</strong></td>
<td><strong>$153.54 9.6%</strong></td>
</tr>
</tbody>
</table>
All proposals submitted to the Division of Physics programs must go through this solicitation.

• **Deadlines:** First Tuesday in December for *Experimental & Theoretical Nuclear Physics*
  → December 6, 2022  5 pm in your home institution’s time zone

• Follow instructions that are specific to this solicitation; non-compliant proposals may be returned without review

• Must conform to the NSF Proposal & Award Policies & Procedures Guide (PAPPG)
  - Updated instructions regarding Current and Pending Support and Biographical Sketches of senior personnel
  - Submission through Research.gov or Grants.gov (not FastLane 😞)

**Questions** – contact cognizant program director.
Alliances for Graduate Education and the Professoriate (AGEP) – increase the number of historically URM faculty in STEM disciplines by advancing knowledge about pathways to career success.

AGEP-GR Supplements to MPS awards  NSF 20-083

- A mechanism by which current MPS PI supports one (additional) Ph.D. student in an ongoing MPS-funded research project.
- Available to PIs at AGEP or AGEP Legacy Institutions
- Graduate Student Eligibility
  - Emphasis placed on under-represented groups in STEM fields
  - Not currently supported by federal government (NSF, DOE, NIH, ...)
  - US Citizen, US National, or US Permanent Resident
- Stipend, tuition, benefits, and IDC (~$60k)
- Renewable up to two times, no deadline for submission
PHY-DCL: Growing a Strong, Diverse Workforce  NSF 21-065

PHY-GR Supplements – emphasis on URMs in STEM fields

• Graduate Student Eligibility
  o Not currently supported by federal government (NSF, DOE, NIH, ...)
  o US Citizen, US National, or US Permanent Resident
• Stipend, tuition, benefits, and IDC (~$60k)
• Renewable up to two times, **no deadline for submission however, early submission suggested**

REU Supplements – emphasis on URMs in STEM fields

• US Citizen, US National, or US Permanent Resident
ASCEND - Postdoctoral Research Fellowships NSF 22-501

• Goal: to support Postdoctoral Fellows who will broaden the participation of groups who are underrepresented in Mathematical and Physical Sciences (MPS) fields in the U.S.

• Prepare PD Fellows to transition from a postdoctoral position into the first few years of an academic faculty position

• Fellowships are awards to individuals, not institutions, and are administered by the Fellows

• $100k/year for up to 3 years
ASCEND - Postdoctoral Research Fellowships

FY21: 33 MPS ASCEND Fellows (7 in PHY)

FY22: 31 MPS ASCEND Fellows (6 in PHY)

Including Brandon Sumner:

Determine properties of excited cascade states, search for new states using data from GlueX at JLab, & develop in-person K – 12 outreach

Arizona State University with Michael Dugger
MPS – LEAPS

LEAPS: Launching Early-Career Academic Pathways in MPS NSF 22-503

• Designed to launch research careers of pre-tenure faculty in MPS fields, emphasis on minority-serving institutions (MSIs), predominantly undergraduate institutions (PUIs), and Carnegie Research 2 (R2) universities while promoting the participation of the entire MPS scientific community

• Awards = 24 months, up to $250k
MPS – LEAPS

LEAPS: Launching Early-Career Academic Pathways in MPS NSF 22-503

FY21: 45 LEAPS-MPS Ascend Awardees (4 in PHY)

FY22: 54 LEAPS-MPS Awardees (5 in PHY)

Including Jason Fry Eastern KY Univ:
Precise measurements of neutron beta decay parameters (Nab) and the free neutron lifetime (BL3) & mentoring 1st gen college students
NSCL / FRIB Transition

Smooth & close coordination $\rightarrow$ exciting opportunities

NSCL

FRIB

COVID-19

Cryo work

CCF Ops Cease

ReA3+6

FY18 FY19 FY20 FY21 FY22 FY23

PAC42 PAC43 ReA PAC CCF Ops ReA3+6

August 2022
NSF and the Long Range Plan for Nuclear Science

• NSF is proposal driven
• NSF budget for NP and other programs is not a line item in federal budget
• Areas of agency overlap, NSF considers
  o Distinctiveness
  o Leadership
• Observation of process informs us
• Most valuable input: science challenges, priorities, and arguments for them
• Provides critical advice for review process
• Does not necessarily lead directly to investments
Key Parallel with DOE

Major Facilities: project with TPC to NSF > $100M

• Funded through the MREFC budget line (i.e. explicitly appropriated)
• Must be approved by the NSB
• NSB typically sees major awards that are unique and/or world leading (e.g. Antarctic Infrastructure, DKIST, HL-LHC Upgrade, RCRV, Vera C. Rubin Observatory)
• FACA advisory is important input (see also decadal surveys)
• Cooperative Agreement every 5 years
What does NSF want/need from the LRP?

• What works:
  o Identify compelling opportunities
  o Identify major national facilities and research infrastructure that enable high priority science

• What does not work:
  o “NSF should do X …”
  o Prescriptive language

N.B. Recommendation IV of the 2015 LRP: We recommend increasing investment in small-scale and mid-scale projects and initiatives that enable forefront research at universities and laboratories. Innovative research and initiatives in instrumentation, …
For the latest updates:
https://www.nsf.gov/physics

Contact us at:

• Bogdan Mihaila
  bmihaila@nsf.gov or call (703)292-8235
• Alfredo Galindo-Uribarri
  agalindo@nsf.gov or call (703)292-5139
• Allena Opper
  aopper@nsf.gov or call (703)292-8958