



Nuclear Energy's University Programs

Briefing for the Nuclear Energy Advisory
Committee (NEAC)

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March 28, 2019

NE Funding in Support of Universities

- **Nuclear Energy University Program (NEUP)**

NE designates up to 20 percent of the funds appropriated to its R&D programs to be applied to university-led R&D and associated infrastructure projects to be performed at universities and collaborating research institutions. These R&D projects are awarded through an open, competitive solicitation process.

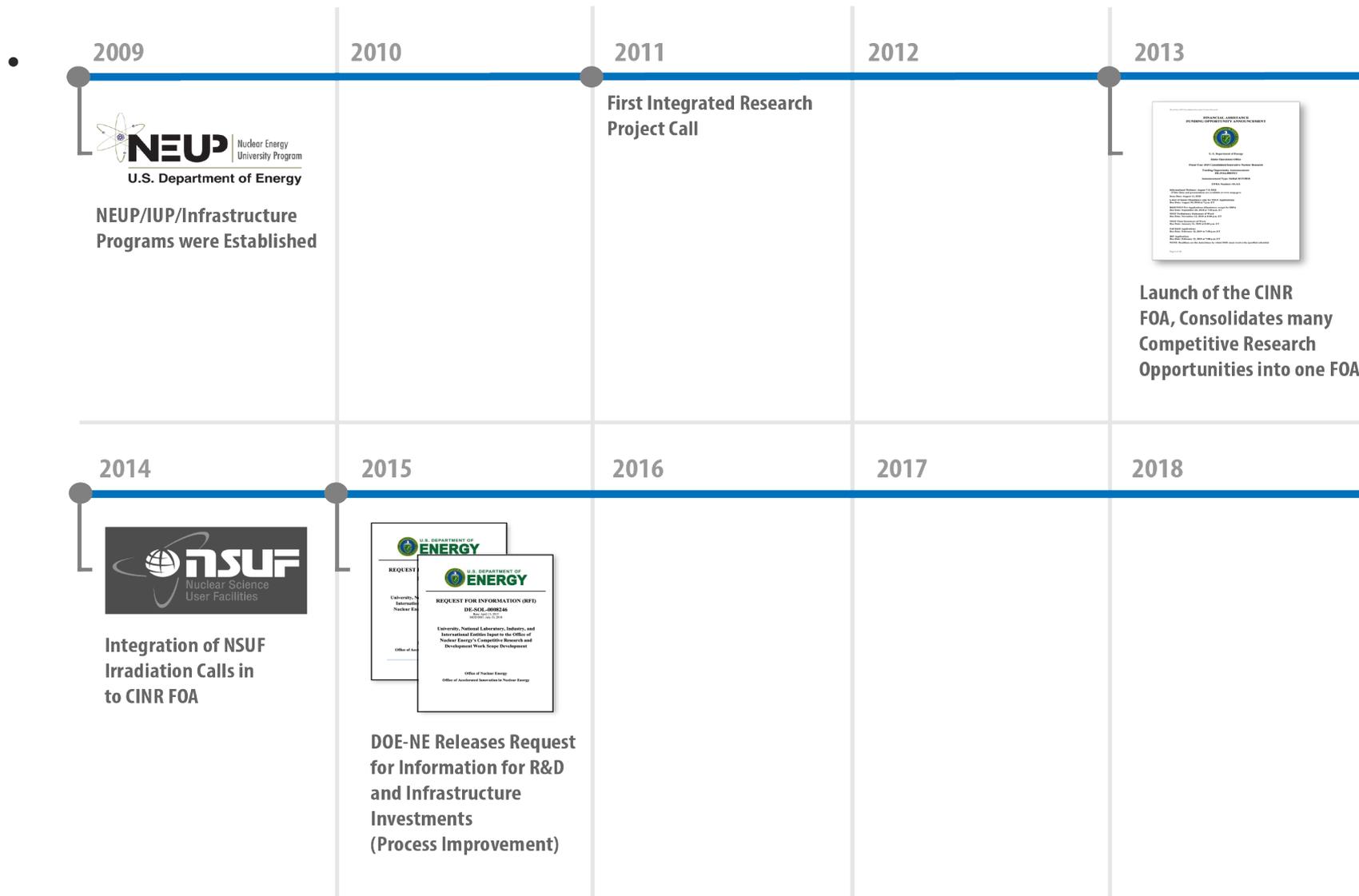
- **Integrated University Program (IUP)**

NE provides graduate-level fellowships and undergraduate-level scholarships to support nuclear science and engineering education, research and training of the next generation nuclear energy workforce.

- **Research Reactor Infrastructure (RRI)**

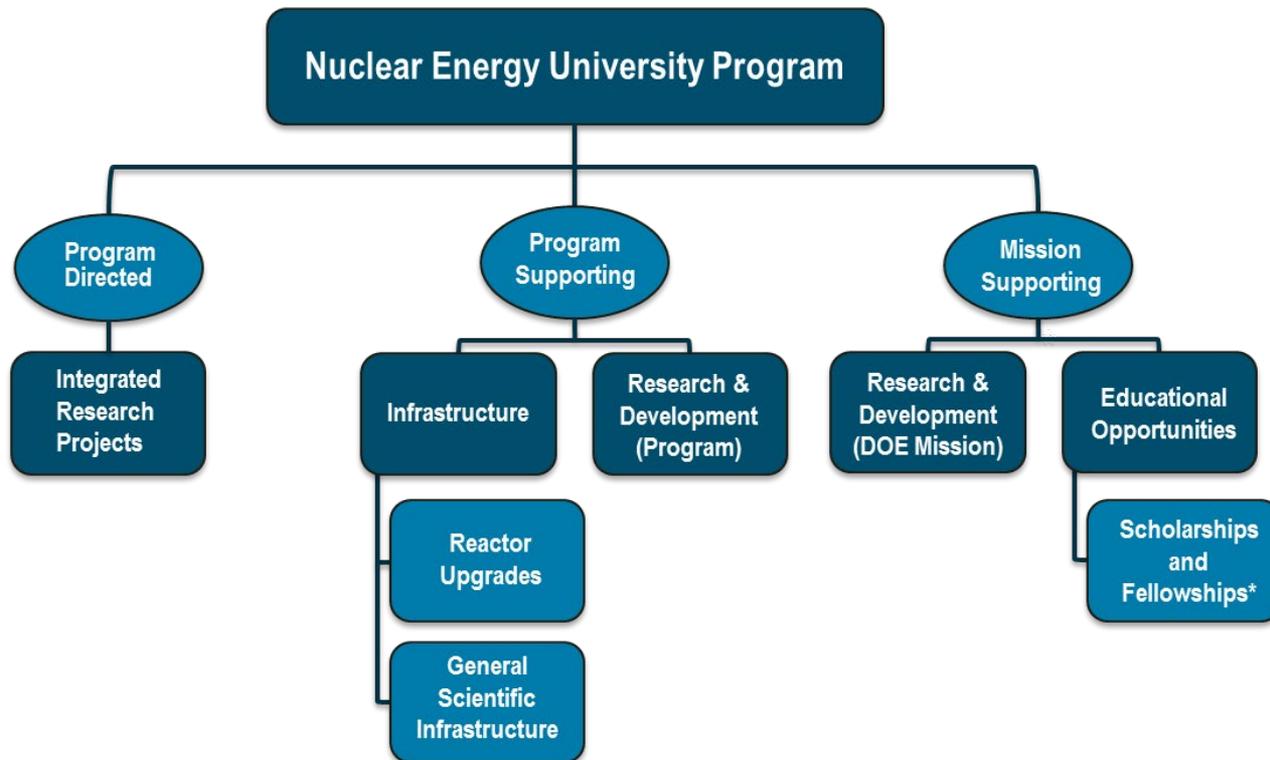
NE supports the continued operation of U.S. university research reactors by providing research reactor fuel services and maintenance of fuel fabrication equipment.

NEUP/IUP History



NEUP/IUP Structure

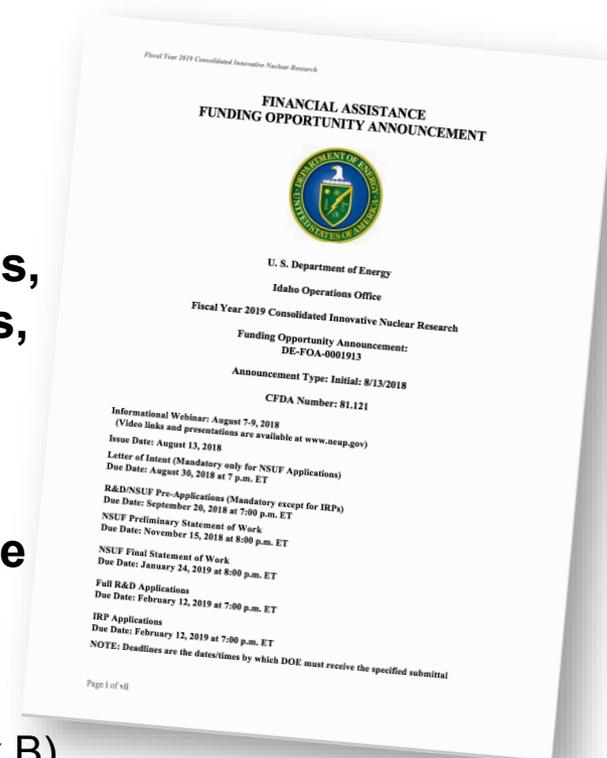
- Competitive process for awarding U.S. university-led R&D and infrastructure projects, and scholarships and fellowships to U.S. or permanent resident students in NE fields of study.
- U.S. universities can be supported by U.S. national laboratories, industry and international partners.



*IUP Supported

FY 2019 Research Award Opportunities

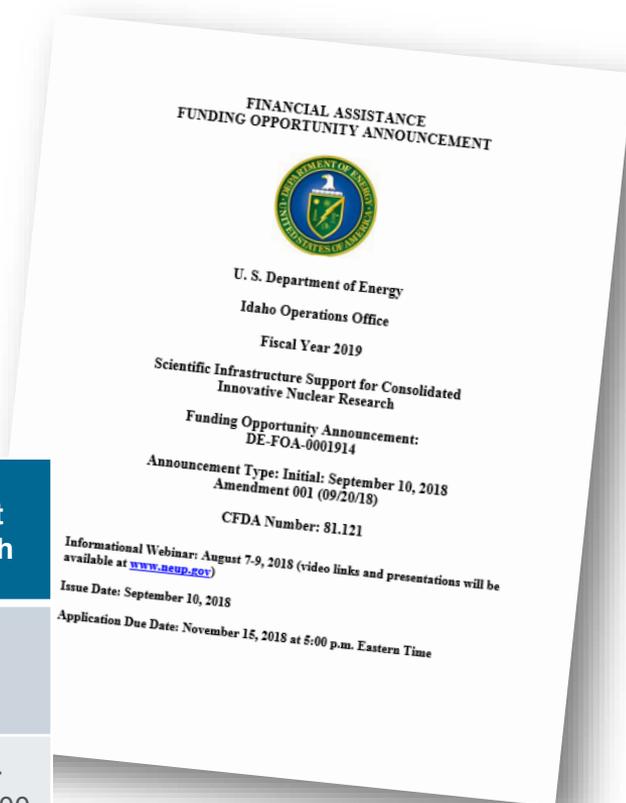
- **DOE issued its Consolidated Innovative Nuclear Research (CINR) competitively-awarded research project solicitation on September 10**
- **Although all U.S. funding is limited to U.S. universities, national laboratories and U.S. incorporated industries, international research partners are strongly encouraged**
- **Fully integrates NE's competitive research and unique facility access portfolio**
 - NEUP: U.S. university-led R&D (Appendix A)
 - NEET CTD: U.S. university/lab/industry-led R&D (Appendix B)
 - NSUF: U.S. university/lab/industry unique facility access (Appendix C)



FY 2019 Infrastructure Award Opportunities

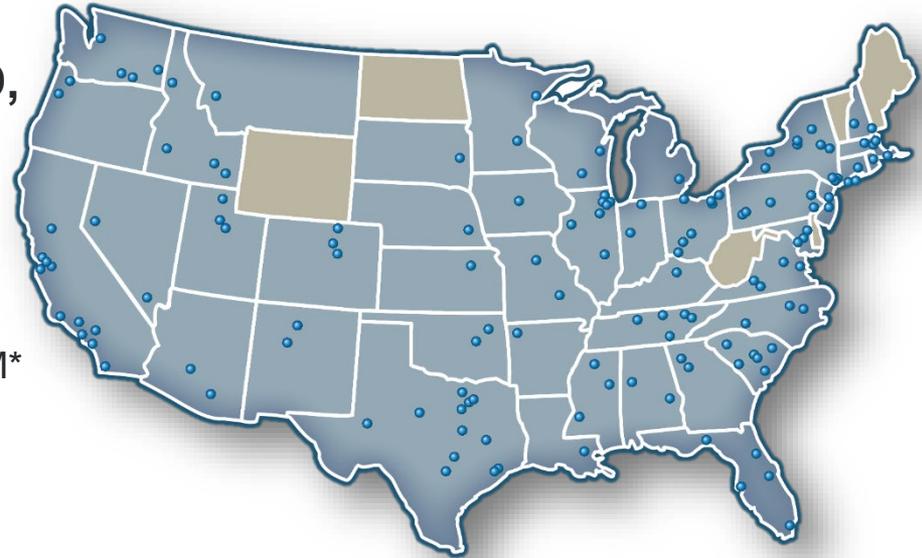
- DOE issued its **Scientific Infrastructure Support for Consolidated Innovative Nuclear Research** competitively-awarded solicitation on **September 10**
- **Better integrates NE's infrastructure investments**
 - University reactor upgrades
 - University general scientific infrastructure (GSI)
- **Applications received on November 15, 2018**

	Estimated Available Budget	Eligibility	Maximum Award Size	Anticipated Award Range	Cost Match
Research Reactor Upgrade	\$2,500,000	University	\$2,500,000	Up to \$1,500,000	N/A
General Scientific Infrastructure	\$2,500,000	University	\$2,500,000	\$250,000	1:1 > \$250,000



Summary of CINR & IUP Awards

- **NEUP and IUP have a well established competitive process for awarding R&D, infrastructure and scholarships/ fellowships.**
 - FY 2018 IUP awards: 44 scholarships and 33 fellowships, totaling \$5M
 - FY 2018 NEUP awards: 89 projects totaling \$58M* for IRP, R&D and Infrastructure
- **The NE R&D Programs are the cognizant technical managers of these competitive R&D awards and therefore play in integral role in the success of each project.**

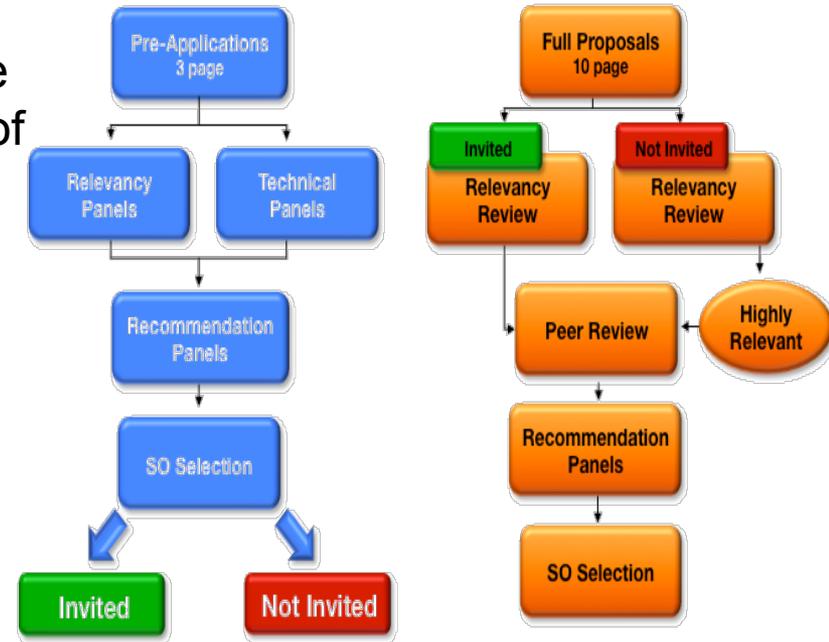


Through CINR and IUP, \$643.8 million has been awarded to 125 schools, 7 national laboratories, and 9 industry/utilities in 42 States and the District of Columbia.

*This includes 8 NEET projects totaling \$6.4M

Review Processes and Criteria

- **Review criteria and processes used for PS, MS and PD evaluation is consistent with traditional peer review**
 - PS and MS (R&D) applications are reviewed in a process that includes pre-applications
 - pre-applications: two relevancy, one peer review
 - results in “Invited” and “Not Invited” status
 - full applications: typically two relevancy, three peer reviews
 - PD (IRPs), INF and IUP applications are reviewed individually by a common set of reviewers who are then convened into a panel for final scoring
 - Typically two relevancy, three peer reviews



U.S./UK Research Collaborations

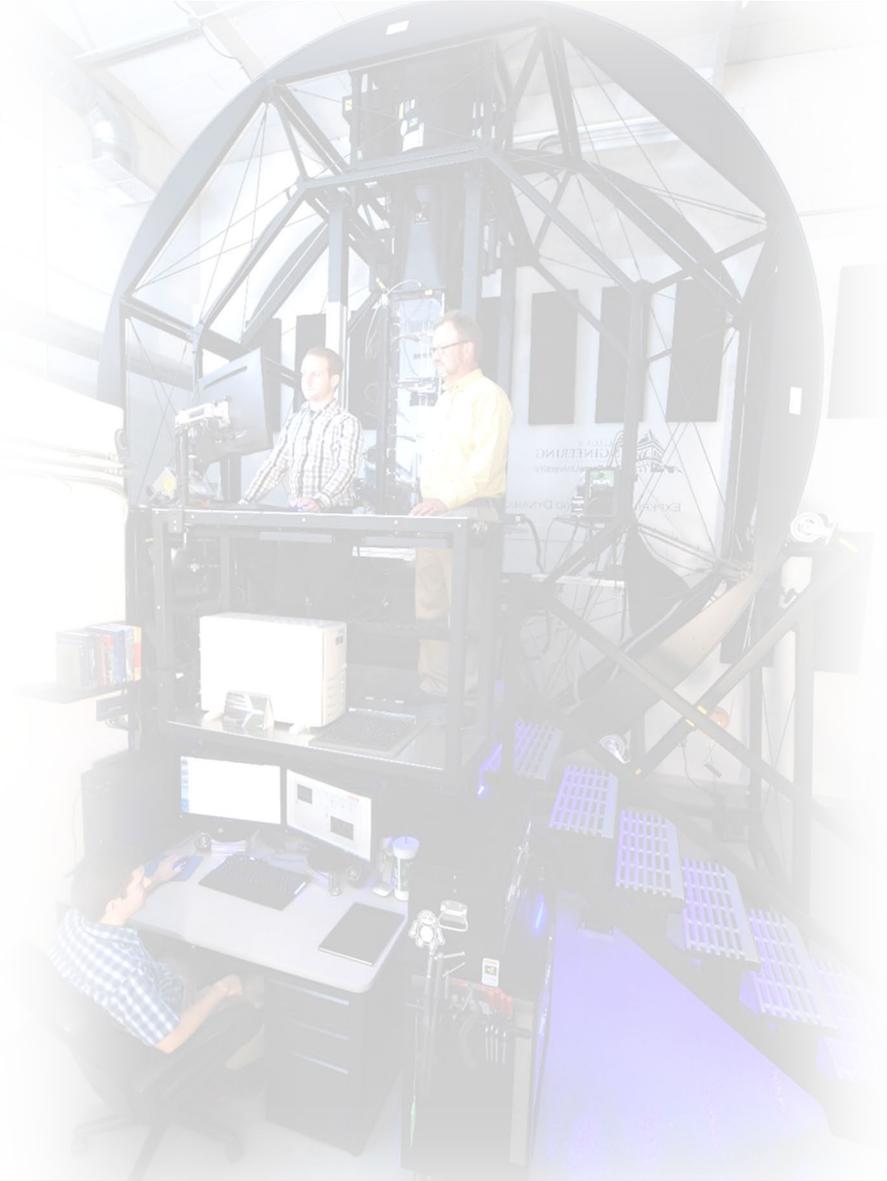
- U.S. and UK researchers have been very successful in previous collaborative research proposals, as illustrated by U.S. DOE Integrated Research Project (IRP) and Research and Development awards announced.
- Since FY 2012 U.S. DOE has worked closely with the Research Councils UK (RCUK) five separate occasions as both parties enthusiastically established mechanisms for effective and successful UK/U.S. collaboration. UK funding to-date totals ~\$6M, resulting in significant research multiplier for U.S. investment of ~\$23M and more diverse research approaches and results.
- UK has committed to providing up to ~\$2.5M for UK collaborations in response to the NE FY 2019 CINR solicitation.



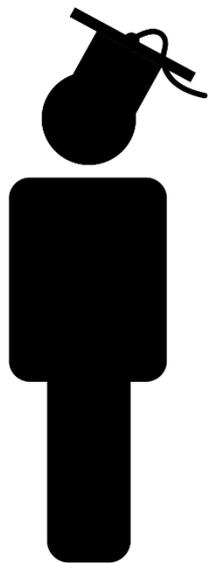
NE University Programs Impacts and Outcomes

DOE-NE's university programs:

- Enhance scientific impact in NE-related research areas
- Build the next generation NE workforce
- Integrate the university, national laboratory and industry research communities
- Support university infrastructure and research reactor improvements



NEUP & IUP Workforce Impact



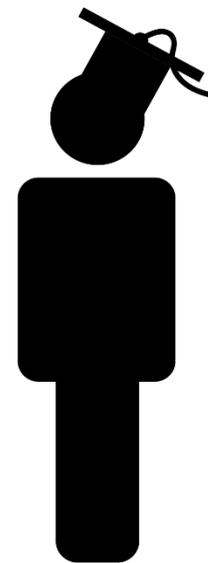
1,716

NEUP Supported Students

716
PhD

599
Masters

401
Undergrad



772

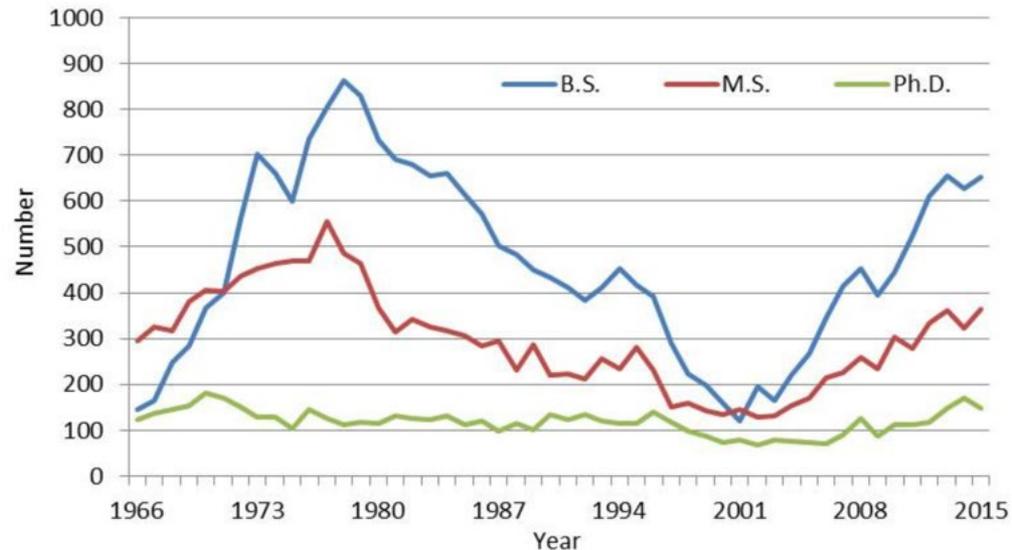
**IUP Scholarship &
Fellowship Recipients**

276
Fellows

496
Scholars

NEUP Support of Nuclear Engineering Graduate Education

Nuclear Engineering Degrees, by Degree Level, 1966, 2015

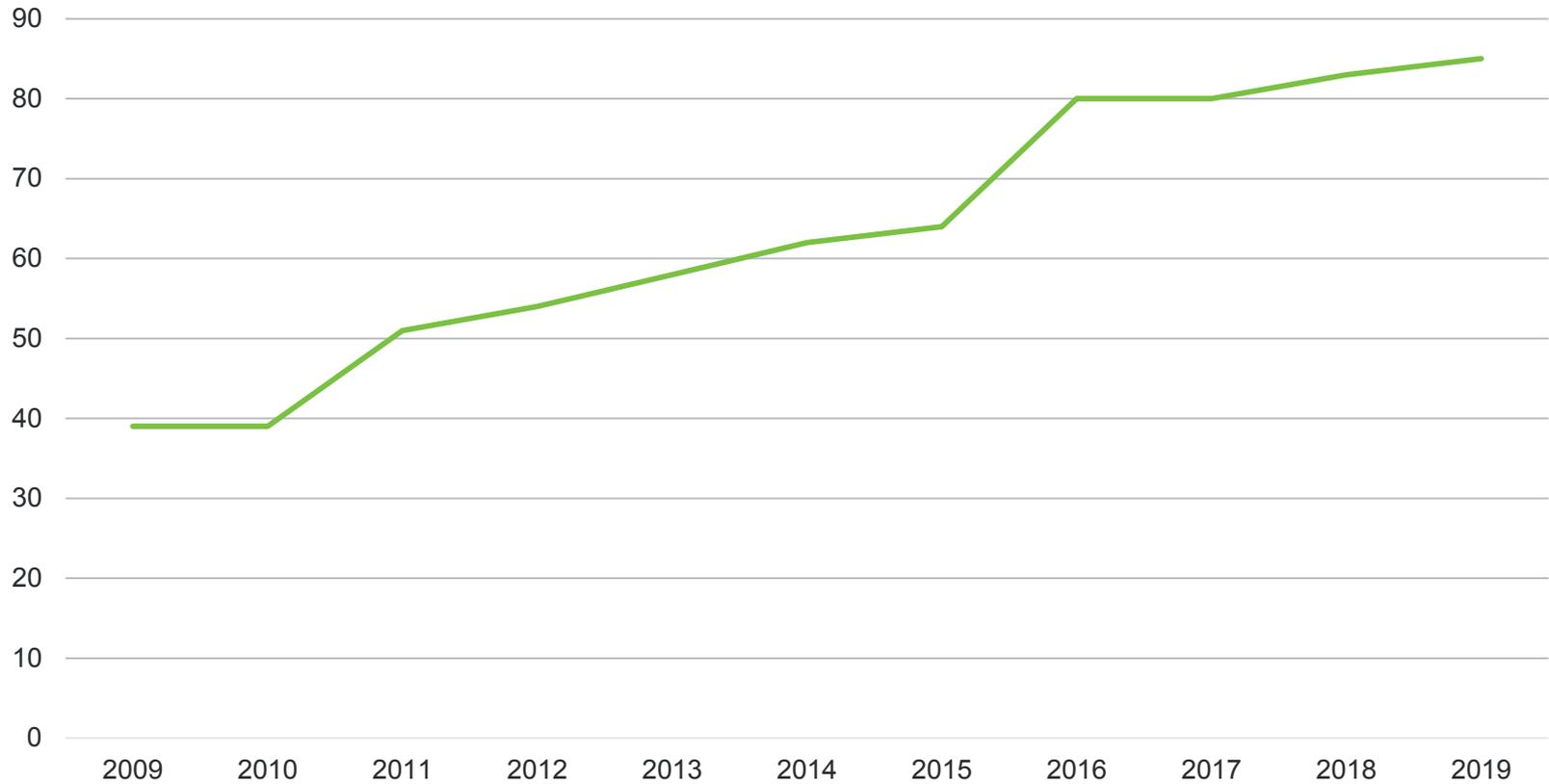


Source: Oak Ridge Institute for Science and Education.

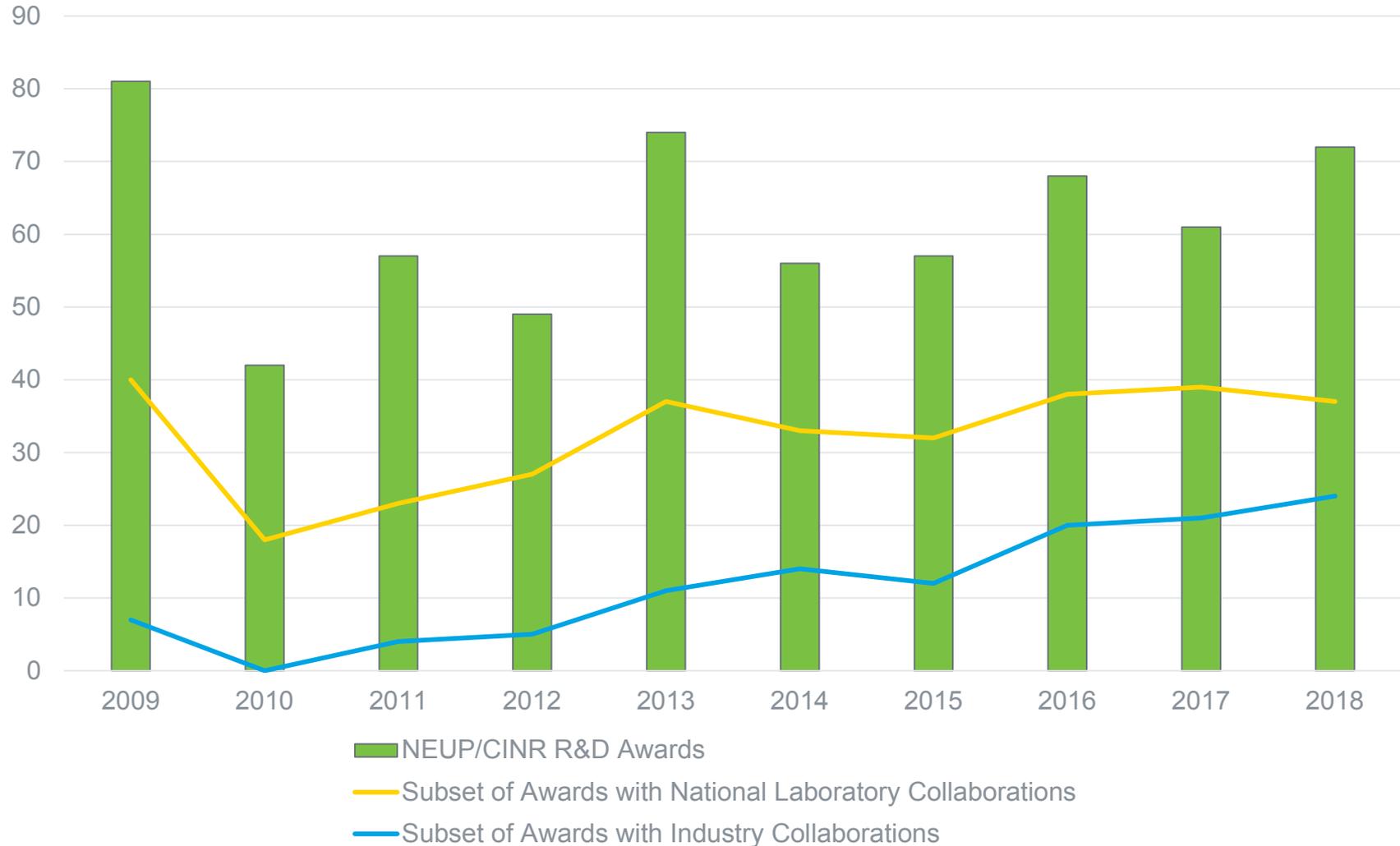
55% of all Nuclear Engineering Ph.D.s were supported with DOE-NE IUP or NEUP funds from 2010-2016

18% of all Nuclear Engineering M.S. degrees were supported with DOE-NE IUP or NEUP funds from 2010-2016

IUP-Approved Universities: 2009-2019



Integration with Industry and National Laboratory Research Communities

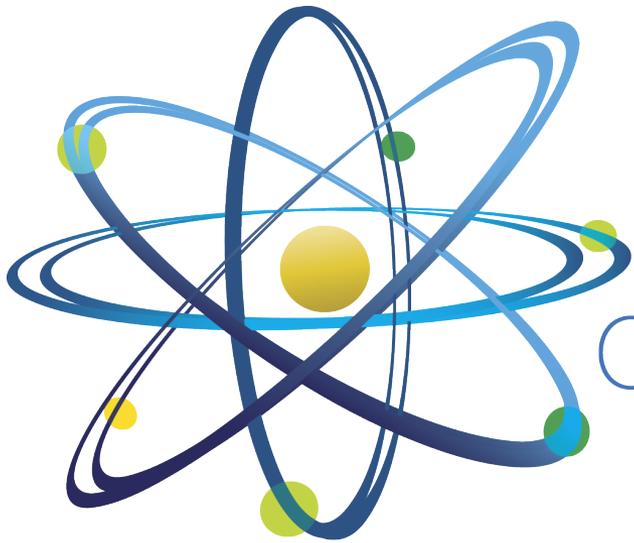


Points of Contact

- DOE Headquarters Director, Office of Nuclear Energy Technologies
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- DOE Headquarters University Capabilities Team Leader:
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- NEUP Integration Office Director:
Dr. John Gilligan - gilligan@ncsu.edu
- NEUP Website: www.neup.gov



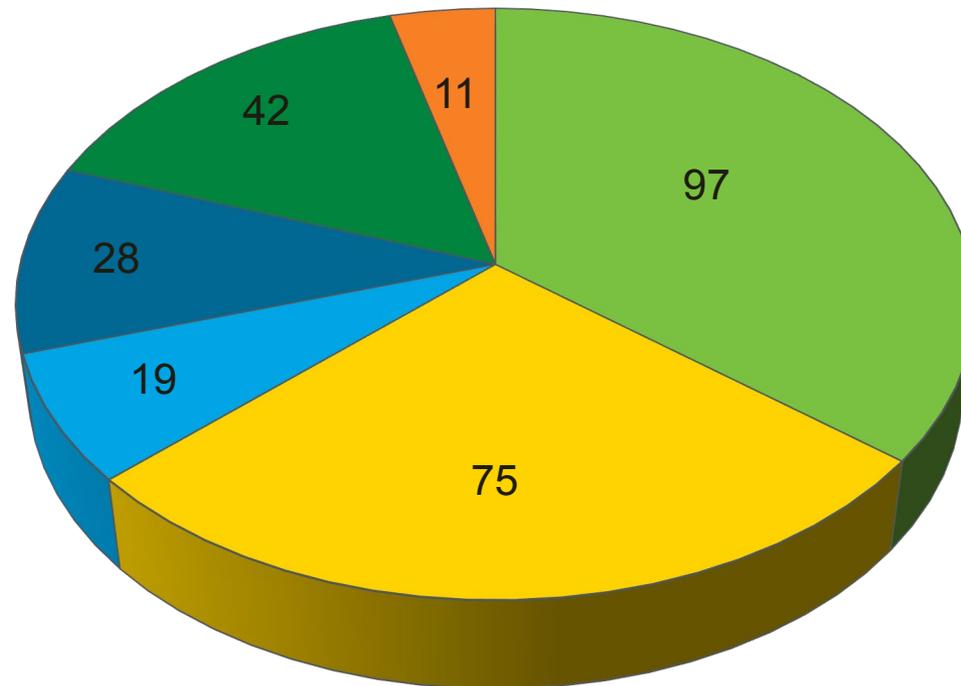
Questions? / Background



Clean. **Reliable. Nuclear.**

Integrating Academic Projects with NE Programs

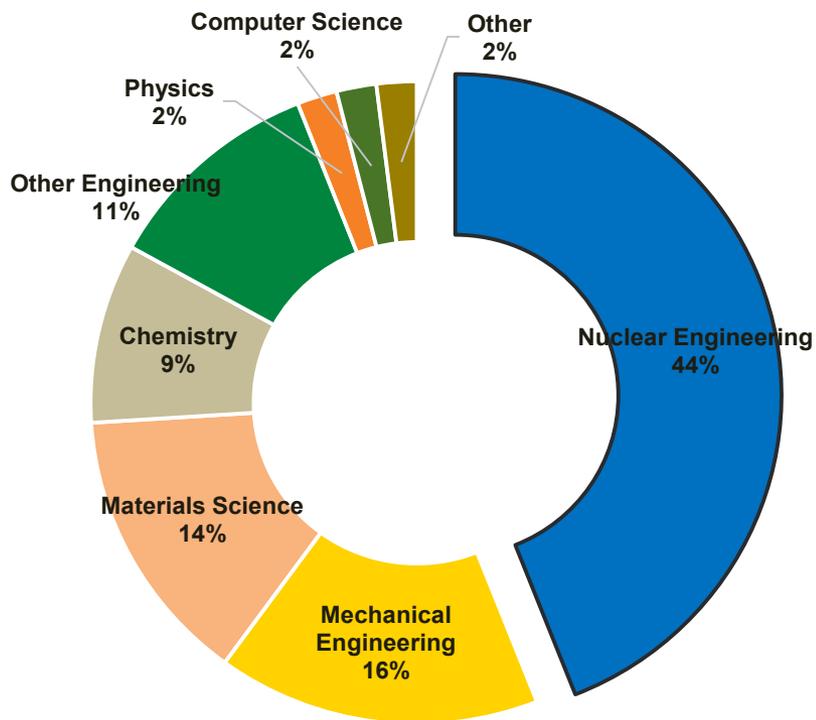
NEUP Projects by Program Technical Area: 2015-2018



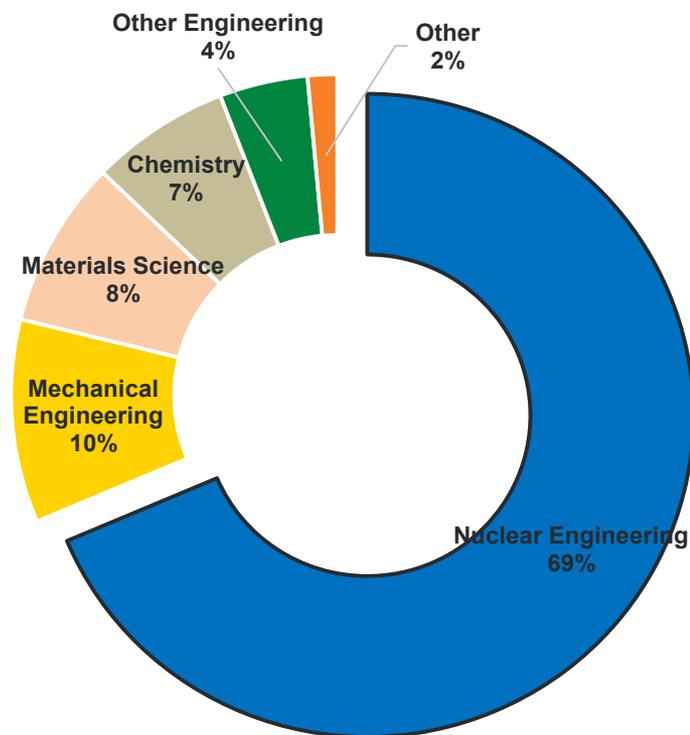
■ Fuel Cycle ■ Reactor Technologies ■ NEAMS ■ NEET ■ NSUF ■ NE

Technical Fields Supported by NEUP & IUP

Students supported on NEUP projects

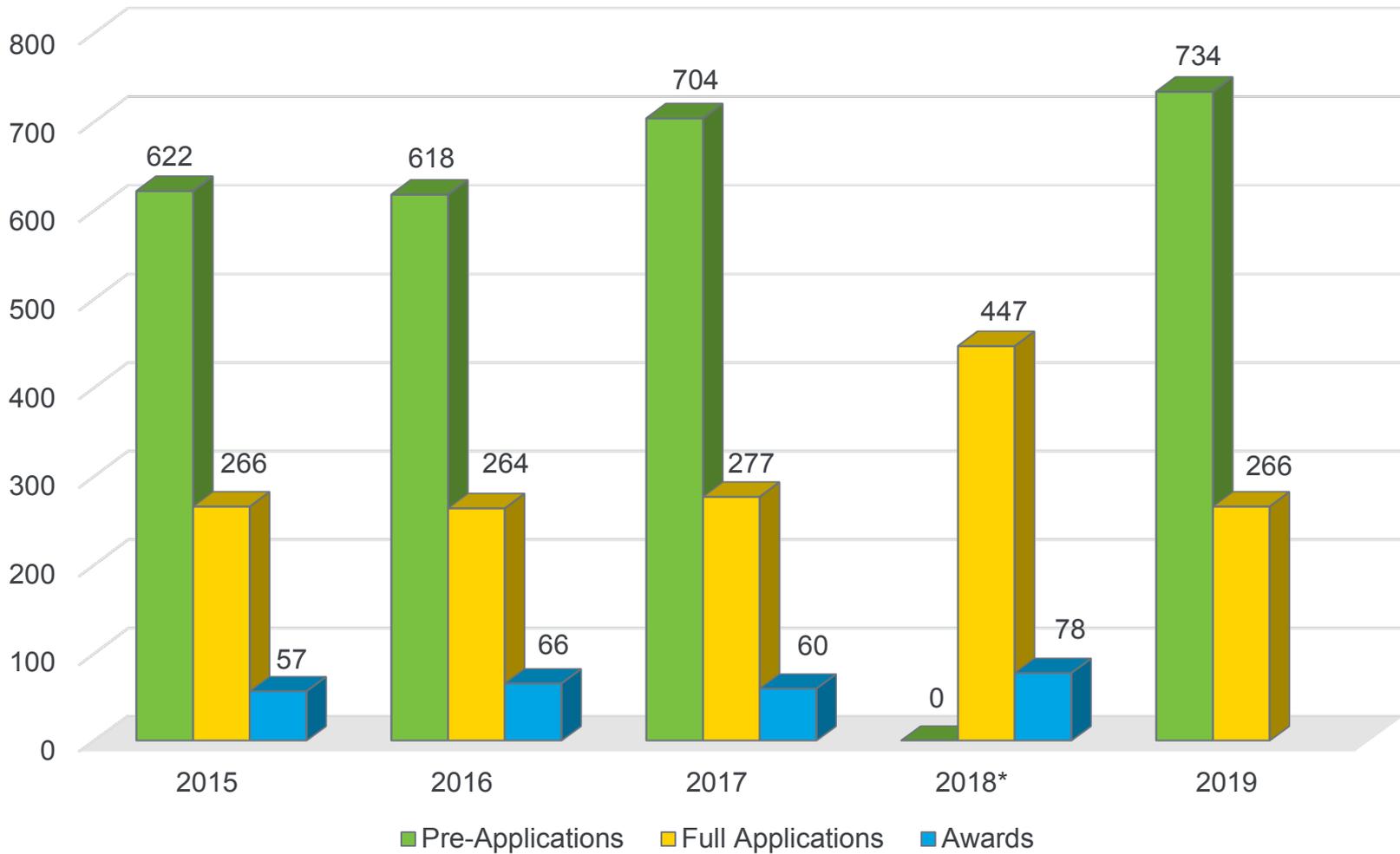


Students supported on IUP Fellowships



*DOE-NE does not track scholarship recipient degree declarations

CINR Applications & Awards: 2015-2019



*2018 CINR did not have a pre-application process

The 2015-2019 CINR contains all of CINR's current program elements.

University R&D Support

Research & Development

521 Projects

94 Funded Institutions

\$381,385,216

Integrated Research Projects

22 Projects

16 Funded Institutions

\$89,009,625

Summary of University Infrastructure Support

**General
Scientific
Infrastructure**

145 Projects

60 Funded Institutions

\$32,560,784

**Reactor
Upgrades**

82 Projects

24 Funded Institutions

\$27,106,146

IUP Eligibility Requirements



- **Award Amounts:**
 - Scholarship: \$7,500 one-year award
 - Fellowship: \$155,000 over three years
- **RFA General Requirements:**
 - U.S. citizen or legal permanent resident
 - Beyond first year in college (scholarships only)
 - Enrolled in a IUP-approved college or university determined by the FOA application
 - Field of study of interest to NE
 - Minimum 3.5 GPA at both undergraduate and graduate levels (fellowships)
 - Minimum 3.25 GPA (scholarships)