

NEUP 2010 Review

Presented by Dr. Marsha Lambregts



How It Works

NEUP offered three funding opportunities

- Research & Development (R&D)
 - Competitive R&D subcontract solicitation through INL's NEUP Integration Office
- Capabilities, Infrastructure & Equipment
 - Competitive grants in conjunction with DOE-ID
- Scholarships & Fellowships
 - Competitive grants in conjunction with DOE-ID



NEUP Management

DOE-NE Headquarters NEUP Office

- **Mary McCune**, HQ Program Manager

DOE-ID Office

- **Kenny Osborne**, DOE-ID Manager

NEUP Integration Office, INL

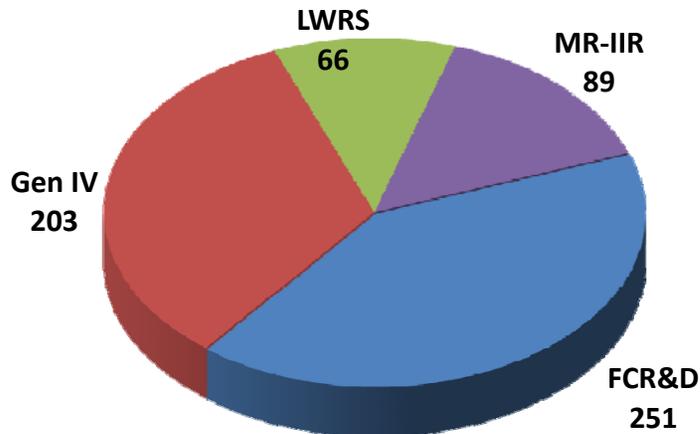
- **John Gilligan**, NEUP IO Director (Joint Appt. w/ NCSU)
- **Marsha Lambregts**, NEUP IO Relationship Manager, R&D Lead
- **Greg Bala**, NEUP IO Deputy Relationship Manager, Infrastructure Lead
- **Kortny Rolston**, NEUP IO Outreach Coordinator
- **Cindie Jensen**, NEUP IO Review Coordinator
- **Val Seeley**, NEUP IO Project Manager—Subcontracts
- **Jenna Payne**, NEUP Support, S&F Lead

RESEARCH AND DEVELOPMENT



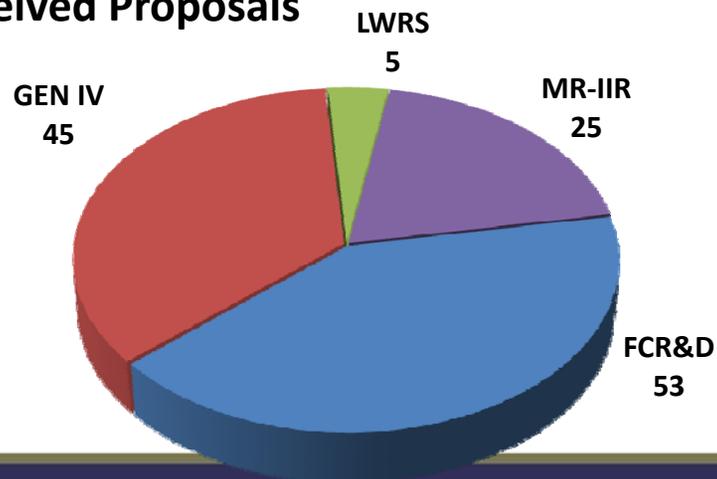
PROGRAM OVERVIEW

Received Pre-Applications

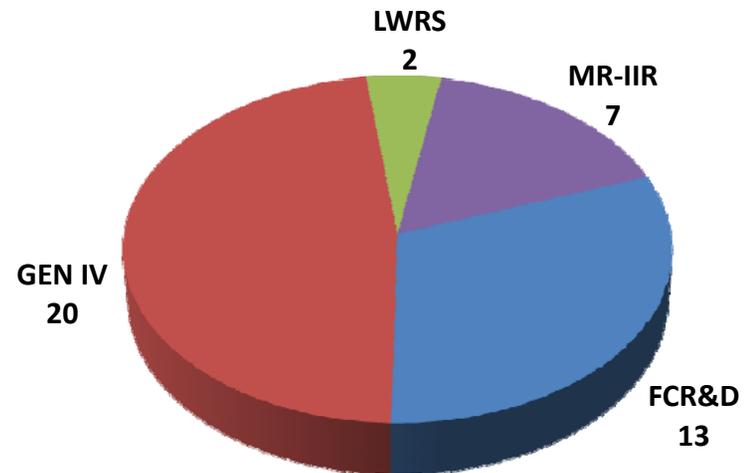


- 609 pre-applications
- 131 requested full proposals
- 128 submitted proposals
- 42 funded proposals

Received Proposals

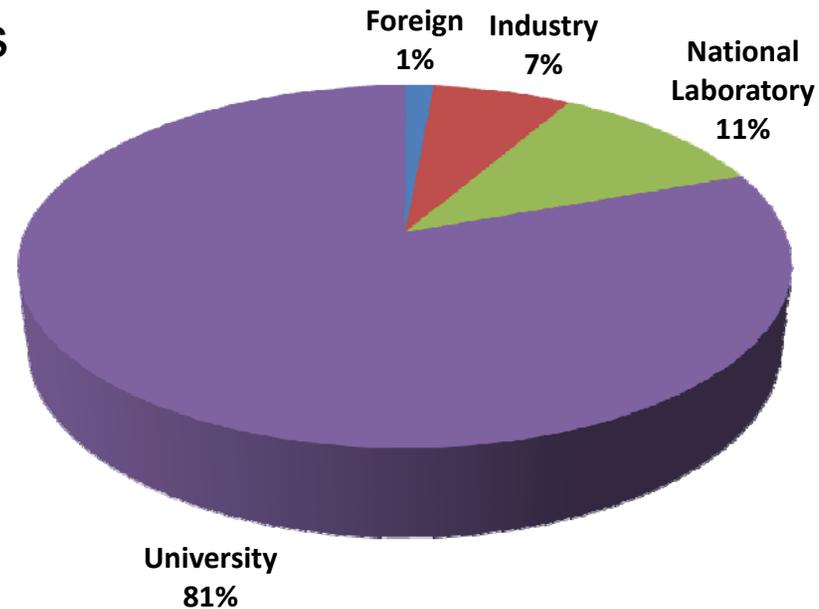


Funded Proposals



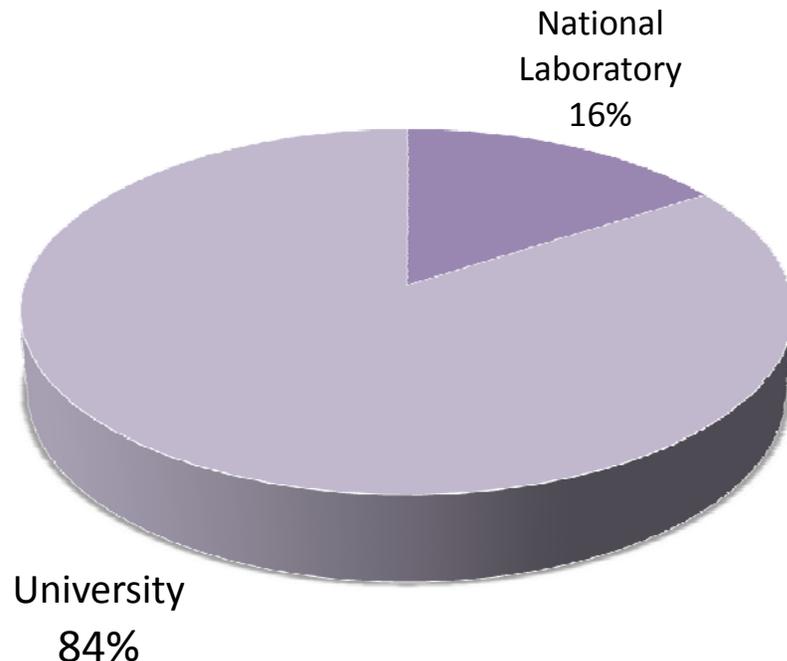
PROPOSALS RECEIVED (128 TOTAL)

- Proposals were submitted by 46 lead universities
- 26 additional organizations collaborated
 - 12 Universities
 - 8 National Laboratories
 - 5 Industry
 - 1 Foreign Institution
- These organizations represent
 - 31 U.S. States
 - 8 Minority Institutions
 - 1 Foreign Country
 - 1 U.S. Territory

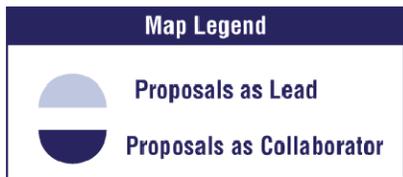
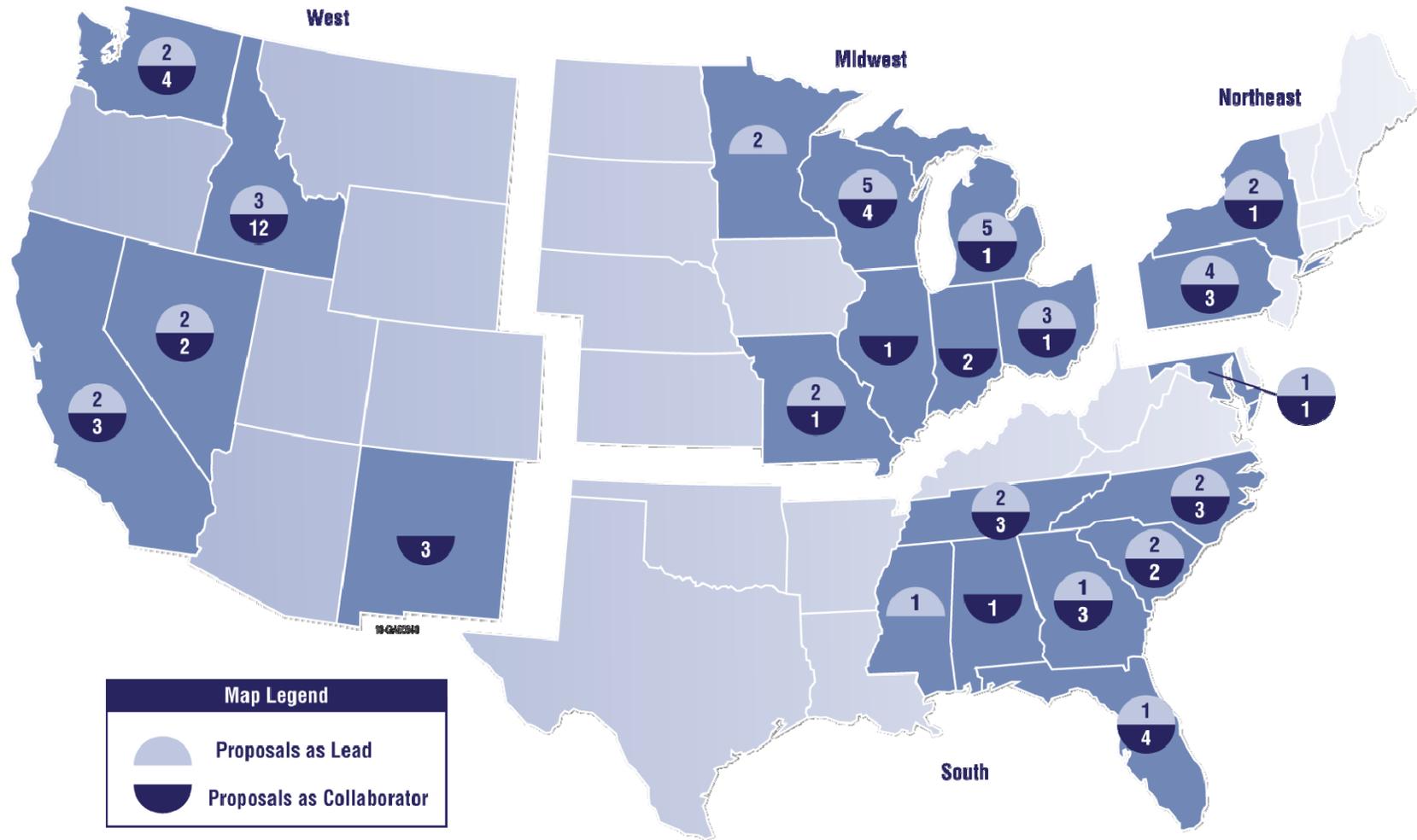


FUNDED PROPOSALS (42 TOTAL)

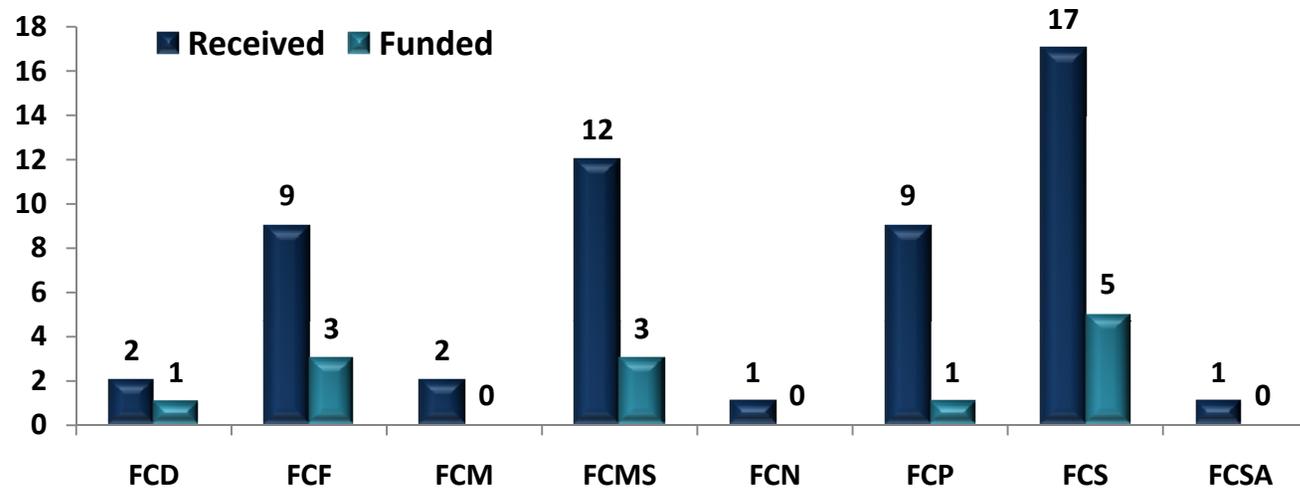
- Funded proposals were comprised of 23 lead universities
- 16 additional collaborating organizations
 - 9 Universities
 - 6 National Laboratories
- All participating organizations represent
 - 22 U.S. States
 - 6 Minority Institutions



FUNDED PROPOSALS BY STATE



FUEL CYCLE RESEARCH & DEVELOPMENT (FCR&D)



FCD – FCR&D Used Nuclear Fuel Disposition

FCF – FCR&D Fuels

FCM – FCR&D Materials

FCMS – FCR&D Modeling & Simulation

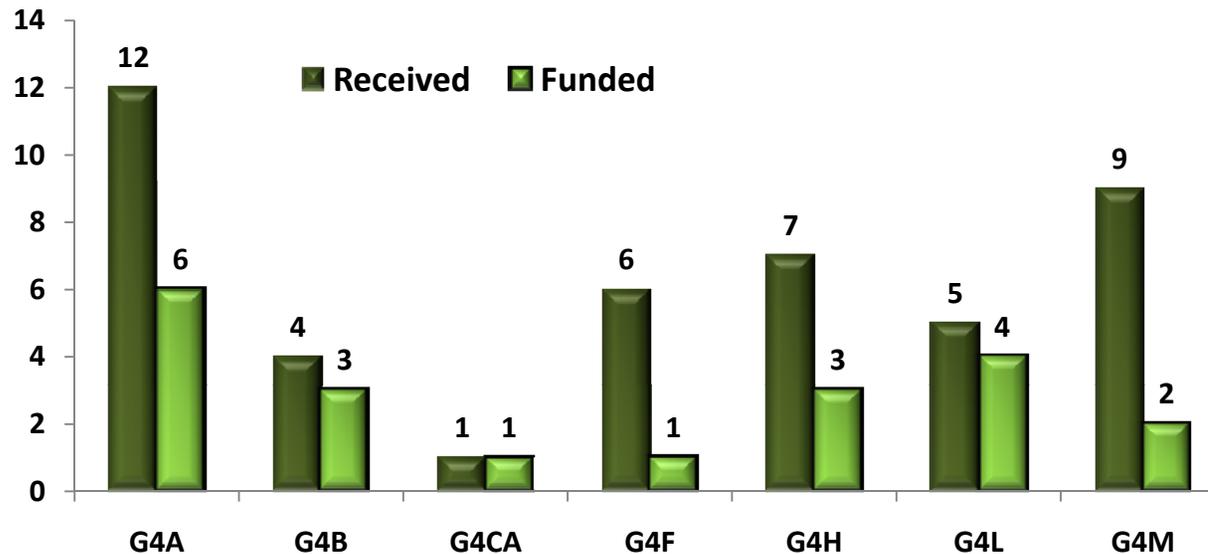
FCN – FCR&D Nuclear Physics & Theory Development

FCP – FCR&D MPACT

FCS – FCR&D Separations & Waste Forms

FCSA – FCR&D Systems Analysis

GENERATION IV REACTOR RESEARCH & DEVELOPMENT (GEN IV)



G4A – Gen IV High-Temperature Materials

G4B – Gen IV Advanced Reactor Concepts

G4CA – Crosscutting R&D: Structural Materials

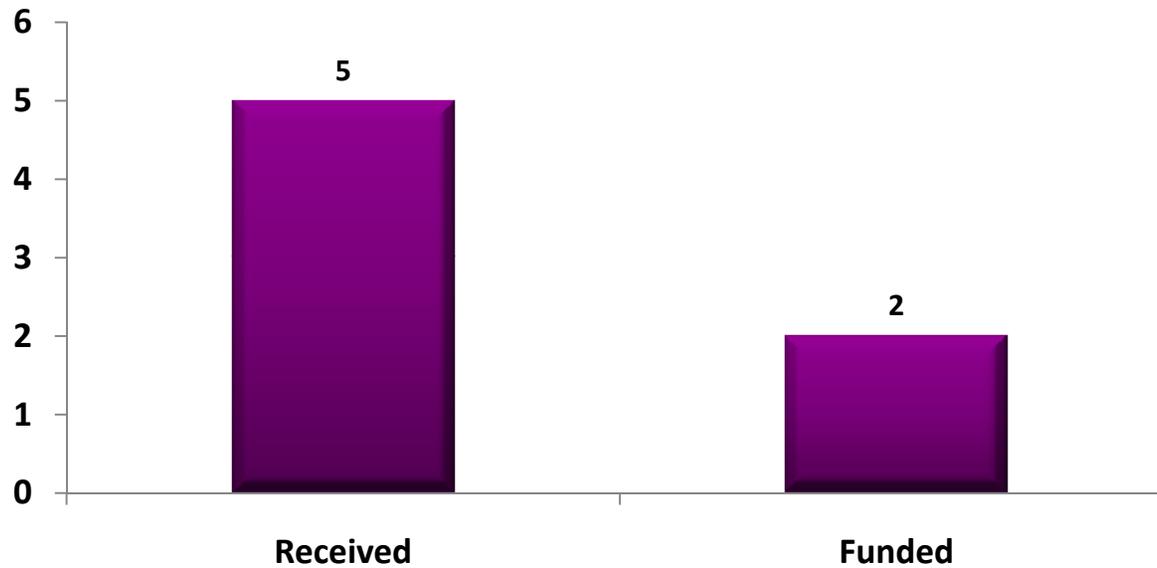
G4F – Gen IV Fuels

G4H – Gen IV Heat Transport, Energy Conversion, Nuclear Heat Applications

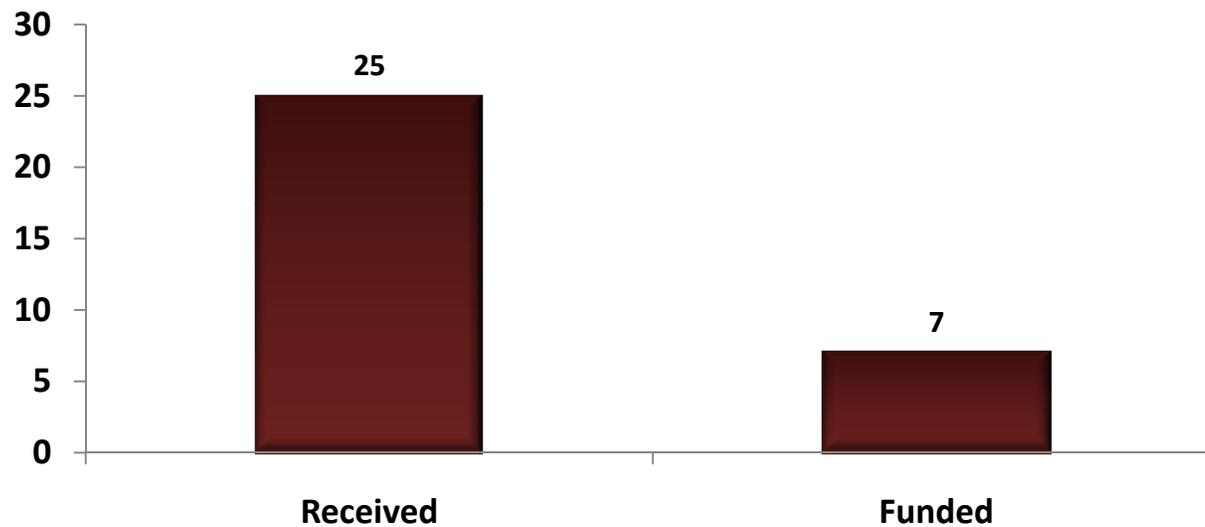
G4L – Gen IV Fast Reactors

G4M – Gen IV Methods

LIGHT WATER REACTOR SUSTAINABILITY (LWRS)



MISSION-RELEVANT INVESTIGATOR-INITIATED RESEARCH



REVIEW AND SELECTION PROCESS

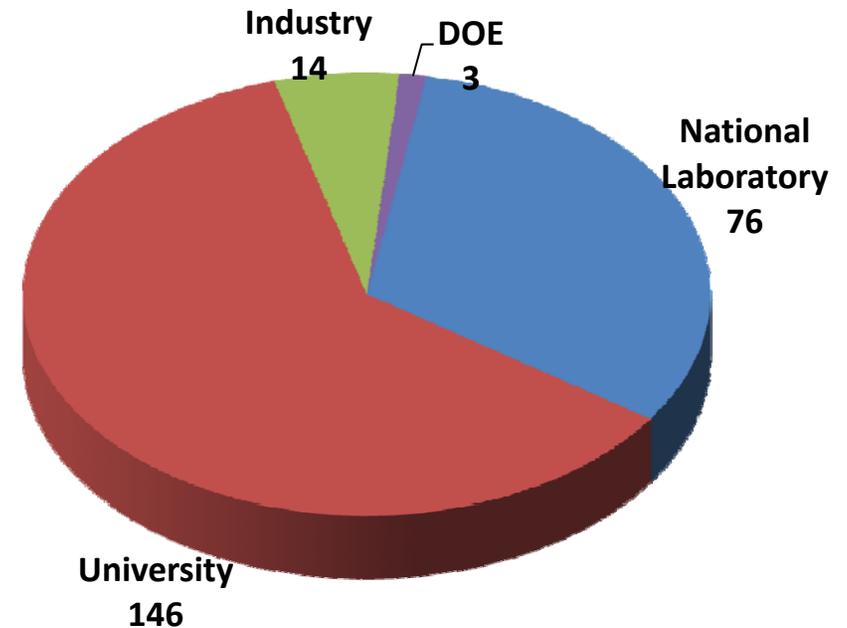
NEUP followed a 3-step selection process

- Semi-Blind Merit Review
 - Goal to achieve mix of reviewers for each application (university, industry, lab, other)
- Proposal Selection
 - Selections were based primarily on merit review scores within workscope areas
- Balancing Review
 - Participation by minority institutions
 - Geographic distribution



MERIT REVIEWERS

- **239 individuals served as merit reviewers**
 - 76 from national laboratories
 - 146 university professors
 - 14 from industry
 - 3 DOE and NNSA
- **Reviewers drawn from about 98 different organizations, including**
 - 8 National Laboratories
 - 69 Universities
- **Reviewers evaluated up to 4 proposals, performing an average of 1.5 each**
- **384 total evaluations conducted**



SELECTION REVIEW BOARD

Selection Board comprised of Technical Integration Office/Technical Development Office and DOE-NE leads for each area, chaired by NEUP

- Considered merit review results for each application, addressing one work-scope at a time
- Statistically significant deviations automatically flagged for more detailed examination
- Except for outliers, selections within a given work code expected to parallel numeric merit scores

SELECTION REVIEW BOARD

Final selection review performed by NEUP with the initiative Directors

- Considered initial selection recommendations across the entire NEUP program

NEUP Review of selections

- Address additional balancing criteria if necessary



SELECTION BOARD REVIEWERS

- **FCR&D**
 - Buzz Savage (NE), Mike Goff (TIO), Phillip Finck (TIO)
- **GEN IV**
 - Sal Golub (NE), Tom O'Connor (NE), Rob Versluis (NE), David Petti (TDO), Hans Gougar (TDO)
- **LWRS**
 - Richard Reister (NE), Ronaldo Szilard (TIO)
- **MR-IIR**
 - Robert Price (NE), Buzz Savage (NE), Sal Golub (NE), Tom O'Connor (NE), Rob Versluis (NE), Phillip Finck (TIO), David Petti (TDO), Mike Goff (TIO)

INFRASTRUCTURE

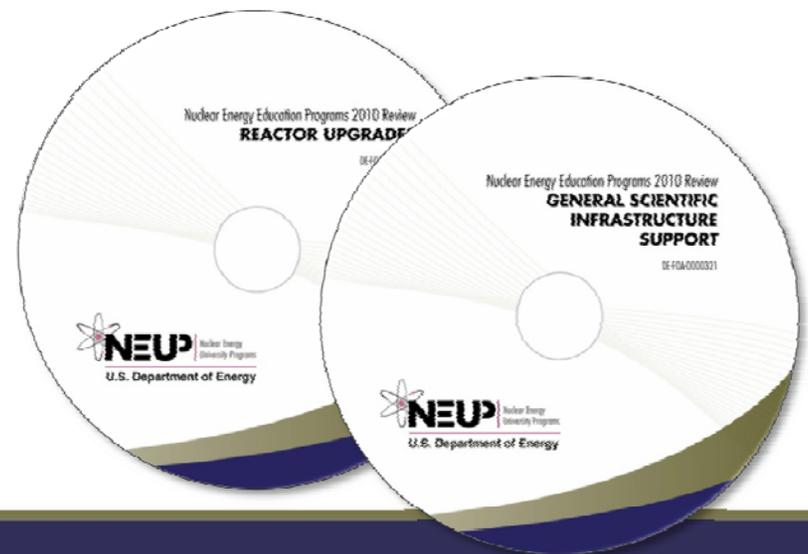


OVERVIEW

Three areas of review:

- Major Reactor Upgrade
- Minor Reactor Upgrade
- General Scientific Equipment

Separate panels convened for each area



MAJOR REACTOR

Major Reactor Upgrade

- 12 proposals from universities in 11 states submitted for a monetary value of \$15,078,389
- 4 proposals funded: \$3,752,415

Review Panel Composition

- 3 University Professors
- Two DOE-NE Program Representatives

MINOR REACTOR

Minor Reactor Upgrade

- 19 proposals from universities in 15 states submitted for a monetary value of \$2,994,970
- 12 proposals funded by panel for \$1,982,185

Review Panel Composition

- 2 University Professors
- Two DOE-NE Program Representatives

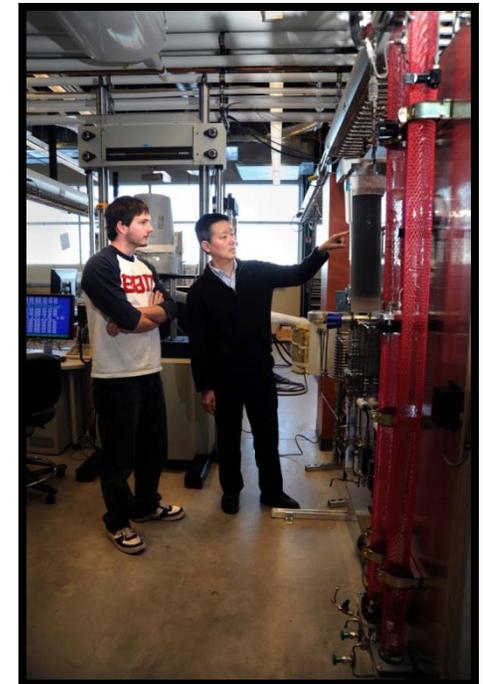
GENERAL EQUIPMENT

General Scientific Infrastructure Support

- 51 proposals from universities in 31 states submitted for a monetary value of \$12,728,567
- 33 proposals funded for \$7,452,904

Review Panel Composition

- 3 University Professors
- Two DOE-NE Program Representatives



REVIEW PROCESS

Initial Review

- Eligibility
- Required information
- Satisfaction of mandatory requirements
- Responsive to FOA objectives

Panel Evaluation

- Impact (50%)
- Use (20%)
- Reasonable? (10%).
- Key Personnel (20%).

Managing Conflict

- Reviewers with a connection to a proposing institution were recused.

Program Policy Factors

- Optimize funding to achieve NEUP goals
- Optimize project mix
- Minority considerations
- Existing NS&E Program

REVIEW PROCESS

Initial Review

Panel Evaluation

Managing Conflict

Program Policy

Major / Minor Reactors

- *Impact (50%)*. Enhance performance, control or capability; increase quality, safety/security or efficiency; expand research, teaching or training
- *Use (20%)*. Enhance the number of users or variety of research

General Scientific Equipment

- *Impact (50%)*. Potential to expand research or training capabilities
- *Use (20%)*. Amount of student or faculty use, amount and variety of research/services provided by the facility

REVIEW PROCESS



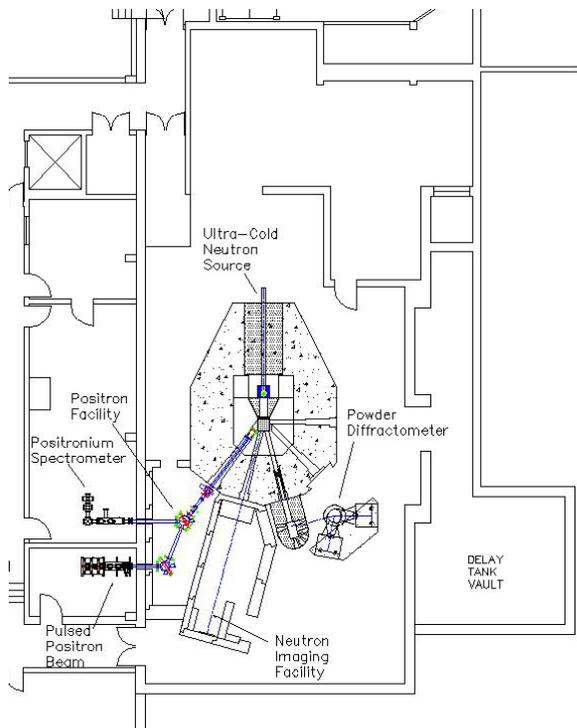
MAJOR REACTOR EXAMPLE: UNIVERSITY OF MISSOURI, COLUMBIA



- \$1.298 M requested for a cooling cell upgrades
- Cost match of \$215 K
- Unique, high power reactor

- Replacement plan mitigates down time thus ensuring continued use
- Requested to replace current system that has been in service for 40 years
- High usage

MAJOR REACTOR EXAMPLE: NORTH CAROLINA STATE UNIVERSITY



- \$1.379 M requested to upgrade power from 1-MW_{th} to 2-MW_{th}
- Includes reactor, cooling systems, instrumentation and control
- Enhance radiation densities, efficiency, and quality
- Expected to increase utilization and interest

MINOR REACTOR EXAMPLE: RENSSELAER POLYTECHNIC INSTITUTE

- \$200 K request (\$50 K cost match) for equipment and instrumentation to enable:
 - Subcritical benchmarks and transient analysis
 - High res gamma spectroscopy of fuel
 - Benchmarking neutron flux mapping
 - Enhanced reactor monitoring and training
- Funds are expected to result in:
 - New experiments for research, teaching and training
 - Improve security of operation
 - Enhance operational capability for distance teaching / remote access



GENERAL EQUIPMENT EDUCATION EXAMPLE: WILBERFORCE UNIVERSITY



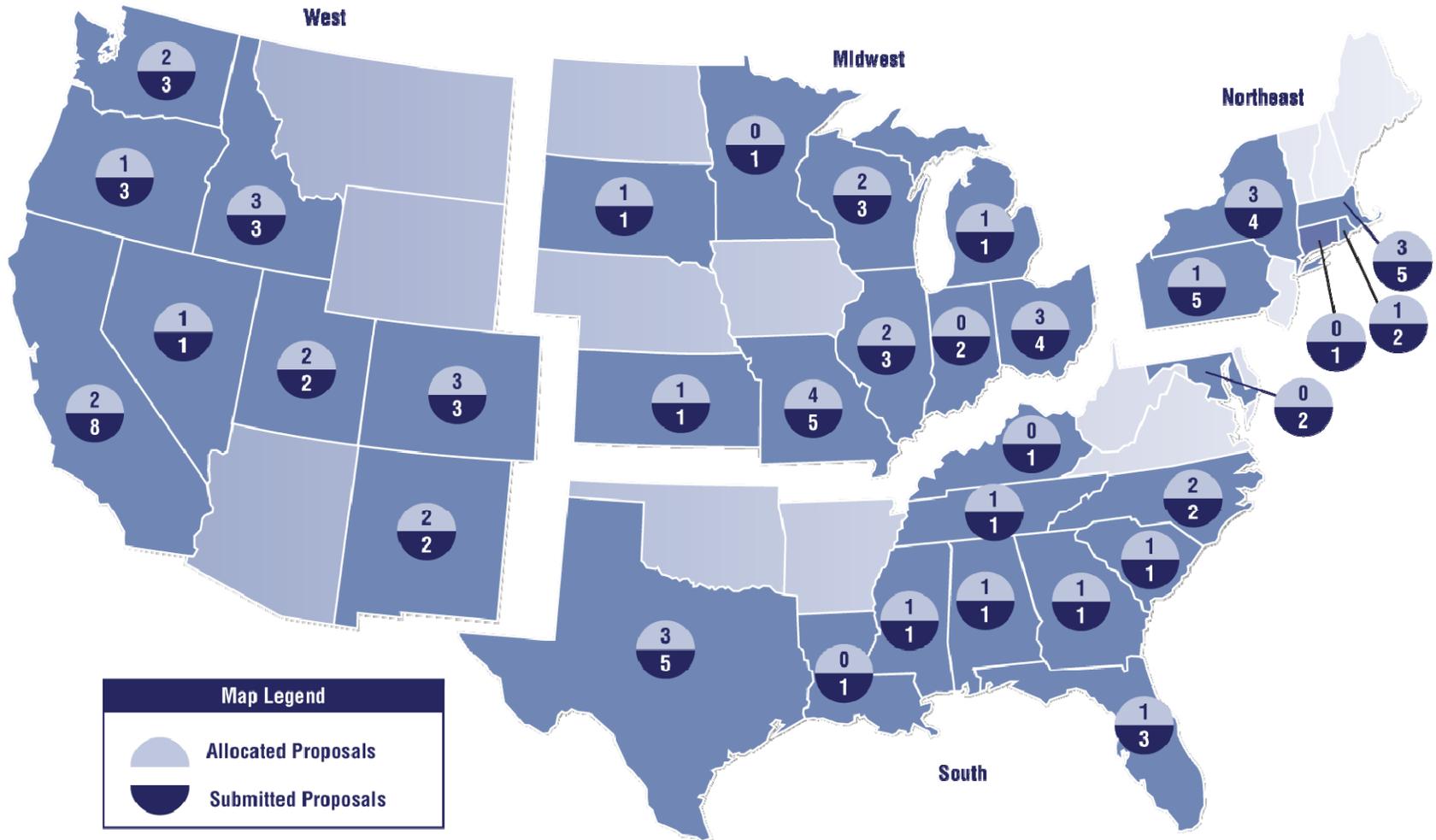
- Supports educational objective
 - Requests \$171 K in general scientific equipment to further education
 - Currently, students travel to Ohio State University to conduct experiments.
-
- This equipment allows some experiments to be conducted at Wilberforce for coursework in:
 - Introduction to Nuclear Engineering, Health Physics, Instrumentation Laboratory, Power Plant Operation, Core Neutronics, Nuclear Safety

GENERAL EQUIPMENT R&D EXAMPLE: WASHINGTON STATE UNIVERSITY



- Supports R&D objectives, enhances teaching opportunities
 - Requests \$257 K (\$42 K cost match) to expand R&D capabilities
 - Purchase a single crystal X-ray diffractometer for the radiochemistry program
-
- Enables programmatic objectives to design improved methods to separate the actinides from fission products in spent nuclear fuel

FUNDED PROPOSALS BY STATE



CONCLUDING RECOMMENDATIONS

Major Reactor Upgrade (\$3 M):

- 12 proposals from universities in 11 states submitted for a monetary value of \$15,078,389
- 4 Proposals were funded (\$3,752,415)

Minor Reactor Upgrade (\$4 M):

- 19 proposals from universities in 15 states submitted for a monetary value of \$2,994,970
- 12 proposals were funded (\$1,982,185)

General Scientific Equipment (\$7.5M):

- 51 proposals from universities in 31 states submitted for a monetary value of \$12,728,567
- 33 proposals were funded (\$7,452,903)

SCHOLARSHIPS & FELLOWSHIPS



FUNDING OPPORTUNITY ANNOUNCEMENT

DOE-ID issued a Funding Opportunity Announcement for universities and colleges with courses or programs in NE Science and Engineering to provide documentation of their programs and agree to accept Scholarships and/or Fellowships through NEUP

- They were not to charge overhead
- Must have a documented current program
- Essentially a pass/fail decision
- Schools did not have to apply prior to the RFA but needed to be signed up before funds could be distributed to students
- 46 participating universities

NEUP-APPROVED UNIVERSITIES/COLLEGES

| | University/College | | University/College |
|----|---|----|-------------------------------------|
| 1 | Boise State University | 16 | Ohio State University |
| 2 | Central State University | 17 | Oregon State University |
| 3 | Clemson University | 18 | Pennsylvania State University |
| 4 | Colorado School of Mines | 19 | Purdue University |
| 5 | Francis Marion University | 20 | Rensselaer Polytechnic Institute |
| 6 | Georgia Institute of Technology | 21 | South Dakota State University |
| 7 | Idaho State University | 22 | Texas A&M University |
| 8 | Illinois Institute of Technology | 23 | University of California, Berkeley |
| 9 | Kansas State University | 24 | University of California, Irvine |
| 10 | Linn State Technical College | 25 | University of Colorado, Boulder |
| 11 | Massachusetts Institute of Technology | 26 | University of Florida |
| 12 | Miami Dade College | 27 | University of Idaho |
| 13 | Missouri University of Science & Technology | 28 | University of Illinois |
| 14 | North Carolina State University | 29 | University of Massachusetts, Lowell |
| 15 | Northwestern University | 30 | University of Maryland |

NEUP-APPROVED UNIVERSITIES/COLLEGES

| | University/College | | University/College |
|----|----------------------------------|----|---|
| 31 | University of Michigan | 39 | University of Texas, Arlington |
| 32 | University of Missouri, Columbia | 40 | University of Texas, Austin |
| 33 | University of Nevada, Las Vegas | 41 | University of Washington |
| 34 | University of Nevada, Reno | 42 | University of Wisconsin, Madison |
| 35 | University of New Mexico | 43 | Utah State University |
| 36 | University of Pittsburgh | 44 | Virginia Polytechnic Institute & State University |
| 37 | University of South Carolina | 45 | Washington State University |
| 38 | University of Tennessee | 46 | Wilberforce University |

REQUEST FOR APPLICATIONS

NEUP requested applications for Scholarship and Fellowship applicants

▪ Application requirements:

- U.S. citizen
- Beyond first year in college (Scholarships)
- Enrolled in a NEUP-approved college or university, determined by FOA application
- Field of study of interest to NE

SCHOLARSHIP REVIEW PROCESS

When evaluating applications, reviewers addressed the following Merit Review criteria:

- How does the student's chosen course of study relate to the mission of the DOE's Office of Nuclear Energy?
- How well qualified is the student to complete the proposed course of study?

In order to address each criterion, panel members considered the following:

- The strength of the academic record
- References
- ACT or SAT scores
- The student's personal career statement
- The appropriateness of the course of study relative to the proposed plan for education

SCHOLARSHIPS: REVIEW PROCESS

Applications were scored by the following:

- Course of study related to mission of DOE-NE: **Y/N**
- Strength of academic record: **1-20**
- References: **1-10**

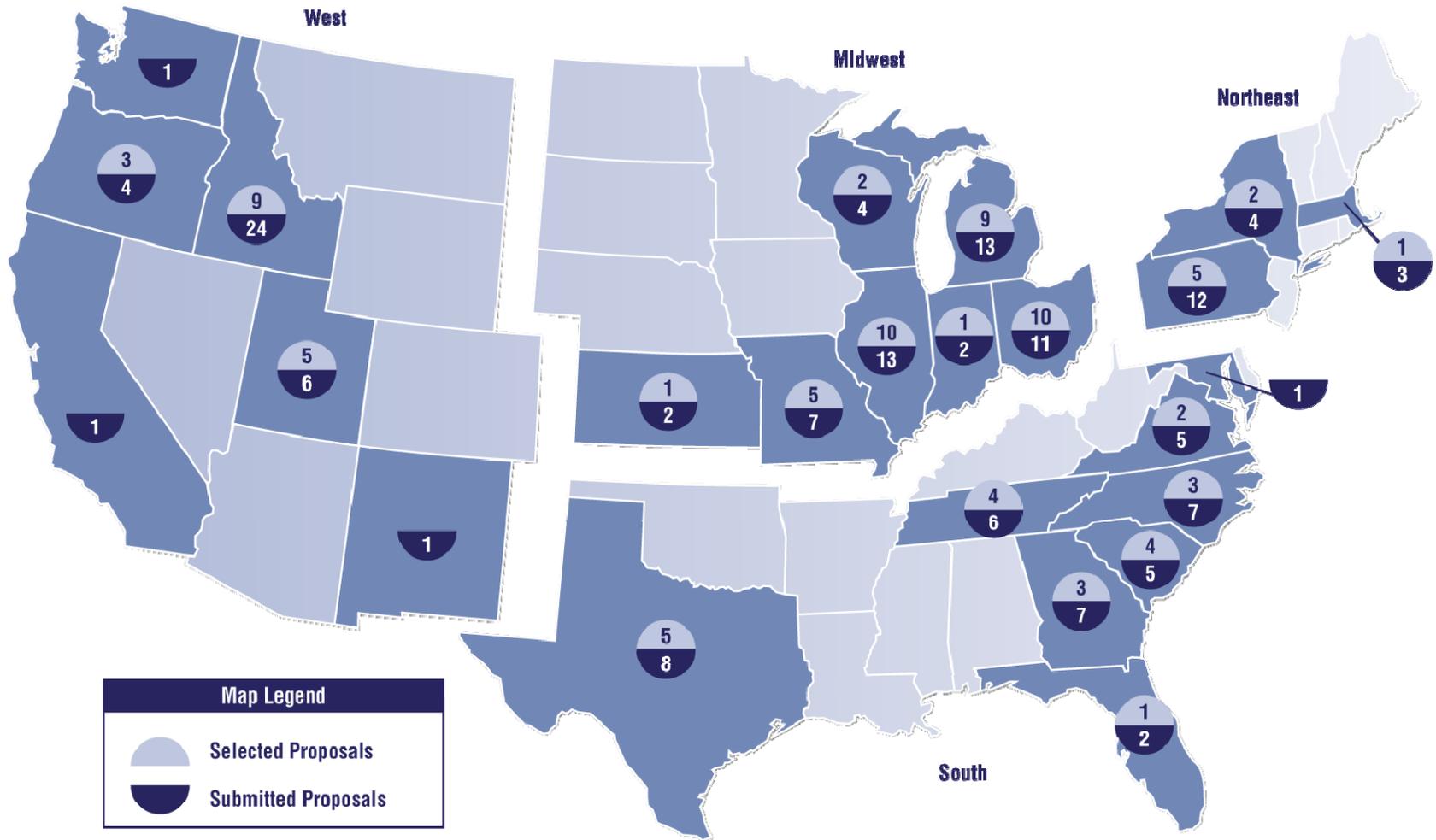
Process:

- Applications were then ranked by average score, which was calculated based on the above scored areas

SCHOLARSHIPS: GENERAL INFORMATION

- 149 viable applications*
- 85 recommended for award, representing 20 states
- 3.8 average undergraduate GPA of recommended students
- Review Panel Composition
 - 2 University Professors
 - Two DOE-NE Program Representatives

FY 2010 SCHOLARSHIP RECIPIENTS



SCHOLARSHIPS: QUOTES FROM APPLICATIONS

- “Even as a Lego-addicted child I knew my future would lead me to engineering...”
- “I want to help build a future with one less crisis my daughter will have to shoulder.”
- “Most students don’t spend their high school summers writing research reports on nuclear power for their mother, but I consider it the best summer of my life.”
- “From the moment I set eyes on the blue glow—also known as Čerenkov radiation—exuding from the spent nuclear fuel I viewed at Idaho National Laboratory’s Advanced Test Reactor, I was captivated.”

FELLOWSHIPS: REVIEW PROCESS

What is the intellectual merit of the application?

- To evaluate the intellectual merit criterion, panelists considered the following:
 - The strength of the academic record,
 - Their career statement,
 - Their identified research area of interest,
 - The description of previous research experience,
 - References,
 - GRE General and Subject Test scores, and
 - The appropriateness of the choice of course of study relative to the proposed plan for graduate education and research.

FELLOWSHIPS: REVIEW PROCESS

Applications were scored by the following:

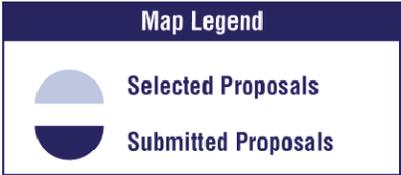
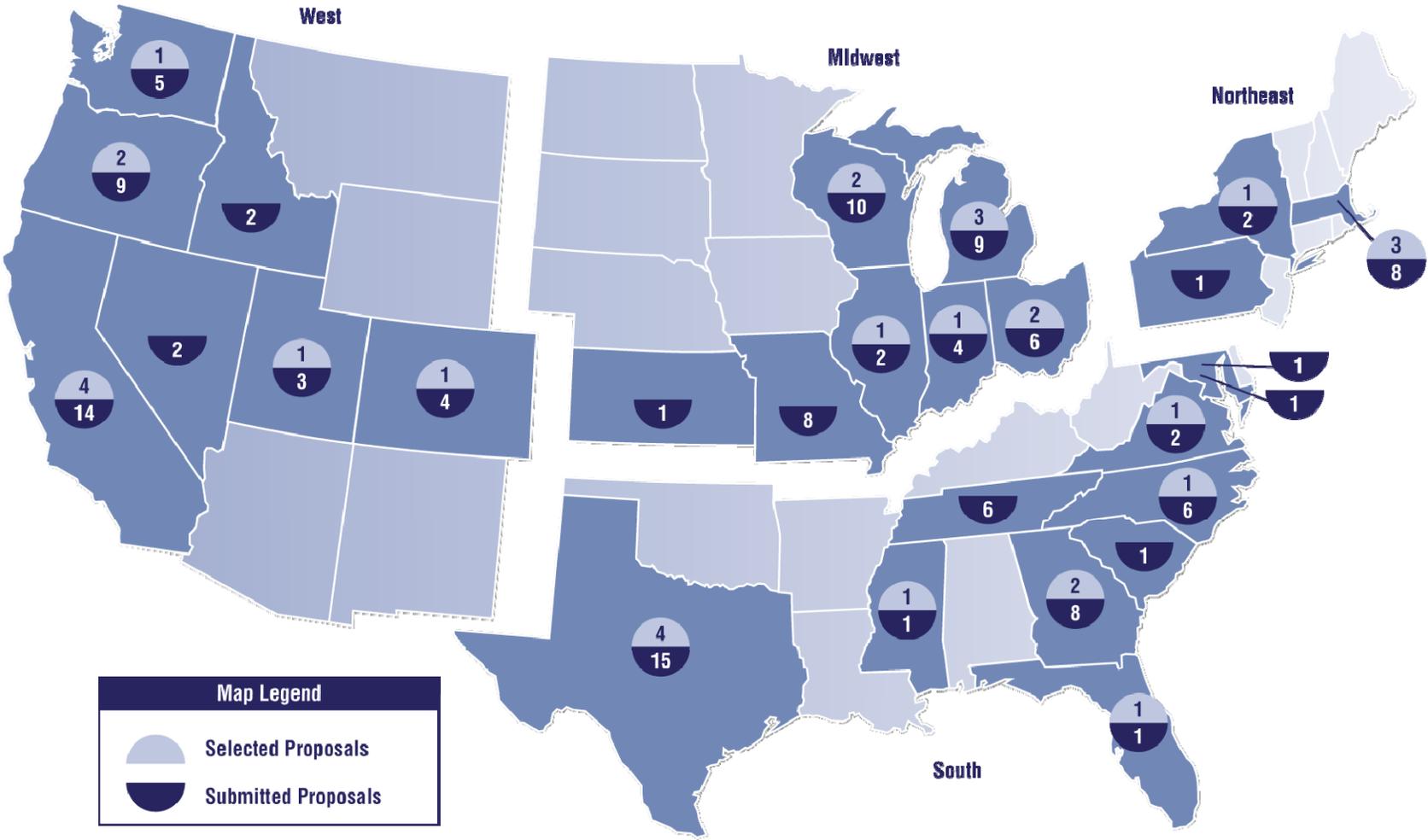
- Academic record: **1-20**
- Career statement: **1-10**
- Research interest and experience: **1-10**
- References: **1-10**

FELLOWSHIPS: GENERAL INFORMATION

- 132 viable applications
- 32 Fellowships were funded, representing 18 states (with alternates: 37 recommended in states)
- Review Panel Composition
 - 3 University Professors
 - 2 DOE-NE Program Representatives



FY 2010 FELLOWSHIP RECIPIENTS



FELLOWSHIP RECIPIENTS

| | Name* | University/College** | Field of Study |
|----|-------------------------|---------------------------------------|----------------------------------|
| 1 | Jonathan Toebbe | Colorado School of Mines | Nuclear Engineering |
| 2 | Erin Gillilan (Hayward) | Georgia Institute of Technology | Nuclear Engineering |
| 3 | Christopher Stewart | Georgia Institute of Technology | Nuclear Engineering |
| 4 | Matthew Everson | Massachusetts Institute of Technology | Nuclear Engineering |
| 5 | Eric Forrest | Massachusetts Institute of Technology | Nuclear Engineering |
| 6 | Mark Massie | Massachusetts Institute of Technology | Nuclear Engineering |
| 7 | Steven Kelley | Mississippi State University | Radiochemistry/Nuclear Chemistry |
| 8 | Jesse Holmes | North Carolina State University | Nuclear Engineering/Physics |
| 9 | Lukasz Koscielski | Northwestern University | Radiochemistry |
| 10 | Matthew Bucknor | Ohio State University | Nuclear Engineering |
| 11 | Christian Petrie | Ohio State University | Nuclear Engineering |
| 12 | Christopher Bowser | Oregon State University | Nuclear Engineering |
| 13 | Michael Brown | Oregon State University | Radiochemistry |

*Names in blue represent students who received an NEUP scholarship in FY 2009

**Universities in red represent new fellowship recipients in NEUP

FELLOWSHIP RECIPIENTS

| | Name | University/College | Field of Study |
|----|------------------|---|------------------------------------|
| 14 | Caleb Brooks | Purdue University | Nuclear Engineering |
| 15 | Matthew Mille | Rensselaer Polytechnic Institute | Health Physics/Nuclear Engineering |
| 16 | Vishal Patel | Texas A&M University | Nuclear Engineering |
| 17 | Kristina Yancy | Texas A&M University | Nuclear Engineering |
| 18 | Anselmo Cisneros | University of California, Berkeley | Nuclear Engineering |
| 19 | Joseph Daniel | University of California, Berkeley | Nuclear Engineering |
| 20 | Dariusz Seif | University of California, Los Angeles | Mechanical Engineering |
| 21 | Peter Wells | University of California, Santa Barbara | Materials Engineering |
| 22 | Matthew Marzano | University of Florida | Nuclear Engineering |
| 23 | Seth Johnson | University of Michigan | Nuclear Engineering |
| 24 | Bruce Pierson | University of Michigan | Nuclear Engineering |
| 25 | Aaron Wysocki | University of Michigan | Nuclear Engineering |

*Names in blue represent students who received an NEUP scholarship in FY 2009

**Universities in red represent new fellowship recipients in NEUP

FELLOWSHIP RECIPIENTS

| | Name | University/College | Field of Study |
|----|-----------------|---|----------------------------------|
| 26 | Brian O'Neil | University of Texas at Austin | Nuclear Engineering |
| 27 | Brian Parks | University of Texas at Austin | Nuclear Engineering |
| 28 | Matthew Gidden | University of Wisconsin, Madison | Nuclear Engineering |
| 29 | Sarah Khalil | University of Wisconsin, Madison | Materials Science/Engineering |
| 30 | Colby Jensen | Utah State University | Mechanical Engineering |
| 31 | Matthew Hiser | Virginia Polytechnic Institute & State University | Materials Science/Engineering |
| 32 | Stephanie Pitts | Washington State University | Mechanical/Materials Engineering |

*Names in blue represent students who received an NEUP scholarship in FY 2009

**Universities in red represent new fellowship recipients in NEUP

FELLOWSHIPS: QUOTES FROM APPLICATIONS

- “I’ve been fascinated with how the universe works for as long as I can remember. In fact, my first word was ‘moon.’ Instead of playing with dolls when I was a little girl, I played with robot building sets...”
- “My father is a nuclear engineer and he showed his passion for the field by naming our dog Neutron.”
- “‘I don’t think you’re cut out to be an engineer. Maybe you should reconsider your major in nuclear engineering,’ were the words my AP Physics teacher spoke after I had excitedly gushed to him my interest in pursuing a career in nuclear engineering.”
- “For most of my life, I wanted to be a chef. I always loved my time in the kitchen, experimenting with food and finding new ways to manipulate recipes. I came to college seeking a path that would allow me to expand on this passion for experimentation.”

AREAS OF STUDY

| | Fellowships | Scholarships |
|---|-------------|--------------|
| Nuclear Engineering | 21 | 37 |
| Other Engineering | 6 | 38 |
| Radiochemistry & Chemical Engineering | 4 | 4 |
| Health Physics | 1 | 3 |
| Other | 0 | 3 |
| Total | 32 | 85 |

2010 Overall Competed Funding

- R&D: \$38,700,022
- Infrastructure: \$13,187,503
- S&F: \$5,000,000

Total
Competed
Funding: **\$56,887,525**