



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

VIA Electronic Mail
[REDACTED]

[REDACTED]
Missouri University of Science & Technology
(Missouri S&T)
300 West 12th Street
202 Centennial Hall
Rolla, MO 65409-1330

SUBJECT: MODIFICATION NO. M0003 TO GRANT NO: NRC-HQ-84-14-G-0031

[REDACTED]:

Pursuant to the authority contained in the Federal Grant and Cooperative Agreement Act of 1977, as amended, and the Atomic Energy Act of 1954, as amended, the Nuclear Regulatory Commission (NRC) hereby modifies the above referenced award to Missouri University of Science & Technology (hereinafter referred to as the "Grantee" or "Recipient"), the additional sum of \$400,000.00 to provide continued support for the "Graduate Fellowships in Nuclear Engineering at Missouri S&T (2017 – 2021)" entitled "Program Description."

This modification is effective June 30, 2017 and shall apply to expenditures made by the Recipient furtherance of program objectives during the period beginning with the effective date of June 30, 2017 and ending June 29, 2021.

This award is made to the Recipient on condition that the funds will be administered in accordance with the terms and conditions as set forth in Attachment A (the Schedule); Attachment B (the Program Description); and Attachment C (the Standard Provisions); all of which have been agreed to by your organization.

Please ensure individuals selected as beneficiaries of support under this grant meet the legal requirements consistent with Supreme Court Decisions including *Fisher*, *Gratz*, and *Gutter*.

Please sign the enclosed grant to acknowledge your receipt of the award, and return as a pdf file to Ms. M'Lita Carr by email at MLita.Carr@nrc.gov.

Sincerely yours,

Erika Eam
Grants Officer
Operations Branch A
Acquisition Management Division

Attachments:
Attachment A – Schedule
Attachment B – Program Description
Attachment C – Standard Terms and Condition

Grant and Cooperative Agreement

CHOOSE ONE:

- ☐ COOPERATIVE AGREEMENT
- ☒ GRANT

CHOOSE ONE:

☒ EDUCATION☐ FACILITIES☐ RESEARCH☐ SDCR☐ TRAINING

1. GRANT/COOPERATIVE AGREEMENT NUMBER NRC-HQ-84-14-G-0031		2. SUPPLEMENT NUMBER M0003		3. EFFECTIVE DATE 06/30/2017		4. COMPLETION DATE	
5. ISSUED TO NAME/ADDRESS OF RECIPIENT (No., Street, City/County, State, Zip) MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY 300 WEST 12 ST ROLLA MO 654096506				6. ISSUED BY U.S. NRC - HQ Mailing Address: Acquisition Management Division Mail Stop: TWFN-8E06M Washington DC 20555-0001			
7. TAXPAYER IDENTIFICATION NO. (TIN)				9. PRINCIPAL INVESTIGATOR/ORGANIZATION'S PROJECT OR PROGRAM MGR. (Name & Phone) [REDACTED]			
8. COMMERCIAL & GOVERNMENT ENTITY (CAGE) NO.				[REDACTED]			
10. RESEARCH, PROJECT OR PROGRAM TITLE SEE SCHEDULE							
11. PURPOSE SEE SCHEDULE							
12. PERIOD OF PERFORMANCE (Approximately) 08/01/2014 through 06/29/2021							
13A.		AWARD HISTORY		13B.		FUNDING HISTORY	
PREVIOUS		\$400,000.00		PREVIOUS		\$400,000.00	
THIS ACTION		\$400,000.00		THIS ACTION		\$400,000.00	
CASH SHARE		\$0.00		TOTAL		\$800,000.00	
NON-CASH SHARE		\$0.00					
RECIPIENT SHARE		\$159,325.00					
TOTAL		\$800,000.00					
14. ACCOUNTING AND APPROPRIATION DATA 2017-X0200-IUPMRU-60-60D099-52-S-164-1148-4110							
PURCHASE REQUEST NO.		JOB ORDER NO.		AMOUNT		STATUS	
RES-17-0165							
15. POINTS OF CONTACT							
	NAME	MAIL STOP	TELEPHONE	E-MAIL ADDRESS			
TECHNICAL OFFICER	NANCY V. HEBRON-ISREAL	TWFN/10B56	301-415-6869	Nancy.Hebron-Isreal@nrc.gov			
NEGOTIATOR							
ADMINISTRATOR	M'LITA R. CARR		301-415-6869	MLita.Carr@nrc.gov			
PAYMENTS							
16. THIS AWARD IS MADE UNDER THE AUTHORITY OF: PURSUANT TO SECTION 31B AND 141B OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED							
17. APPLICABLE STATEMENT(S), IF CHECKED: <input checked="" type="checkbox"/> NO CHANGE IS MADE TO EXISTING PROVISIONS <input type="checkbox"/> FDP TERMS AND CONDITIONS AND THE AGENCY-SPECIFIC REQUIREMENTS APPLY TO THIS GRANT				18. APPLICABLE ENCLOSURE(S), IF CHECKED: <input type="checkbox"/> PROVISIONS <input type="checkbox"/> SPECIAL CONDITIONS <input type="checkbox"/> REQUIRED PUBLICATIONS AND REPORTS			
UNITED STATES OF AMERICA				COOPERATIVE AGREEMENT RECIPIENT			
CONTRACTING/GRANT OFFICER ERIKA EAM		DATE 06/28/2017		AUTHORIZED REPRESENTATIVE		DATE	

Grant and Cooperative Agreement

ITEM NO. (A)	ITEM OR SERVICE (Include Specifications and Special Instructions) (B)	QUANTITY (C)	UNIT (D)	ESTIMATED COST	
				UNIT PRICE (E)	AMOUNT (F)
	<p>CFDA Number: 77.008</p> <p>The purpose of this modification is to revise the grant in it's entirety:</p> <p>1. Add an additional program to the existing grant: Program B: entitled "Graduate Fellowships in Nuclear Engineering at Missouri S&T (2017 - 2021)";</p> <p>2. Update the Terms and Conditions;</p> <p>3. Extend the grant's period of performance as a result of the addition of Program B.</p> <p>As a result of this modification:</p> <p>1. Block 9, PRINCIPAL INVESTIGATOR/ORGANIZATION'S PROJECT OR PROGRAM MGR, delete in its entirety and replace with the following: "Programs A & B: [REDACTED] [REDACTED]"</p> <p>2. Block 10, RESEARCH, PROJECT, OR PROGRAM TITLE, delete in its entirety and replace with the following: "Programs A: GRADUATE FELLOWSHIPS IN NUCLEAR ENGINEERING AT MISSOURI S&T (2014 - 2018) Program B: GRADUTE FELLOWSHIPS IN NUCLEAR ENGINEERING AT MISSOURI S&T (2017 - 2021)";</p> <p>3. Attachments A, B, & C, delete in its entirety and replace with the following, see attached beginning on page 4.</p> <p>Please see attached for detailed information. LIST OF CHANGES: Period Of Performance End Date changed from 2018-07-31 00:00:00 to 2021-06-29 00:00:00 Continued ...</p>				

Grant and Cooperative Agreement

ITEM NO. (A)	ITEM OR SERVICE (Include Specifications and Special Instructions) (B)	QUANTITY (C)	UNIT (D)	ESTIMATED COST	
				UNIT PRICE (E)	AMOUNT (F)
	<p>Total Amount for this Modification: \$400,000.00</p> <p>New Total Amount for this Version: \$400,000.00</p> <p>New Total Amount for this Award: \$800,000.00</p> <p>Obligated Amount for this Modification:</p> <p>\$400,000.00</p> <p>New Total Obligated Amount for this Award:</p> <p>\$800,000.00</p> <p>Agreement Officer changed</p> <p>from M'LITA R CARR</p> <p>to ERIKA EAM</p> <p>Administrative Grant Officer changed</p> <p>from GORDANA ZUBER</p> <p>to M'LITA R CARR</p> <p>Delivery: 06/29/2021</p> <p>Delivery Location Code: NRCHQ</p> <p>NUCLEAR REGULATORY COMMISSION</p> <p>NUCLEAR REGULATORY COMMISSION</p> <p>WASHINGTON DC 20555-0001 USA</p> <p>Payment:</p> <p>ASAP GRANT FUNDS REIMBURSEMENT SYS</p> <p>US TREASURY</p> <p>Period of Performance: 08/01/2014 to 06/29/2021</p> <p>Payment will be made through the Automated Standard Application for Payment (ASAP.gov) unless the recipient has failed to comply with the program objectives, award conditions, Federal reporting requirements or other conditions specified in 2 CFR 200.</p>				

Attachment A - Schedule**A.1 PURPOSE OF GRANT**

The purpose of this Grant is to provide support to two distinct programs with Missouri University of Science & Technology, as described in Attachment B entitled "Program Description."

1. **Program A:** Graduate Fellowships in Nuclear Engineering at Missouri S&T (2014 – 2018)
2. **Program B:** Graduate Fellowships in Nuclear Engineering at Missouri S&T (2017 – 2021)

A.2 PERIOD OF GRANT

The effective date of this Grant is:

Program A: Graduate Fellowships in Nuclear Engineering at Missouri S&T (2014 – 2018) – The effective date of this grant is August 1, 2014. The estimated completion date of this Grant is July 31, 2018. Funds obligated hereunder are available for program expenditures for the estimated period: August 1, 2014 – July 31, 2018.

Program B: Graduate Fellowships in Nuclear Engineering at Missouri S&T (2017 – 2021) – The effective date of this grant is June 30, 2017. The estimated completion date of this Grant is June 29, 2021. Funds obligated hereunder are available for program expenditures for the estimated period: June 30, 2017 – June 29, 2021.

A.3 AMOUNT OF AWARD AND PAYMENT PROCEDURES

1. **Program A:** The total estimated amount of this Award is \$559,325.00 for the four year period; inclusive of \$159,325.00 in cost share. NRC hereby obligates the amount of \$400,000.00 for program expenditures during the period set forth above and in support of the Budget above. NRC is not obligated to reimburse the Grantee for the expenditure of amounts in excess of the total obligated amount.
2. **Program B:** The total estimated amount of this Award is \$400,000.00 for the four year period. NRC hereby obligates the amount of \$400,000.00 for program expenditures during the period set forth above and in support of the Budget above. NRC is not obligated to reimburse the Grantee for the expenditure of amounts in excess of the total obligated amount.
3. Payment shall be made to the Recipient in accordance with procedures set forth in the Automated Standard Application for Payments (ASAP) Procedures set forth below.

A.4 BUDGET

Revisions to the grant award budget shall be made in accordance with Revision of Grant Budget in accordance with [2 CFR § 200.308](#).

Program A

- | | |
|--------------------------------|--------------|
| 1. Total Estimated NRC Amount: | \$400,000.00 |
| 2. Total Obligated Amount: | \$400,000.00 |
| 3. Cost-Sharing Amount: | \$159,325.00 |

4. Activity Title: Graduate Fellowships in Nuclear Engineering at Missouri S&T (2014 – 2018)

5. NRC Project Officer: Nancy Hebron-Isreal

6. DUNS No.: 804883767

	Year 1	Year 2	Year 3	Year 4
Total	\$99,999.00	\$100,000.00	\$100,000.00	\$100,000.00

Program B

1. Total Estimated NRC Amount: \$400,000.00

2. Total Obligated Amount: \$400,000.00

3. Cost-Sharing Amount: \$0.00

4. Activity Title: Graduate Fellowships in Nuclear Engineering at Missouri S&T (2017 – 2021)

5. NRC Project Officer: Nancy Hebron-Isreal

6. DUNS No.: 804883767

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	NRC-HQ-60-17- FOA-0001				
a. Personnel	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
b. Fringe Benefits	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
c. Travel	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
d. Equipment	0.00	0.00	0.00	0.00	
e. Supplies	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
f. Contractual	0.00	0.00	0.00	0.00	
g. Construction	0.00	0.00	0.00	0.00	
h. Other	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
i. Total Direct Charges (sum of 6a-6h)	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$ [REDACTED]
j. Indirect Charges	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$ [REDACTED]
k. TOTALS (sum of 6i and 6j)	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 400,000.00
7. Program Income	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	

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Standard Form 424A (Rev. 7-97)
Prescribed by OMB (Circular A -102) Page 1A

ATTACHMENT B - PROJECT DESCRIPTION

Program A: Graduate Fellowships in Nuclear Engineering at Missouri S&T (2014 – 2018)

Principal Investigator: [REDACTED]

Missouri University of Science and Technology (Missouri S&T) is one of the nation's leading technological institutions, hosting the only accredited nuclear engineering program in the state of Missouri. In addition to the traditional engineering disciplines (i.e., Mechanical, Electrical, Civil, Chemical etc.), Missouri S&T offers an exceptional opportunity for interdisciplinary research because of the synergy between other closely related branches of science and engineering (Geological Sciences and Engineering, Materials Science and Engineering, Chemical Engineering, Environmental Engineering, and Mining Engineering).

Enrollment in nuclear engineering (NE) program is consistently high at Missouri S&T. The enrollment data for Missouri S&T's nuclear engineering program for the last eleven years. The current graduate enrollment is 44, which is much higher than the 27 graduate students in Fall 2012. With a current full time NE faculty strength of 7 and 189 undergraduate students majoring in NE or having an NE preference in the Freshman Engineering Program, our faculty teaching and research load is quite high. Twelve of the 44 graduate students are US citizens/Permanent residents who will be eligible for the NRC fellowship. In order to recruit the best graduate students for the fellowships we will also advertise the fellowships to other U.S. universities.

We have also partnered with Southern University of Baton Rouge, Louisiana (HBCU) to provide Reactor Laboratory and Radiation Measurement & Spectroscopy Laboratory experience to minority students by distance education.

B.1 Proposed Fellowship Program

Missouri S&T proposes to develop a graduate fellowship program which will support three (3) students to pursue a PhD or a MS degree in nuclear engineering. The fellowship will cover tuition and fees, and some cost of travel to attend professional meetings (e.g. ANS). The fellowship will also provide [REDACTED] during the first year and will increase 4% every year thereafter. The total budget of \$400,000 is requested for the four year fellowship program. [REDACTED]

[REDACTED] In addition to the faculty expertise, Missouri S&T has the research infrastructure to support the fellowship program. There is an on-site nuclear reactor facility, a neutron generator, a well-equipped radiation measurement and spectroscopy laboratory, a two-phase flow thermal hydraulics laboratory, a modulated beam mass spectrometry laboratory, a radiochemistry laboratory, and a well-equipped numerically intensive computing (NIC) facility. [REDACTED]

In addition to taking the required course work, fellowship recipients will work on a nuclear engineering dissertation research under the supervision of a faculty advisor. The topic of the thesis will be selected based on the mutual interest of the student, the faculty advisor and the industry's research needs. Several nuclear engineering graduate students at Missouri S&T have been conducting their research under the mentorship or collaboration with researchers in a

national laboratory (LANL, ORNL, INL and ANL). This arrangement has been very helpful in providing the students with opportunities to work on research topics of current interest. The NRC fellowship will enhance this opportunity. The PhD dissertation research topics will include the traditional nuclear engineering areas such as thermal hydraulics, reactor safety, reactor physics, radiation detection and measurements, nuclear materials, and criticality safety, as well as areas under development such as radiological engineering, radiochemistry, nuclear forensics and health physics.

B-2. Recruitment Activities and Marketing Strategies

An extensive recruitment plan has been developed to attract the best graduate students at the national level. Various nuclear engineering programs in the country share the list of students graduating with a BS in nuclear engineering. The Missouri S&T nuclear engineering program will use this list to send emails to the graduating BS students in the country inviting them to apply for the fellowship program. In addition, an email will be sent out to all the chairs and department heads of the nuclear engineering programs of the nation requesting them to encourage their students to apply for the NRC fellowship at Missouri S&T. The nuclear engineering department web page at Missouri S&T will also host a special page on the NRC Fellowship, providing information about the program.


In addition to these traditional methods, nuclear engineering faculty at Missouri S&T will advertise and hold "Skype Hours". During these weekly hours (very similar to office hours) the faculty members will be available to any potential fellowship candidate to discuss the fellowship program and the research opportunities at Missouri S&T. The candidates will be able to have a two way tele-conferencing with the faculty members. These "Skype Hours" can be held from an on-campus laboratory allowing the faculty members to share the details of the research that the students may participate in if they join the fellowship program.

The Nuclear Engineering Program will also entertain graduate candidates on specific dates with mutual convenience to show prospective graduate students our experimental facilities and to visit with faculty members. During this visit the candidate and faculty members will discuss research opportunities in detail and visit our NE research laboratories and the campus nuclear reactor.

Schedule of Tuition, Fees and Other Costs of Students Participating in the Program

The cost of tuition and fees for graduate students at Missouri S&T per academic year is \$9,306 for Missouri residents and \$19,844 for non-residents. These costs are provided in Attachment G-2. However non-resident fellows will pay fees at the resident rate.

B-3. Selection Process

Academic criteria as well as financial need, and compatibility of interests with the Department will be used for selecting students into the fellowship program. The minimum qualification for the program will be a cumulative GPA and GPA in major > 3.3/4.0, full-time student status, and U.S. Citizenship or permanent resident status, as per the Funding Opportunity Announcement (FOA). The NRC fellowship opportunities will be announced to a national audience as described in the previous section (B-2). After verifying their GPA and other academic credentials, those students having the highest GPA and demonstrated superior research capabilities will be invited for an interview to determine their desire to pursue careers in the nuclear-related industry. A total of up to six (6) candidates will be selected for the interview. The selection of students will be conducted by a Graduate Fellowship Committee consisting of the following faculty: 

[REDACTED] and one other nuclear engineering faculty interested in the candidate's area of research. The committee will evaluate each candidate. The evaluation criteria will include: Cumulative GPA, performance in standardized test (GRE), past research experience and recommendation letters. The short-listed candidates will be ranked based on the collective evaluation of the committee. Initially, only the top three candidates will be offered to join the program. In the event that one or more of them decline the offer, the committee will extend the offer to the next ranked individual from the list until all positions are filled.

Management and Administrative Structure

The fellowship program will be managed by [REDACTED] is experienced in managing NE grants at Missouri S&T. For the last 5 years at Missouri S&T, funding for previous fellowships came from USNRC, research grants from USDOE, DARPA, national laboratories, and industry. [REDACTED] will be assisted by a fellowship committee of [REDACTED]

[REDACTED], and one other nuclear engineering faculty interested in the candidate's area of research, and the Office of Student Financial Assistance (OSFA) at Missouri S&T.

B-4. Evaluation Plan on Project Effectiveness

To ensure the success of the program it is important to closely monitor the progress of each fellowship recipient and, if required, provide constructive intervention. Missouri S&T has already established an Academic Alert System (<http://advising.mst.edu/alertsystems/acadaalert/index.html>). This system will be used to monitor the progress of each fellowship recipient. The Academic Alert system is a web-based application that supports communication among instructors, advisors and students in cases where students are not meeting academic course progress expectations.

Mentoring and Advisor Assistance

For the fellowship program it is equally important to keep the candidate's research on track. At times even the brightest graduate students get sidetracked in the research phase of their degree program. Most often the reason for this inefficiency is the lack of clarity of research goals. For each of the fellowship recipients a mentoring committee will be established which will include the primary faculty advisor, PI of the NRC fellowship program, and a national laboratory research mentor (to be selected according to the area of research of the fellow). The mentoring committee will establish a research plan in writing for each fellow at the beginning of the fellowship. This plan will provide a road map for the fellow's path to success. The fellow will meet with the faculty advisor on a weekly basis (1/2 - 1 hour) to discuss weekly progress, problems that have arisen in the research, and expected goals for the incoming week. The students will provide a quarterly progress report to the mentoring committee. The report will include students' accomplishment during the last semester and the plan for the next three months. After reviewing the progress report, the committee will provide feedback on the student's progress and future plans. This goal and accomplishment tracking system coupled with regular and frequent feedback from the advisor will provide a roadmap to ensure the success of the students in their research projects.

B-5. Institutional Support and Plans for Sustainability

Missouri S&T is committed to the sustainability and growth of its NE program. The campus has maintained and supported the nuclear reactor facility on campus for the last 50 years even

during times of financial hardship. Likewise, during the current hiring freeze the campus administration permitted replacement hiring of three tenure-track faculty members in nuclear engineering, one each year (2009 – 2011). In addition, the campus administration allowed the hiring of an additional tenure-track faculty member in Fall 2012 to increase the tenured/tenure-track faculty strength to 7 from the original 6 faculty.

In addition, for the last 50 years the university has never charged graduate students for utilizing the nuclear reactor facilities to conduct research in non-destructive analysis, radiochemistry, health physics, gamma ray spectrometry, and material irradiation effects (it costs approximately \$200,000/year to run our reactor. Missouri S&T Reactor (MSTR) is a "SWIMMING POOL" reactor, currently licensed to operate at 200 kilowatts thermal power. The reactor facilities are particularly valuable for research and experimentation with thermal neutrons. Missouri S&T currently has a web-accessible hot cell facility and long-distance reactor lab training capability to foster research and teaching collaboration with distant partners. Missouri S&T administration is committed to supporting the reactor facility and to enhancement of its capability and utilization for education and innovative research.

B-6. Missouri S&T Fellowship program as an integral part of a regional plan to attract, prepare and retain students from Minority Serving Institutions

Missouri S&T participates on a regular basis in collaborative research with scientists at national laboratories. In addition, Missouri S&T is a full Board member of SUNRISE (Southeast Universities Nuclear Reactors Institute for Science and Education) corporation, a not-for-profit organization with the goal of supporting advancement of nuclear education in the southeastern United States. SUNRISE has 11 university members (including minority-serving institutions), national laboratories and members from industry. Missouri S&T will utilize SUNRISE as an avenue to reach prospective fellows at the participating universities (e.g. Georgia Tech, NC State, Florida, South Carolina, etc.).

We have partnered with Southern University and A&M College in Baton Rouge (SUBR), Louisiana, a Minority serving institution and one of the Historically Black Colleges and Universities. Missouri S&T will help students at SUBR obtain hands-on experience and knowledge of Radiation Detection and Measurements using the Internet-Accessible Hot Cell (IAHC) facility at the Missouri S&T Nuclear Reactor and the distance education capabilities of the Radiation Measurements & Spectroscopy laboratory (RMSL), fully renovated at Missouri S&T using DOE funding. SUBR is a part of this DOE grant. At present, with the help of Missouri S&T faculty, SUBR is in the process of developing teaching modules incorporating these distance capabilities such that students at SUBR can perform experiments on half-life measurements, and neutron activation analysis remotely. Such a feature in SUBR's education will motivate and help minority students of SUBR to consider nuclear related areas for their undergraduate and graduate education.

Program B: Graduate Fellowships in Nuclear Engineering at Missouri S&T (2017 – 2021)

Principal Investigator: [REDACTED]

Missouri University of Science and Technology (Missouri S&T) is one of the nation's leading technological institutions, hosting the only accredited nuclear engineering program in the state of Missouri. In addition to the traditional engineering disciplines (i.e., Mechanical, Electrical, Civil, Chemical etc.), Missouri S&T offers an exceptional opportunity for interdisciplinary research because of the synergy between other closely related branches of science and engineering (Geological Sciences and Engineering, Materials Science and Engineering, Chemical Engineering, Environmental Engineering, and Mining Engineering).

Enrollment in nuclear engineering (NE) program is consistently high at Missouri S&T. Figure 1 shows the enrollment data for Missouri S&T's nuclear engineering program for the last thirteen years. The current graduate enrollment is 46. With a current full-time NE faculty strength of 8 and 181 undergraduate students majoring in NE or having an NE preference in the Freshman Engineering Program, our faculty teaching and research load is quite high. Twenty-two of the 46 graduate students are US citizens/Permanent residents who will be eligible for the NRC fellowship. In order to recruit the best graduate students for the fellowships we will also advertise the fellowships to other U.S. universities.

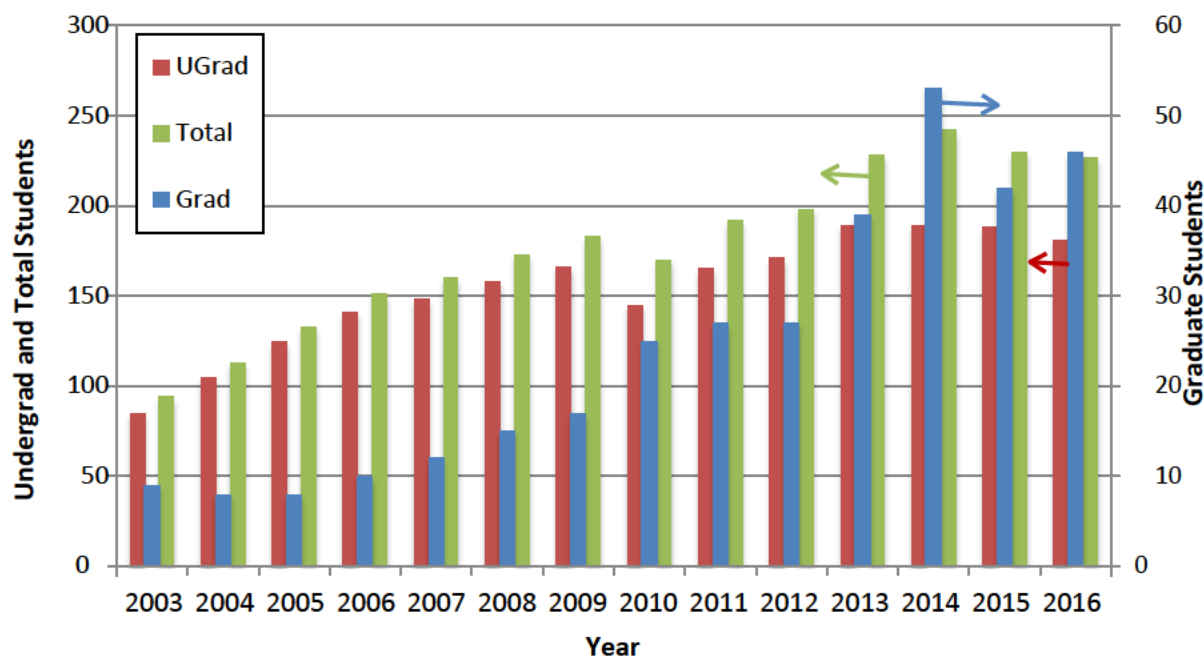


Figure 1. Enrollment increase in Missouri S&T Nuclear Engineering 2004-2014.

We have also partnered with the University of Illinois at Urbana-Champaign to provide Reactor Laboratory experience to their students by distance education.

B-1. Proposed Fellowship Program

Missouri S&T proposes to develop a graduate fellowship program which will support two (2) students to pursue a PhD degree in nuclear engineering. The fellowship will provide [REDACTED] during the first year and will increase 4% every year thereafter. The fellowship will also cover some cost of travel to attend professional meetings (e.g. ANS) and lab supplies. A total budget of \$400,000 is requested for the four-year fellowship program. In addition to the faculty expertise, Missouri S&T has the research infrastructure to support the fellowship program. There is an on-site nuclear reactor facility, a neutron generator, a well-equipped radiation measurement and spectroscopy laboratory, a two-phase flow thermal hydraulics laboratory, a modulated beam mass spectrometry laboratory, a radiochemistry laboratory, and a well-equipped numerically intensive computing (NIC) facility. [REDACTED]

In addition to taking the required course work, fellowship recipients will work on a nuclear engineering dissertation research under the supervision of a faculty advisor. The topic of the thesis will be selected based on the mutual interest of the student, the faculty advisor and the industry's research needs. Several nuclear engineering graduate students at Missouri S&T have been conducting their research under the mentorship or collaboration with researchers in a national laboratory (LANL, ORNL, INL and ANL). This arrangement has been very helpful in providing the students with opportunities to work on research topics of current interest. The NRC fellowship will enhance this opportunity. The graduate research topics will include the traditional nuclear engineering areas such as thermal hydraulics, reactor safety, reactor physics, radiation detection and measurements, nuclear materials, and criticality safety, as well as areas under development such as radiological engineering, radiochemistry, nuclear forensics and health physics.

B-2. Recruitment Activities and Marketing Strategies

An extensive recruitment plan has been developed to attract the best graduate students at the national level. Various nuclear engineering programs in the country share the list of students graduating with a BS in nuclear engineering. The Missouri S&T nuclear engineering program will use this list to send emails to the graduating BS students in the country inviting them to apply for the fellowship program. In addition, an email will be sent out to all the chairs and department heads of the nuclear engineering programs of the nation requesting them to encourage their students to apply for the NRC fellowship at Missouri S&T. The nuclear engineering program web page at Missouri S&T will also host a special page on the NRC Fellowship, providing information about the program.

In addition to these traditional methods, nuclear engineering faculty at Missouri S&T will advertise and hold "Skype Hours". During these weekly hours (very similar to office hours) the faculty members will be available via Skype to any potential fellowship candidate to discuss the fellowship program and the research opportunities at Missouri S&T. The candidates will be able to have a two way tele-conferencing with the faculty members. These "Skype Hours" can be held from an on-campus laboratory allowing the faculty members to share the details of the research that the students may participate in if they join the fellowship program.

The Nuclear Engineering Program will also entertain graduate candidates on specific dates with mutual convenience to show prospective graduate students our experimental facilities and to visit with faculty members. During this visit the candidate and faculty members will discuss

research opportunities in detail and visit our NE research laboratories and the campus nuclear reactor.

In addition, the Office of Graduate Studies at Missouri S&T has recently implemented a new on-campus graduate visit program, Experience S&T: Prospective Doctoral Student Visitation Program. This graduate student visit program is intended to allow potential domestic doctoral students to tour our campus and see what we have to offer. In the two-day visit to Missouri S&T, they will have a customized agenda filled with opportunities to visit with faculty, staff and students who are working and researching in their respective field.

Schedule of Tuition, Fees and Other Costs of Students Participating in the Program

The cost of tuition and fees for graduate students at Missouri S&T per academic year is \$11,010 for Missouri residents and \$24,318 for non-residents. These costs are provided in Attachment F-1.

B-3. Selection Process

Academic criteria as well as financial need, and compatibility of interests with the Department will be used for selecting students into the fellowship program. The minimum qualification for the program will be a cumulative GPA and GPA in major > 3.3/4.0, full-time student status, and U.S. citizenship or permanent resident status, as per the Funding Opportunity Announcement (FOA).

The NRC fellowship opportunities will be announced to a national audience as described in the previous section (B-2). After verifying their GPA and other academic credentials, those students having the highest GPA and demonstrated superior research capabilities will be invited for an interview to determine their desire to pursue careers in the nuclear-related industry. A total of up to six (6) candidates will be selected for the interview. The selection of students will be conducted by a Graduate Fellowship Committee consisting of the following faculty:

[REDACTED] and one other nuclear engineering faculty interested in the candidate's area of research. The committee will evaluate each candidate. The evaluation criteria will include: Cumulative GPA, performance in standardized test (GRE), past research experience and recommendation letters. The short-listed candidates will be ranked based on the collective evaluation of the committee. Initially, only the top two candidates will be offered to join the program. In the event that one or more of them decline the offer, the committee will extend the offer to the next ranked individual from the list until all positions are filled.

Management and Administrative Structure

The fellowship program will be managed by [REDACTED] is experienced in managing NE grants at Missouri S&T. For the last 7 years at Missouri S&T, he received funding for previous scholarships and fellowships from USNRC, research grants from USDOE, DARPA, national laboratories, and industry.

[REDACTED] will be assisted by the Graduate Fellowship Committee of [REDACTED]

and one other nuclear engineering faculty interested in the candidate's area of research, and the Office of Student Financial Assistance (OSFA) at Missouri S&T.

B-4. Evaluation Plan on Project Effectiveness

To ensure the success of the program it is important to closely monitor the progress of each fellowship recipient and, if required, provide constructive intervention. Missouri S&T has already established an Academic Alert System (<http://advising.mst.edu/alertsystems/acadaalert/index.html>). This system will be used to monitor the progress of each fellowship recipient. The Academic Alert system is a web-based application that supports communication among instructors, advisors and students in cases where students are not meeting academic course progress expectations.

Mentoring and Advisor Assistance

For the fellowship program it is equally important to keep the candidate's research on track. At times even the brightest graduate students get sidetracked in the research phase of their degree program. Most often the reason for this inefficiency is the lack of clarity of research goals. For each of the fellowship recipients a mentoring committee will be established which will include the primary faculty advisor, PI of the NRC fellowship program, and a national laboratory research mentor (to be selected according to the area of research of the fellow). The mentoring committee will establish a research plan in writing for each fellow at the beginning of the fellowship. This plan will provide a road map for the fellow's path to success. The fellow will meet with the faculty advisor on a weekly basis (1/2 - 1 hour) to discuss weekly progress, problems that have arisen in the research, and expected goals for the incoming week. The students will provide a quarterly progress report to the mentoring committee. The report will include students' accomplishment during the last semester and the plan for the next three months. After reviewing the progress report, the committee will provide feedback on the student's progress and future plans. This goal and accomplishment tracking system coupled with regular and frequent feedback from the advisor will provide a roadmap to ensure the success of the students in their research projects.

B-5. Institutional Support and Plans for Sustainability

Missouri S&T is committed to the sustainability and growth of its NE program. The campus has maintained and supported the nuclear reactor facility on campus for the last 50 years even during times of financial hardship. Likewise, during the hiring freeze the campus administration permitted replacement hiring of three tenure-track faculty members in nuclear engineering, one each year (2009 – 2011). The campus administration allowed the hiring of additional tenure-track faculty members in Spring 2014 and Fall 2015 to increase the tenured/tenure-track faculty strength to 8 from the original 6 faculty members.

For the last 50 years the university has never charged graduate students for utilizing the nuclear reactor facilities to conduct research in non-destructive analysis, radiochemistry, health physics, gamma ray spectrometry, and material irradiation effects (it costs approximately \$200,000/year to run our reactor. Missouri S&T Reactor (MSTR) is a "swimming pool" reactor currently licensed to operate at 200 kilowatts thermal power. The reactor facilities are particularly valuable for research and experimentation with thermal neutrons. Missouri S&T currently has a web-accessible hot cell facility and long-distance reactor lab training capability to foster research

and teaching collaboration with distant partners. Missouri S&T administration is committed to supporting the reactor facility and to enhancement of its capability and utilization for education and innovative research.

B-6. Missouri S&T Fellowship program as an integral part of a regional plan to attract, prepare and retain students from Minority Serving Institutions

Missouri S&T participates on a regular basis in collaborative research with scientists at national laboratories. In addition, Missouri S&T is a full Board member of SUNRISE (Southeast Universities Nuclear Reactors Institute for Science and Education) corporation, a not-for-profit organization with the goal of supporting advancement of nuclear education in the southeastern United States. SUNRISE has 11 university members (including minority-serving institutions), national laboratories and members from industry. Missouri S&T will utilize SUNRISE as an avenue to reach prospective fellows at the participating universities (e.g., Georgia Tech, NC State, Florida, South Carolina, etc.).

In addition, we have partnered with the University of Illinois at Urbana-Champaign and have been providing a nuclear reactor laboratory class using the distance education capabilities of the Missouri S&T Reactor, which was fully renovated using DOE funds.

B-7. Service agreement

Missouri S&T will require a service agreement to be signed by every fellowship recipient.

ATTACHMENT C – STANDARD TERMS AND CONDITIONS**The Nuclear Regulatory Commission's
Standard Terms and Conditions for U.S. Nongovernmental Recipients****Preface**

This award is based on the application submitted to, and as approved by, the Nuclear Regulatory Commission (NRC) under the authorization [42 U.S.C. § 2051\(b\)](#), pursuant to section 31b and 141b of the Atomic Energy Act of 1954, as amended, and is subject to the terms and conditions incorporated either directly or by reference in the grant or cooperative agreement. The following also apply:

- Restrictions on the expenditure of Federal funds in appropriation acts, to the extent those restrictions are pertinent to the award.
- Code of Federal Regulations/Regulatory Requirements – [2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards](#).

Any inconsistency or conflict in terms and conditions specified in the award will be resolved according to the following order of precedence: public laws, regulations, applicable notices published in the Federal Register, Executive Orders (E.O.), Office of Management and Budget (OMB) Circulars, the NRC's Mandatory Standard Provisions, special award conditions, and standard award conditions.

Certifications and Representations: These terms incorporate the certifications and representations required by statute, executive order, or regulation that were submitted with the SF424B application through [GRANTS.GOV](#).

I. Mandatory General Requirements

The order of these requirements does not make one requirement more important than any other requirement.

1. Applicability of 2 CFR Part 200

All provisions of 2 CFR Part 200 and all Standard Provisions attached to this grant/cooperative agreement are applicable to the Recipient and to sub-recipients which meet the definition of "Recipient" in 2 Part [§200.86](#), unless a section specifically excludes a sub-recipient from coverage. The Recipient and any sub-recipients must, in addition to the assurances made as part of the application, comply and require each of its sub-awardees employed in the completion of the project to comply with [Subpart D](#) of [2 CFR Part 200](#) and include this term in lower-tier (sub-award) covered transactions.

Recipients must comply with monitoring procedures and audit requirements in accordance with [2 CFR Part 200, Subpart F—AUDIT REQUIREMENTS](#).

2. Award Package

The Recipient is obligated to conduct project oversight as may be appropriate, to manage the funds with prudence, and to comply with the provisions outlined in [2 CFR Part 200](#). Within this framework, the Principal Investigator (PI) named on the award face page, is responsible for the scientific or technical direction of the project and for preparation of the

project performance reports. This award is funded on a cost-reimbursement basis, not to exceed the amount awarded as indicated on the face page, and is subject to a refund of unexpended grant funds to the NRC.

The non-Federal entity alone must be responsible, in accordance with good administrative practice and sound business judgment, for the settlement of all contractual and administrative issues arising out of procurements related to its grant award. These issues include, but are not limited to, source evaluation, protests, disputes, and claims. These standards do not relieve the non-Federal entity of any financial or fiduciary responsibilities or obligations arising under its grant, including sub-contracts and sub-awards, or any other contractual or financial obligation. The Federal awarding agency will not substitute its judgment for that of the non-Federal entity unless the matter is primarily a Federal concern. Violations of law will be referred to the local, State, or Federal authority having proper jurisdiction. See [2 CFR § 200.318\(k\)](#), General Procurement Standards.

Subawards

[Appendix II to Part 200](#) Contract Provisions for Non-Federal Entity Contracts Under Federal Awards

Sub-recipients, sub-awardees, and contractors have no relationship with NRC under the terms of this grant/cooperative agreement. All required NRC approvals must be directed through the Recipient to NRC. See [2 CFR § 200.318](#).

Nondiscrimination

This provision is applicable when work under the grant/cooperative agreement is performed in the U.S. or when employees are recruited in the U.S.

The Recipient agrees to comply with the non-discrimination requirements below:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d et seq.), which prohibits discrimination on the grounds of race, color, or national origin in any program or activity receiving federal financial assistance.
- Title IX of the Education Amendments of 1972 (20 U.S.C. §§ 1681 et seq.), which prohibits discrimination on the basis of sex in any education program or activity receiving federal financial assistance.
- Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which prohibits discrimination on the basis of disability in any program or activity receiving federal financial assistance.
- The Age Discrimination Act of 1975, as amended (42 U.S.C. §§ 6101 et seq.), which prohibits discrimination on the basis of age in any program receiving federal financial assistance.
- The Americans with Disabilities Act of 1990 (42 U.S.C. §§ 12101 et seq.), which prohibits recipients from discriminating on the basis of disability in employment (Title I); State and local government services (Title II); and places of public accommodation and commercial facilities (Title III).
- Parts II and III of E.O. 11246, as amended by E.O. 11375, 11478, 12086, 12107, 13279, 13665, and 13672, which prohibits federal contractors and federally assisted construction contractors and subcontractors, who do over \$10,000 in Government business in one year, from discriminating in employment decisions on

the basis of race, color, religion, sex, or national origin and requires that government contractors take affirmative action to ensure that equal opportunity is provided in all aspects of their employment.

- E.O.13166, "Improving Access to Services for Persons with Limited English Proficiency," which clarifies that national origin discrimination under Title VI includes discrimination on the basis of limited English proficiency (LEP) and requires that the recipient take reasonable steps to ensure that LEP persons have meaningful access to programs and activities.
- Any other applicable non-discrimination law(s).

Generally, Title VII of the Civil Rights Act of 1964, 42 U.S.C. § 2000e et seq, provides that it shall be an unlawful employment practice for an employer to discharge any individual or otherwise to discriminate against an individual with respect to compensation, terms, conditions, or privileges of employment because of such individual's race, color, religion, sex, or national origin. However, Title VII, 42 U.S.C. § 2000e-1(a), expressly exempts from the prohibition against discrimination on the basis of religion, a religious corporation, association, educational institution, or society with respect to the employment of individuals of a particular religion to perform work connected with the carrying on by such corporation, association, educational institution, or society of its activities.

Applicants must ensure that individuals selected as beneficiaries of support under this grant meet the legal requirements consistent with Supreme Court Decisions including *Fisher, Gratz, and Grutter*.

Modifications/Prior Approval

NRC's prior written approval may be required before a Recipient makes certain budget modifications or undertakes particular activities. If NRC approval is required for changes in the grant or cooperative agreement, it must be requested and obtained from the NRC Grants Officer in advance of the change or obligation of funds. All requests for NRC prior approval, including requests for extensions to the period of performance, must be made, in writing (which includes submission by e-mail), to the designated Grants Officer at least 30 days before the proposed change. The request must be signed by the authorized organizational official. Failure to obtain prior approval, when required, from the NRC Grants Officer, may result in the disallowance of costs, or other enforcement action within NRC's authority.

Lobbying Restrictions

The Recipient will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§ 1501-1508 and 7324-7328) which limits the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

The Recipient will comply with provisions of 31 U.S.C § 1352. This provision generally prohibits the use of Federal funds for lobbying in the Executive or Legislative Branches of the Federal Government in connection with the award, and requires disclosure of the use of non-Federal funds for lobbying.

The Recipient shall submit, at the time of application, a completed "Certification Regarding Lobbying" form, regardless of dollar value.

If applicable, the Recipient receiving in excess of \$100,000.00 in Federal funding shall submit a completed Standard Form (SF-LLL), "Disclosure of Lobbying Activities" for any persons engaged in lobbying activities, as discussed at 31 U.S. Code § 1352 – Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions. The form concerns the use of non-Federal funds for lobbying within 30 days following the end of the calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed. If the Recipient must submit the SF-LLL, including those received from sub-recipients, contractors, and subcontractors, to the Grants Officer.

Debarment And Suspension – (See [2 CFR Part 180](#); [2 CFR § 200.205](#); [2 CFR § 200.113](#); and [2 CFR Part 200, Appendix II.](#))

The Recipient agrees to notify the Grants Officer immediately upon learning that it or any of its principals:

- (1) Are presently excluded or disqualified from covered transactions by any Federal department or agency;
- (2) Have been convicted, within the preceding three-year period preceding this proposal, of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, receiving stolen property, making false claims, or obstruction of justice; commission of any other offense indicating a lack of business integrity or business honesty that seriously and directly affects the recipient's present responsibility;
- (3) Are presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b); or
- (4) Have had one or more public transactions (Federal, State, or local) terminated for cause or default within the preceding three years.
- (5) The Recipient agrees that, unless authorized by the Grants Officer, it will not knowingly enter into any subaward or contracts under this grant/cooperative agreement with a person or entity that is not included on the System for Award Management (SAM) (<https://www.sam.gov>).

The Recipient further agrees to include the following provision in any subaward or contracts entered into under this award:

Debarment, Suspension, Ineligibility, and Voluntary Exclusion

The Recipient certifies that neither it nor its principals is presently excluded or disqualified from participation in this transaction by any Federal department or agency. The policies

and procedures applicable to debarment, suspension, and ineligibility under NRC-financed transactions are set forth [2 CFR Part 180](#) and [2 CFR Part 200](#).

Drug-Free Workplace

The Recipient must be in compliance with The Federal Drug Free Workplace Act of 1988. The policies and procedures applicable to violations of these requirements are set forth in [41 U.S.C. §§ 8101-8106](#).

Implementation of E.O.13224 – Executive Order on Terrorist Financing

The Recipient is reminded that U.S. Executive Orders and U.S. law prohibits transactions with, and the provision of resources and support to, individuals and organizations associated with terrorism. It is the legal responsibility of the Recipient to ensure compliance with these Executive Orders and laws. This provision must be included in all contracts/sub-awards issued under this grant/cooperative agreement.

The Recipient must comply with E.O. 13224, Blocking Property and Prohibiting Transactions with Persons who Commit, Threaten to Commit, or Support Terrorism. Information about this Executive Order can be found at:

[Implementation of Executive Order 13224 Blocking Property and Prohibiting Transactions With Persons Who Commit, Threaten To Commit, or Support Terrorism amended by E.O. 13268, 13284, and 13372.](#)

Procurement Standards - 2 CFR §§ 200.318-200.326

Sections 200.318 - 200.326 set forth standards for use by Recipients in establishing procedures for the procurement of supplies and other expendable property, equipment, real property and other services with Federal funds. These standards are furnished to ensure that such materials and services are obtained in an effective manner and in compliance with the provisions of applicable Federal statutes and executive orders. No additional procurement standards or requirements will be imposed by the Federal awarding agencies upon Recipients, unless specifically required by Federal statute, executive order, or approved by OMB.

Travel and Transportation

Travel must be in accordance with the Recipient's Travel Regulations or the U.S. Government Travel Policy and Regulations at: <http://www.gsa.gov/portal/category/21222> and the per diem rates set forth at: <http://www.gsa.gov/portal/content/104877>, absent Recipient's travel regulations. Travel and transportation costs for the grant must be consistent with provisions as established in [2 CFR § 200.473-474](#).

All other travel, domestic or international, must not increase the total estimated award amount for the grant.

The Recipient will comply with the provisions of the Fly America Act (49 U.S.C 40118), as implemented at 41 CFR §§ 301-10.131 through 301-10.143.

Federal funds may not be used to travel to countries identified as "Foreign Policy Restricted Countries", as identified by the U.S. Department of State or the U.S. Agency for International Development.

Property Standards

Property standards of this award shall follow provisions as established [2 CFR §§ 200.310-200.316](#).

Intangible Property

Intangible and intellectual property of this award shall generally follow provisions established in [2 CFR § 200.315](#).

Inventions Report - The Bayh-Dole Act (P.L. 96-517) affords Recipients the right to elect and retain title to inventions they develop with funding under an NRC grant award ("subject inventions"). In accepting an award, the Recipient agrees to comply with applicable NRC policies, the Bayh-Dole Act, and its Government-wide implementing regulations found at Title 37, Code of Federal Regulations (CFR) Part 401. A significant part of the regulations require that the Recipient report all subject inventions to the awarding agency (NRC) as well as include an acknowledgement of federal support in any patents.

Patent Notification Procedures - If the NRC or its Recipients, without making a patent search, knows (or has demonstrable reasonable grounds to know) that technology covered by a valid United States patent has been or will be used without a license from the owner, E.O.12889 requires NRC to notify the owner. If the Recipient uses or has used patented technology under this award without license or permission from the owner, the Recipient must notify the Grants Officer. This notice does not imply that the Government authorizes and consents to any copyright or patent infringement occurring under the financial assistance.

Data, Databases, and Software - The rights to any work produced or purchased under a NRC federal financial assistance award, such as data, databases or software are determined by [Subpart D](#) of [2 CFR Part 200](#). The Recipient owns any work produced or purchased under a NRC federal financial assistance award subject to NRC's right to obtain, reproduce, publish or otherwise use the work or authorize others to receive, reproduce, publish or otherwise use the data for Government purposes.

Copyright - The Recipient may copyright any work produced under a NRC federal financial assistance award subject to NRC's royalty-free nonexclusive and irrevocable right to reproduce, publish or otherwise use the work or authorize others to do so for Government purposes. Works jointly authored by NRC and Recipient employees may be copyrighted, but only the part authored by the Recipient is protected because, under [17 U.S.C. § 105](#), works produced by Government employees are not copyrightable in the United States. On occasion, NRC may ask the Recipient to transfer to NRC its copyright in a particular work when NRC is undertaking the primary dissemination of the work. Ownership of copyright by the Government through assignment is permitted under [17 U.S.C. § 105](#).

Record Retention and Access

Recipient shall follow established provisions in [2 CFR §§ 200.333-337](#).

Conflict Of Interest

Conflict of Interest standards for this award will follow the Organizational Conflict of Interest (OCOI) requirements set forth in Section 170A of the Atomic Energy Act of 1954, as amended, and provisions set forth at [2 CFR § 200.112](#), Conflict of Interest.

Dispute Review Procedures

- a. Any request for review of a notice of termination or other adverse decision should be addressed to the Grants Officer. It must be postmarked or transmitted electronically no later than 30 days after the postmarked date of such termination or adverse decision from the Grants Officer.
- b. The request for review must contain a full statement of the Recipient's position and the pertinent facts and reasons in support of such position.
- c. The Grants Officer will promptly acknowledge receipt of the request for review and shall forward it to the Director, Office of Acquisition Management Division, unless otherwise delegated, who shall appoint an intra-agency Appeal Board to review a recipient appeal of an agency action, if required, which will consist of the program office director, the Deputy Director of Office of Administration, and the Office of General Counsel, or their designees.
- d. Pending resolution of the request for review, the NRC may withhold or defer payments under the award during the review proceedings.
- e. The review committee will request the Grants Officer who issued the notice of termination or adverse action to provide copies of all relevant background materials and documents. The committee may, at its discretion, invite representatives of the Recipient and the NRC program office to discuss pertinent issues and to submit such additional information as it deems appropriate. The chairman of the review committee will insure that all review activities or proceedings are adequately documented.
- f. Based on its review, the committee will prepare its recommendation to the Director, Office of Administration, who will advise the parties concerned of his/her decision.

Remedies for Noncompliance

Termination of this award will follow provisions as established and described above in "Dispute Review Process" in [2 CFR §§ 200.338-342](#).

Performance and Financial Monitoring and Reporting - 2 CFR §§ 200.327-329

Recipient Financial Management systems must comply with the provisions in [2 CFR § 200.302](#).

- Payment – [2 CFR § 200.305](#)
- Cost Share or Matching – [2 CFR § 200.306](#)
 - Recipients are to be careful with providing excessive cost share or match since at the end of the grant, if the identified match has not been provided, then a portion of the federal share may be required to be returned to the Government.

- Program Income – [2 CFR § 200.307](#)
 - Earned program income, if any, will be added to funds committed to the project by the NRC and Recipient and used to further eligible project or program objectives or be deducted from the total project cost for the grant, as directed by the Grants Officer or indicated in the terms and conditions of the award.
- Revision of Budget and Program Plans – [2 CFR § 200.308](#)
 - The Recipient is required to report deviations from the approved budget and program descriptions in accordance with – [2 CFR § 200.308\(b\)](#) and request prior written approval from the Project Officer and the Grants Officer.
 - The Recipient is not authorized to re-budget between direct costs and indirect costs without written prior approval of the Grants Officer.
 - The Recipient is authorized to transfer funds among direct cost categories up to a cumulative 10 percent of the total approved budget. The Recipient is not allowed to transfer funds if the transfer would cause any Federal appropriation to be used for purposes other than those consistent with the original intent of the appropriation.
 - Allowable Costs – [2 CFR §§ 200.403](#)
- See section [2 CFR §§ 200.330-332](#) for Subrecipient Monitoring and Management.

FEDERAL FINANCIAL REPORTS

Federal Financial Reports (SF-425) are semi-annually, for the periods ending March 31 and September 30. Reports are due within 30 calendar days following the end of the reporting period and must be emailed to the Project Officer at the email addressed indicated in the Notice of Award, and to the Grants Officer at: Grants_FFR.Resource@nrc.gov. (NOTE: There is an underscore between Grants and FFR in the email address.) The SF-425 form and instructions are available at the following URL: http://www.whitehouse.gov/omb/grants_forms/.

PERFORMANCE PROGRESS REPORTS

The performance (technical) reports indicated below are subject to [2 CFR §200.328](#).

Fellowship Programs

Performance Progress reports must be submitted annually, for the period ending September 30, or any portion thereof, regardless of the award date. Reports are due within 30 days following the end of each reporting period and must be emailed to the Project Officer at the email addressed indicated in the Notice of Award, and to the Grants Officer at: Grants_PPR.Resource@nrc.gov. (NOTE: There is an underscore between Grants and PPR in the email address.)

Final Reports - The Recipient is required to submit final reports, both Financial (SF-425) and Performance (SF-PPR, SF-PPR-B, SF-PPR-E) within 90 days of the grant expiration. In addition to these reports, a final SF-428, Tangible property report, is also required, if applicable. The final PPR (for Scholarship, Fellowship, and Trade School and Community College Scholarship awards) must include the

names of all students with up to date contact information (mailing address, telephone/cell phone, email address). The reports must be emailed to the Project Officer at the email address indicated in the Notice of Award, and to the Grants Officer at: Grants_FFR.Resource@nrc.gov and Grants_PPR.Resource@nrc.gov. (NOTE: There is an underscore between Grants and FFR and Grants and PPR in the email addresses.)

For grant awards that are modified to add additional Program Descriptions, the recipient is required to address the applicable grant performance metrics associated with all programs. Further, these metrics should be broken out by individual program (e.g. Program A and Program B). This can be done utilizing Block 10, Performance Narrative, of the SF-PPR form. If this block does not have sufficient space, additional pages will be accepted. Sf-PPR-B and SF-PPR-E should be used to address both programs as well.

Period of Performance – [2 CFR § 200.309](#)

The recipient may charge to the Federal award only allowable costs incurred during the period of performance and any costs incurred before the NRC or pass-through entity made the Federal award that was authorized by the NRC or pass through entity.

Unless otherwise authorized in [2 CFR Part 200](#) or by special award condition, any extension of the award period can only be authorized by the Grants Officer in writing. Assurances of funding from other than the Grants Officer shall not constitute authority to obligate funds for programmatic activities beyond the expiration date.

The NRC Grant Officer may authorize a no cost extension of the period of performance. The recipient must submit a no cost extension request no less than 30 days prior to the award end date. Any request for a no cost extension after the grant has expired will not be approved. However, the NRC has no obligation to provide any additional prospective or incremental funding. Any modification of the award to increase funding and/or to extend the period of performance is at the sole discretion of the NRC.

Automated Standard Application For Payments (ASAP) Procedures

Unless otherwise stated, Recipient payments are made using the Department of Treasury's Automated Standard Application for Payment (ASAP) system, [ASAP.gov](#), through preauthorized electronic funds transfers. To receive payments, Recipients are required to enroll with the Department of Treasury, Financial Management Service, and Regional Financial Centers, which allows them to use the on-line method of withdrawing funds from their ASAP established accounts. The following information is required to make ASAP withdrawals: (1) ASAP account number – the award number found on the cover sheet of the award; (2) Agency Location Code (ALC) – 31000001; and Region Code. Recipients enrolled in the ASAP system do not need to submit a "Request for Advance or Reimbursement" (SF-270).

II. Audit Requirements

Audits

Organization-wide or program-specific audits are performed in accordance with the Single Audit Act of 1996, as amended, and as implemented by [2 CFR Part 200, Subpart F—](#)

AUDIT REQUIREMENTS. Recipients are subject to the provisions of this subpart if they expend \$750,000 or more in a year in Federal awards. See [2 CFR 200.501](#).

The Form SF-SAC and the Single Audit Reporting packages for fiscal periods ending on or after January 1, 2008 are submitted online, as follows:

1. Create the recipient's online report ID at:
<http://harvester.census.gov/fac/collect/ddeindex.html>;
2. Complete the Form SF-SAC;
3. Upload the Single Audit;
4. Certify the Submission; and
5. Click "Submit."

Organizations expending less than \$750,000 a year are not required to have an annual audit for that year but must make their grant-related records available to NRC or other designated officials for review or audit.

III. Programmatic Requirements

The recipient is responsible for providing documentation to the NRC that tracks each student's progress in achievement of the academic program for which federal funds were provided. This includes: (1) ensuring the service agreement is signed by the student prior to providing support; (2) providing the NRC with student contact information upon student entry into the program, upon completion or withdrawal from the program, and upon request by the NRC; and (3) monitoring the student's fulfillment of the service agreement for the duration of the award. The NRC shall be notified immediately if a student is not fulfilling the academic program or the service agreement.

Grant Performance Metrics

The Office of Management and Budget requires all Federal Agencies providing funding for educational scholarships and fellowships as well as other educational related funding to report on specific metrics. These metrics are part of the Academic Competitiveness Council's (ACC) 2007 report and specifically relates to Science, Technology, Engineering, and Mathematics (STEM) curricula.

As part of the OMB requirements indicated above (for metric reporting), the recipient shall address the following questions and submit responses with the required progress reports:

Fellowship Metrics:

1. How many graduate students have been sponsored by NRC funding?
 - a. Response is the number of students, for this reporting period and cumulative to the grant.
2. How many students, supported by NRC funding, have received M.S. or equivalent degrees?
 - a. Response is the number of students, for this reporting period and cumulative to the grant.

3. How many students, supported by NRC funding, have received Ph.D. or equivalent degrees?
 - a. Response is the number of students, for this reporting period and cumulative to the grant.
4. How many students, supported by NRC funding, have accepted a job and are employed in the nuclear industry?
 - a. Response is the number of students, for this reporting period and cumulative to the grant.
5. How many items have students produced, for example, Professional Journal articles, publications, patents, or conference reports?
 - a. Response is the type and number of items (not a bibliography), for this reporting period and cumulative to the grant.

As part of the PPR, include the following information for each student supported under this award:

1. Student Name
2. Years of Support
3. Cumulative Support in Dollars
4. Estimated Graduation Date
5. Status
6. Up to date student contact information (mailing address, telephone/cell phone, email address) for students no longer participating in the program, i.e. transferred programs, graduated, withdrew, etc.
7. Up to date student contact information, for all students at time of grant expiration, i.e. Final PPR.

Examples of status could be:

“Employed in Nuclear Industry”, if so, where;

“Looking for employment”, if so, how long;

“Deferred due to continuing education”, if so, what degree;

“Employed by Non-Nuclear”, if so, where; and

“Dropped out of program”

Unsatisfactory Performance

Failure to perform the work in accordance with the terms of the award and maintain at least a satisfactory performance rating may result in designation of the Recipient as high risk and the assignment of special award conditions. Further action may be required as specified in the standard term and condition entitled “Remedies for Noncompliance.”

Failure to comply with the award provisions may result in a negative impact on future NRC funding. In addition, the Grants Officer may withhold payments; change the method of payment from advance to reimbursement; impose special award conditions; suspend or terminate the grant.

Other Federal Awards With Similar Programmatic Activities

The Recipient will immediately notify the Project Officer and the Grants Officer in writing if after award, other financial assistance is received to support or fund any portion of the program description stated in the NRC award. NRC will not pay for costs that are funded by other sources.

Prohibition Against Assignment By The Recipient

The Recipient will not transfer, pledge, mortgage, or otherwise assign the award, or any interest to the award, or any claim arising under the award, to any party, banks, trust companies, or other financing or financial institutions without the written approval of the Grants Officer.

Site Visits

The NRC, through authorized representatives, has the right to make site visits to review project accomplishments and management control systems and to provide technical assistance as required. If any site visit is made by the NRC on the premises of the Recipient or contractor under an award, the Recipient shall provide and shall require his/her contractors to provide reasonable access to all facilities and provide necessary assistance for the safety and convenience of the Government representative in the performance of his/her official duties.

IV. Additional Requirements**Criminal and Prohibited Activities**

The Program Fraud Civil Remedies Act ([31 U.S.C. §§ 3801-3812](#)), provides for the imposition of civil penalties against persons who make false, fictitious, or fraudulent claims to the Federal government for money (including money representing grant/cooperative agreements, loans, or other benefits).

False statements ([18 U.S.C. § 287](#)), provides that whoever makes or presents any false, fictitious, or fraudulent statements, representations, or claims against the United States shall be subject to imprisonment of not more than five years and shall be subject to a fine in the amount provided by 18 USC §287.

False Claims Act ([31 U.S.C. § 3729 et seq.](#)), provides that suits under this Act can be brought by the government, or a person on behalf of the government, for false claims under federal assistance programs.

Copeland "Anti-Kickback" Act ([18 U.S.C. § 874](#)), prohibits a person or organization engaged in a federally supported project from enticing an employee working on the project from giving up a part of his compensation under an employment contract.

American-Made Equipment and Products

Recipients are encouraged to purchase American-made equipment and products with funding provided under this award.

Increasing Seat Belt Use in the United States

E.O. 13043, amended by E.O. 13652, requires Recipients to encourage employees and contractors to enforce on-the-job seat belt policies and programs when operating company-owned, rented or personally-owned vehicle.

Federal Leadership of Reducing Text Messaging While Driving

E.O. 13513 requires Recipients to encourage employees, sub-awardees, and contractors to adopt and enforce policies that ban text messaging while driving company-owned, rented vehicles or privately owned vehicles when on official Government business or when performing any work for or on behalf of the Federal Government.

Federal Employee Expenses

Federal agencies are barred from accepting funds from a Recipient to pay transportation, travel, or other expenses for any Federal employee unless specifically approved in the terms of the award. Use of award funds (Federal or non-Federal) or the Recipient's provision of in-kind goods or services, for the purposes of transportation, travel, or any other expenses for any Federal employee may raise appropriation augmentation issues. In addition, NRC policy prohibits the acceptance of gifts, including travel payments for Federal employees, from Recipients or applicants regardless of the source.

Minority Serving Institutions (MSIs) Initiative

Pursuant to E.O.s 13230 and 13270, [amended by E.O. 13316](#) and [13385](#), 13532, 13592, 13555, 13515, and 13621, NRC is strongly committed to broadening the participation of MSIs in its financial assistance program. NRC's goals include achieving full participation of MSIs in order to advance the development of human potential, strengthen the Nation's capacity to provide high-quality education, and increase opportunities for MSIs to participate in and benefit from Federal financial assistance programs. NRC encourages all applicants and Recipients to include meaningful participations of MSIs. Institutions eligible to be considered MSIs are listed on the Department of Education website:

<http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>

Research Misconduct

Scientific or research misconduct refers to the fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. It does not include honest errors or differences of opinions. The Recipient organization has the primary responsibility to investigate allegations and provide reports to the Federal Government. Funds expended on an activity that is determined to be invalid or unreliable because of scientific misconduct may result in a disallowance of costs for which the institution may be liable for repayment to the awarding agency. The Office of Science and Technology Policy at the White House published in the Federal Register on December 6, 2000, a final policy that addressed research misconduct. The policy was developed by the National Science and Technology Council ([65 FR 76260](#)). The NRC requires that any allegation be submitted to the Grants Officer, who will also notify the OIG of such allegation. Generally, the Recipient organization shall investigate the allegation and submit its findings to the Grants Officer. The NRC may accept the Recipient's findings or proceed with its own investigation. The Grants Officer shall inform the Recipient of the NRC's final determination.

Publications, Videos, and Acknowledgment of Sponsorship

Publication of the results or findings of a research project in appropriate professional journals and production of video or other media is encouraged as an important method of recording and reporting scientific information. It is also a constructive means to expand access to federally funded research. The Recipient is required to submit a copy to the NRC and when releasing information related to a funded project include a statement that the project or effort undertaken was or is sponsored by the NRC. The Recipient is also responsible for assuring that every publication of material (including Internet sites and videos) based on or developed under an award, except scientific articles or papers appearing in scientific, technical or professional journals, contains the following disclaimer:

“This [report/video] was prepared by [Recipient name] under award [number] from [name of operating unit], Nuclear Regulatory Commission. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the view of the [name of operating unit] or the US Nuclear Regulatory Commission.”

Trafficking In Victims Protection Act Of 2000 (as amended by the Trafficking Victims Protection Reauthorization Act of 2003)

Section 106(g) of the Trafficking In Victims Protection Act Of 2000 (as amended as amended, directs on a government-wide basis that:

“...any grant, contract, or cooperative agreement provided or entered into by a Federal department or agency under which funds are to be provided to a private entity, in whole or in part, shall include a condition that authorizes the department or agency to terminate the grant, contract, or cooperative agreement, without penalty, if the recipient or any subrecipient, or the contractor or any subcontractor (i) engages in severe forms of trafficking in persons or has procured a commercial sex act during the period of time that the grant, contract, or cooperative agreement is in effect, or (ii) uses forced labor in the performance of the grant, contract, or cooperative agreement.” (See 22 U.S.C. §7104(g).)

EXECUTIVE COMPENSATION REPORTING

2 CFR § 170.220 directs agencies to include the following text to each grant award to a non-federal entity if the total funding is \$25,000 or more in Federal funding.

Reporting Subawards and Executive Compensation.

a. Reporting of first-tier subawards.

1. *Applicability.* Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates \$25,000.00 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111–5) for a subaward to an entity (see definitions in paragraph e. of this award term).

2. *Where and when to report.*

i. You must report each obligating action described in paragraph a.1. of this award term to <http://www.fsrs.gov>.

ii. For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)

3. *What to report.* You must report the information about each obligating action that the submission instructions posted at <http://www.fsrs.gov> specify.

b. Reporting Total Compensation of Recipient Executives.

1. *Applicability and what to report.* You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if—

i. the total Federal funding authorized to date under this award is \$25,000.00 or more;

ii. in the preceding fiscal year, you received—

(A) 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at [2 CFR § 170.320](#) (and subawards); and

(B) \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at [2 CFR § 170.320](#) (and subawards); and

iii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 ([15 U.S.C. 78m\(a\), 78o\(d\)](#)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>.)

2. *Where and when to report.* You must report executive total compensation described in paragraph b.1. of this award term:

i. As part of your registration profile at <http://www.sam.gov>.

ii. By the end of the month following the month in which this award is made, and annually thereafter.

c. Reporting of Total Compensation of Subrecipient Executives.

1. *Applicability and what to report.* Unless you are exempt as provided in paragraph d. of this award term, for each first-tier subrecipient under this award, you shall report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if—

i. in the subrecipient's preceding fiscal year, the subrecipient received—

(A) 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at [2 CFR § 170.320](#) (and subawards); and

(B) \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and

ii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>.)

2. *Where and when to report.* You must report subrecipient executive total compensation described in paragraph c.1. of this award term:

i. To the recipient.

ii. By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (*i.e.*, between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

d. *Exemptions*

If, in the previous tax year, you had gross income, from all sources, under \$300,000.00, you are exempt from the requirements to report:

i. Subawards,

and

ii. The total compensation of the five most highly compensated executives of any subrecipient.

e. *Definitions.* For purposes of this award term:

1. *Entity* means all of the following, as defined in 2 CFR Part 25:

i. A Governmental organization, which is a State, local government, or Indian tribe;

ii. A foreign public entity;

iii. A domestic or foreign nonprofit organization;

iv. A domestic or foreign for-profit organization;

v. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

2. *Executive* means officers, managing partners, or any other employees in management positions.

3. *Subaward*:

i. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

ii. The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see Sec. __ .210 of the attachment to OMB Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations")

iii. A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

4. *Subrecipient* means an entity that:

i. Receives a subaward from you (the recipient) under this award; and

ii. Is accountable to you for the use of the Federal funds provided by the subaward.

5. *Total compensation* means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and includes the following (for more information see [17 CFR § 229.402\(c\)\(2\)](#)):

i. *Salary and bonus*.

ii. *Awards of stock, stock options, and stock appreciation rights*. Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.

iii. *Earnings for services under non-equity incentive plans*. This does not include group life, health, hospitalization or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.

iv. *Change in pension value*. This is the change in present value of defined benefit and actuarial pension plans.

v. *Above-market earnings on deferred compensation which is not tax-qualified*.

vi. Other compensation, if the aggregate value of all such other compensation (e.g., severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds \$10,000.00.