

UNIVERSITY CURRENTS

A Newsletter For and About the University Nuclear Engineering and Science Community

U. S. Department of Energy

Spring 1999

TWENTY-ONE UNIVERSITY RESEARCH REACTORS RECEIVE INSTRUMENTATION GRANTS

The fiscal year 1999 University Reactor Instrumentation program has recently been completed with the awarding of 21 grants totaling \$750,000. All twenty-one university proposals were funded this year, although the requests for funds once again exceeded availability. Over \$1,440,000 was requested with 52% of the requested funding granted. The initial Federal Register notice was posted on November 19, 1998 with final proposals due to the Idaho Operations Office by January 14, 1999. The review panels were divided into eastern and western teams each reviewing reactors from the other geographic region. The panels met on February 17, 1999 in Dallas, Texas. The panelists received only travel expenses for their voluntary effort. The eastern panel was comprised of Charles McGibbon (Missouri - Columbia), David Slaughter (Utah), and Sean O'Kelly (Texas). The western panel members were Tom Newton (MIT), Pedro Perez (North Carolina State), and William Vernetson (Florida). The Office of Nuclear Energy, Science and Technology, the Idaho Operations Office and the Idaho National Engineering and Environmental Laboratory appreciate the excellent effort and time commitment of all the panelists and would like to thank them for their service to the Department and the university research reactor and engineering community.

BUDGET OUTLOOK FOR FY 2000 AND BEYOND

The proposed budget for FY 2000 is shown below and is similar to levels the program received for FY 1999. Three of the areas decline; matching grants, reactor sharing and fellowships while fuel assistance increases and a new initiative, nuclear education recruitment, is introduced. This latter program is intended to bolster undergraduate interest in nuclear engineering by exposing students through their science teachers to nuclear topics. It is envisioned that a nuclear organization with national stature will conduct a series of teacher education workshops to equip teachers with the requisite knowledge to convey to their students and thereby stimulate an interest in nuclear engineering. Requirements for the FY 2001 budget will be addressed by May 1999 for inclusion in the FY 2001 budget

request. To suggest items of educational value that should be considered for inclusion, send to john.gutteridge@hq.doe.gov

	FY 1998	FY 1999	FY 2000
Fuel Assistance	\$2.1	\$2.3	\$2.8
NEER	2.2	4.5	4.5
Matching Grants	0.8	1.0	0.8
Reactor Sharing	0.5	0.7	0.6
Fellowships and Scholarships	1.1	1.4	1.3
Reactor Upgrade	0.3	0.8	8.5
Radiochemistry	--	0.3	0.3
Recruitment	--	--	<u>0.2</u>
TOTAL	\$7.0	\$11.0	\$11.3

UNIVERSITY OF FLORIDA LAND MINE DETECTION

Lateral Migration Radiology (LMR) is a form of Compton backscatter imaging (CBI) developed at the University of Florida (UF) for application to the extraordinarily difficult problem of detecting buried, all plastic land mines.

As the name suggests, LMR utilizes the lateral transport of multiple-scattered

photons in materials to form images. Large area detectors, correctly positioned and collimated, yield an extraordinary reduction in the required x-ray source strength and image acquisition time. LMR systems typically use two sets of detectors to form images. The first set of uncollimated detectors respond to predominantly first-collision photons and a second set is collimated

and placed so as to sense predominantly multiple-collision photons. The uncollimated detectors primarily generate images of the surface features.

Using the LMR system UF obtained images of 12 types of actual antitank and antipersonal mines. The acquired images demonstrate the detection is feasible with burial depths ranging from

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FISCAL YEAR 1999 NUCLEAR ENGINEERING EDUCATION RESEARCH (NEER) GRANTS

The second year of awards in the NEER program was completed in late March when successful proposers were notified by the Idaho Operations Office. Those who did not receive awards also will be notified by mail stating the reasons for not receiving funding this year and are entitled to a detailed explanation if they request it. The number of proposers increased from 99 in FY 1998 to 126 in FY 1999. The number of awards increased slightly from 19 to 20 even though funding rose substantially from \$3,000,000 in '98 to \$4,500,000 in '99. The primary reason the number of awards did not increase more dramatically was that the '98 awards required their second year of funding and therefore absorbed a large portion of the \$4,500,000 appropriated by the Congress. A second reason was that the proposals in '99 were of a greater dollar level than their '98 counterparts. The 20 new awards went to 15 universities compared to 13 in '98. Of the 20 awards, 13 are for three years and seven are two year projects. Of the 126 proposals, about 75 were deserving of funding. A possible change for next year may include a cap on the dollar level of each project. Many thanks to all the reviewers from the universities and the national laboratories. Once again, the Idaho Operations Office and the Idaho National Engineering and Environmental Laboratory did an excellent job of administering this program. All '98 award recipients will be contacted by the Idaho Operations Office to provide their progress reports on their individual research projects.

REACTOR OPERATIONS AND SYSTEMS EXPERIENCE CO-OP PROGRAM



The University of Massachusetts-Lowell (UM) is introducing a unique and exciting campus opportunity for under graduate engineering and science majors. Entitled the Reactor Operations and Systems Experience Co-op program, it provides students a multi-disciplinary systems approach to education and training where they "learn by doing". Students will study and learn the design aspects of real-world systems associated with nuclear reactor operations such as: heat transfer systems, process instrumentation and control, water conditioning systems, electrical power distribution, ventilation systems, and radiological safety and control. Knowledge is gained by working closely with experienced staff and faculty and

through independent study. UML course credit is also available. Students may elect to continue in this program during the academic year and complete the requirements for Reactor Operator Candidate. Those individuals can gain sufficient understanding of the facility, reactor theory, and procedures and regulations to take and pass a Federal licensing examination. Students are then provided the opportunity to be hired as staff at the UMLRR. For further information about the program contact Professor Gilbert J. Brown at the University of Massachusetts Lowell, Nuclear Engineering Program. Dr. Brown can be reached at (978)934-3166 or e-mail at gilbert_brown@uml.edu.

DEPARTMENT OF ENERGY SUMMER BRIDGE PROGRAM

The Department of Energy and Morgan State University's Physics Department are proud to announce the second year of the Department of Energy Summer Bridge Program. The Summer program was begun last year and is a program that provides math, science and english studies to interested and talented high school students from Baltimore. The program has been expanded by one week to six weeks. This extension will allow students to receive possible accreditation of courses taken. There will also be an increase in participants from 16 to 30. Ten returning rising seniors and twenty rising juniors will participate. The participants are selected for the program on the basis of teacher recommendations, previous course performance, test scores and other qualifying criteria. The program's academic components, coupled with appropriate follow-on courses at their parent schools, are designed to help the students have calculus ready status by the end of their senior year. Another program goal is for these students to qualify for college admission with improved scores on their SAT's taken during their junior/senior year. If other schools are interested in beginning a program similar to this one, please contact Nancy Hebron on 301-903-1536 or e-mail her at Nancy.hebron@hq.doe.gov.



NUCLEAR ENGINEERING AND HEALTH PHYSICS PROGRAM ELIGIBILITY CHANGES

The eligibility criteria for the Nuclear engineering and Health Physics Fellowship program will be expanded to include all first, second, and third year graduate students enrolled in participating academic programs. The length of appointments to the program will be based on a maximum period of four years and prorated based on the number of course hours the fellow has completed at the beginning of the appointment. Award preference will continued to be given to entering graduate students. In addition, the monthly stipend will be increased from \$1,200 to \$1,400. This new stipend amount will become effective on September 1, 1999. The scholarships will remain at \$2,000, however, they will be paid in semester increments of \$1,000 in November and \$1,000 in February.

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UNIVERSITY OF MICHIGAN - CHINA NATIONAL NUCLEAR CORPORATION AGREEMENT FORGES LINK TO CHINA'S FUTURE

On November 12, 1999, the University of Michigan (UM) signed a Memorandum of Understanding (MOU) with the China National Nuclear Corporation (CNNC) to provide nuclear engineering and reactor safety education to select individuals who are targeted to lead the commercial nuclear power development effort in China. UM has in place a masters program that would provide CNNC engineers with the breadth and depth of education in nuclear engineering and reactor safety that will help ensure safe operation of the plants already built, as well as developing desirable safety programs for their commercial nuclear power program. The safe and efficient operation of commercial nuclear plants is vital to China's emerging electricity

needs as well as to the safety and stability of Asia and the world. China currently has only three nuclear engineering departments within its university system, and lacks the educational infrastructure and industry experience necessary to train the engineers needed for its nuclear development plans. China, currently, has three operating nuclear power plants, with eight on order, and hopes to construct as many as 30 to 40 more plants by 2002. The educational program will lay the foundation for a safe and successful commercial nuclear program in China in the years to come.

Chair of Nuclear Engineering and Radiological Sciences at UM, Gary S. Was and research scientist Lumin Wang were

invited to visit the Beijing offices of CNNC in April 1998. UM will offer a curriculum based on its existing courses and tailored to a year-long program including nuclear reactor engineering and safety and practical training for the students. Up to twelve students will be admitted into the program each year. Under the agreement, the practical training component of the program and the cost of student tuition and support would be provided by the U.S. nuclear industry, allowing companies to introduce their technology to Chinese students and thereby establish a relationship with the Chinese nuclear industry.

RADIOCHEMISTRY EDUCATION AWARD PROGRAM (REAP) SOLICITATION

The Office of Nuclear Energy, Science and Technology has established the Radiochemistry Education Award Program (REAP) to provide matching funds to universities interested in improving the educational aspects of their radiochemistry program. Awards have been set at a maximum of \$100,000 per year for a three-year award and can be used to support faculty salaries, postdoctoral students, graduate students, laboratory and equipment improvements, coursework, and any suggested academic program enhancements working with DOE facilities in radiochemical areas. Interdisciplinary programs which include combining science programs with engineering programs are

strongly encouraged. In particular, Chemistry Departments working with Nuclear Engineering programs are encouraged to apply for participation in this program. Applications to this program will be distributed directly to Chemistry, Chemical Engineering and Nuclear Engineering programs in the US and Puerto Rico. Notices regarding the program will be posted in the Commerce Business Daily and other national publications. Applications can be found on the internet at <http://hubcap.clemson.edu/SCUREF/>. Applications must be received at South Carolina State University by 5:00 p.m. on June 1, 1999. The awards will be announced and made on or before July 31, 1999.

NUCLEAR ENGINEERING AND HEALTH PHYSICS PROGRAM ELIBILITY CHANGES -- page 2)

Although the quality of the applicants to this year's program remained high, the number of students applying was low. The Department of Energy, Office of Nuclear Energy, Science and Technology and the program administrators are very interested on receiving input on how to increase the number of students applying for the scholarships and fellowships. Please contact John Gutteridge at (301)903-1632, John.Gutteridge@hq.doe.gov and/or Craig Williamson (843)792-1469, Wcraig@clemson.edu, with your suggestions regarding the recruitment of program applicants.

NEDHO

MANPOWER STUDY

The goals of the NEDHO man-power study are to quantify the apparent imbalance in supply and demand for nuclear engineers and to recommend action to address that trend. The first step was a joint ANS/NEI workshop held at the 1998 ANS Conference in Washington, D.C., entitled "Crisis in the Workplace Manpower Supply and Demand in the Nuclear Industry: The Imbalance." Representative Joseph Knollenberg, from the 11th District in Michigan, gave the keynote address for the workshop. The workshop, which had participants from universities, government, and industry, resulted in a list of key problems and potential solutions for the looming manpower shortage. The second phase of the manpower study, a DOE-sponsored survey of industry, government, and the universities, being conducted by ASEE, is now underway. This survey is intended to provide an assessment of the present and future imbalance of supply and demand for nuclear engineers. A final report summarizing the ASEE survey and the ANS/NEI manpower workshop, as well as follow-on activities, will be presented at the Long Beach ANS Meeting in November 1999. There will also be a

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NRC ISSUES REVISION CERTIFICATE FOR BMI-1 CASK

Revision 25 Certificate of Compliance 5957 authorizes transport of up to eight intact, irradiated, MTR-type, University of Virginia, low-enriched uranium (LEU) fuel assemblies, positioned in the Texas A&M basket. This allows shipment of spent fuel from the University of Virginia reactor. The BMI-1 cask is owned by the DOE and is used primarily for shipment of spent fuel from university reactors. BMI-1 is a steel-encased lead shielded cylindrical shipping cask. Its outside dimensions are about 33 inches in diameter by 73 inches high, while its inside dimensions are 15.5 inches in diameter by 54 inches high. The Certificate of Compliance authorizes use of a number of inner can and basket assemblies and shipment of a variety of fuel assemblies and other radioactive material. The current Certificate of Compliance will expire January 31, 2001. Prior to expiration, DOE will submit an application for renewal.

*FOR ADDITIONAL
INFORMATION PLEASE
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IDAHO STATE UNIVERSITY
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\\ Heather MacLean
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\\ Daniel Evans
\\ Jennifer Parsons

NEDHO MANPOWER STUDY -- page 3)

informal update at the Boston ANS Meeting in June 1999. For additional information contact William Martin at the University of Michigan, wrm@umich.edu.



Important Dates To Remember

June 6-10, 1999 :
**American Nuclear Society
Summer Meeting, Boston, MA**

June 20-23, 1999 :
**ASEE Annual Conference and
Exposition (NEDHO) Meeting
Charlotte, NC**

September 14-17, 1999 :
**TRTR Annual Conference
Raleigh, NC**

UNIVERSITY OF FLORIDA LAND MINE DETECTION -- cover)

on the soil surface to 10 centimeters. Moreover, the images are so definitive to six centimeters burial that clear identification of mine-type is easily accomplished. LRM offers a realistic, immediately available technique for humanitarian missions of systematic detection and recognition of land mines near, or on, the soil surface with near-zero false positive and false negative probabilities.

To date, eight masters degrees, one engineers degree, and three Ph.D. degrees have been earned by students conducting research on lateral migration radiography with over twenty-five publications. Currently, there are two master degree students and one Ph.D. student working on LMR with research being directed now not only at land mine detection, but to the detection of subtle flaws and defects in materials and structures.