DOE Nuclear Energy University Program

NEUP in Idaho
Idaho’s public universities and the Idaho National Laboratory (INL), through collaborations fostered by the Center for Advanced Energy Studies (CAES), are conducting research and educating the future workforce that supports the nation’s and world’s increasing demand for affordable, safe, reliable and environmentally sound nuclear energy. Support from the highly competitive U.S. Department of Energy Nuclear Energy University Program (NEUP) has enabled the revitalization of the universities’ nuclear engineering, science, and related program research and educational programs.

Over the past seven years, Idaho universities have been awarded $37 million through the NEUP, including $33.5 million for research development, $2.4 million for research infrastructure development, and $1 million for student scholarships and fellowships. With this funding, Idaho’s universities are engaged in science and engineering research leading to the development of new innovative technologies, providing creative solutions to current nuclear energy challenges, and enabling future nuclear power development and deployment.

University of Idaho (UI) researchers have six active NEUP projects totaling more than $3.4 million. Past NEUP project topics at UI include recycling and storing used nuclear fuel, designing intelligent control systems for next-generation reactors, improving the service life of concrete and recovering uranium resources from sea water.

Background
Through NEUP, the DOE designates up to 20 percent of its annual nuclear energy research and development budget to fund university-based projects and research infrastructure development activities through an open, peer-reviewed competition. These competitions address both the near-term specific needs and long-term general needs of DOE nuclear energy research and development programs, as well as infrastructure improvements that support the educational and research missions of the participating universities.

CAES is a consortium among Boise State University (BSU), Idaho State University (ISU), UI, the University of Wyoming and the Idaho National Laboratory, which is managed by the private entity Battelle Energy Alliance.

Current Research
- In 2015, UI researchers, led by Gabriel Potirniche, an associate professor in mechanical engineering, began a three-year, $800,000 study to characterize creep-fatigue crack growth in alloy 709.
- In October 2016, UI researchers, led by Batric Pesic, a professor of chemical and materials engineering, began a two-year, $350,000 project on advanced electrochemical separation in spent nuclear fuel.
- In October 2016, UI researchers, led by Indrajit Charit, an associate professor of chemical and materials engineering, began a three-year, $800,000 project to develop science-based guidelines to select dopants for fast reactor fuel compositions.
- In October 2017, UI researcher Richard Christensen, director and a professor of nuclear engineering at the University of Idaho, Idaho Falls, in collaboration with University of Michigan, began a three-year, $800,000 (UI-$285,000) project to evaluate He-Air mixing in gas cooled reactors.
- In October 2017, UI researcher Richard Christensen, in collaboration with the University of Wisconsin, began a three-year, $5,000,000 (UI-$300,000) project to develop an ASME code case for advanced heat exchangers.

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FY19 PROGRAMS OF INTEREST

• In October 2017, UI researcher Krishnan Raja, an associate professor of chemical and materials engineering, began a three-year, $800,000 project to evaluate the electrochemical behavior of Iodine.

• In October 2017, BSU researcher Maria Mitkova, an associate professor in computer and electrical engineering, began a three-year, $800,000 project to develop sensors for monitoring temperatures in nuclear facilities.

Upcoming Goals

• BSU, ISU and UI faculty will submit full NEUP proposals for projects in FY18. Topics include cybersecurity research and development, welding procedures for used fuel canisters, new safety processes for existing nuclear power plants, development of accelerated numerical schemes, development of thermal energy storage systems, studies of molten salt reactor materials, and other critical issues in nuclear engineering and energy.

• Collaborators on these projects include the INL, ISU, BSU, University of Illinois, Brigham Young University, the University of Michigan, the University of Tulsa, Vanderbilt University and the University of Alabama – Huntsville, as well as industry partners.

Projected Impact of Continued and Increased Funding

Continued and expanded support of the NEUP program will allow the UI, ISU and BSU to continue to educate the next generation of nuclear professionals, support the mission of the INL and address the nation’s energy challenges.

Accounts: Energy and Water, Department of Energy, Nuclear Energy

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