

THE DOE-NE ROLE IN SUPPORTING NUCLEAR ENGINEERING: EDUCATION OF THE NEXT GENERATION OF NUCLEAR REACTOR ENGINEERS

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ABSTRACT

The DOE Office of Nuclear Energy Science and Technology (NEST) is sponsoring research that supports the education of nuclear engineering students, graduate research activities, and research efforts of nuclear reactor physics professionals in industry and at the national laboratories. The goal of this research and development (R&D) funding is not only to train people, but also to provide the necessary R&D results required for keeping nuclear energy as a viable option for the United States' and for world's energy needs. The DOE also will need a continued supply of well-trained nuclear engineers for its own complex, particularly for criticality and reactor safety analyses, reactor operations and support, nuclear fuel analysis, and nuclear waste issues. DOE NEST is also determining whether the United States has the infrastructure needed to meet its projected nuclear science and technology requirements through the year 2020, and is planning future missions at current facilities in its Infrastructure Roadmap. A gap analysis will identify needs that require additional capabilities, facilities, and training, including nuclear reactor physics-related areas. The NEST Strategic Plan will provide an overall scheme for the long-range nuclear R&D activities.

Various research programs exist in NEST to support the DOE education mission. Direct funding to nuclear engineering programs and departments allows for university reactor sharing and equipment upgrades, student recruitment, fellowships, scholarships, financial aid to minority students, industry matching grants, and research project support. The Nuclear Engineering Education Research grant program has provided funds to nuclear engineering departments for innovative research in basic nuclear science and engineering, as well as research that addresses solutions for current plant issues and future Generation IV (i.e., future economic, proliferation-resistant, safe designs) concepts. The Nuclear Energy Research Initiative (NERI) program is focused on the research and development of Generation IV designs. Several NERI grants that have strong reactor physics and computational components will be described. The next generation of power plant designs will require more advanced computational reactor physics methods and coupled thermal-hydraulic neutronic codes. The education of future nuclear engineers will have to include these new advanced reactor physics methods as well as traditional techniques.