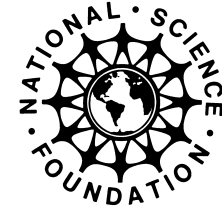


Bioengineering and Environmental Systems Division

Environmental/Ocean Systems



The Bioengineering and Environmental Systems (BES) Division supports research that:

- a) expands the knowledge base of bioengineering at scales ranging from proteins and cells to organ systems, including mathematical models, devices and instrumentation systems. Current interest areas include tissue engineering and the development of biological substitutes; biosensors, i.e., devices that use a biological component; food processing, especially with respect to food safety; and metabolic engineering, including the application of systems analysis tools to understand metabolic transport.
- b) applies engineering principles to the understanding of living systems, development of new and improved devices, and products for human health care. Emphasis is placed on engineering research that contributes to better and more efficient health care delivery and aid to people with disabilities.
- c) improves our ability to apply engineering principles to avoid and/or correct problems that impair the usefulness of land, air and water. Current interest areas include environmental remediation, especially with respect to understanding the fate and transport of surface and groundwater pollutants; novel processes for waste treatment; industrial ecology; technologies for the avoidance of pollution; technology to limit fouling of the ocean.
- d) advances fundamental engineering knowledge of the ocean environment and develops technological innovation related to conservation, development, and use of the oceans and their resources.

Three program areas comprise the BES Division:

- Biomedical Engineering/Research to Aid Persons with Disabilities
- Biotechnology/Biochemical Engineering
- Environmental/Ocean Systems

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Information on application procedures may be found in the NSF Grant Proposal Guide (NSF 99-2) and on the NSF Home Page (<http://www.nsf.gov>).

The Foundation welcomes proposals from all qualified scientists and engineers and strongly encourages women, minorities, and persons with disabilities to compete fully in any of the research and education related programs described here. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving financial assistance from the National Science Foundation. Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF projects. See the program announcement or contact the program coordinator at (703) 306-1636. The National Science Foundation has TDD (Telephonic Device for the Deaf) capability, which enables individuals with hearing impairment to communicate with the Foundation about NSF program employment, or general information. To access NSF TDD dial (703) 306-0090, for FIRS, 1-800-877-8339.

NSF 99-20 (Replaces NSF 97-115)

Environmental/ Ocean Systems

Bioengineering And Environmental Systems Division

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National Science Foundation

Environmental / Ocean Systems

This program supports research on environmental systems with the goal of applying engineering principles to reduce adverse effects of solid, liquid, and gaseous discharges into land, fresh and ocean waters and air that result from human activity and impair the value-of those resources. It also supports research on innovative biological, chemical, and physical processes used alone or as components of engineered systems to restore the usefulness of polluted land, water, and air resources.

The program emphasizes engineering principles underlying pollution avoidance as well as pollution treatment and reparation. Environmental technology research for improved sensors, innovative production processes, waste reduction and recycling, and industrial ecology are important to this program. Research may be directed toward improving the cost effectiveness of pollution avoidance as well as developing new principles for pollution avoidance technologies.

Research in ocean systems engineering and technology seeks to expand the knowledge base to develop the ocean resources in an environmentally conscious manner. Projects can be supported in any area of ocean engineering with particular attention on engineering with particular attention on engineering practices involving man-made devices in the coastal ocean.

Areas of Research

- Applications of ionizing radiation in improving the treatability of wastes and accelerating the biodegradability of biologically refractory residues from other physical, chemical and biological treatment processes.
- Engineering issues regarding management of residues derived from processing of wastewaters.
- Advanced oxidation technologies including ozonation, radiation, photolysis, nonthermal plasmas, ionizing radiation, electrohydraulic cavitation, sonolysis and supercritical oxidation for destruction of organic substances.
- Industrial Ecology, which aims to allow industry to adopt the cyclical laws of a natural ecosystem in order to incorporate environmental concerns into the design and manufacture of products and the processing of materials.
- Sensors and instrumentation to monitor environmental processes for control and feedback.
- Models which address problems such as recycling, material recovery, disassembly, remanufacturing, life-cycle analysis and pollution prevention.
- Technology for minimizing or eliminating point source and non-point source pollution. This includes recovery, recycling, and re-use

technology as well as materials for containment of pollutants.

- Fundamental research in coastal ocean space utilization including platforms/systems autonomous undersea vehicles, sub-sea robotics, and other instrumented and remotely operated systems for use in characterization of the ocean environment, seafloor, and subsea floor; and for the development and utilization of ocean resources.
- Engineering research contributing to development of new materials, marine organisms, and development and improvement of ocean grown and harvested products.
- Advanced techniques for sensing, processing, and communicating ocean and sea floor data as well as ocean energy, power sources, and environmentally benign ocean space development.