

Office of Science
Notice 00-01

Annual Notice
Continuation of Solicitation for the Office of Science
Financial Assistance Program

Department of Energy
Office of Science

**Continuation of Solicitation for the Office of Science Financial Assistance
Program**
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AGENCY: U.S. Department of Energy

ACTION: Annual Notice of Continuation of Availability of Grants and Cooperative Agreements

SUMMARY: The Office of Science of the Department of Energy hereby announces its continuing interest in receiving grant applications for support of work in the following program areas: Basic Energy Sciences, High Energy Physics, Nuclear Physics, Computational and Technology Research, Fusion Energy Sciences, and Biological and Environmental Research. On September 3, 1992, (57FR40582), DOE published in the Federal Register the Office of Energy Research Financial Assistance Program (now called the Office of Science Financial Assistance Program), 10 CFR Part 605, Final Rule, which contained a solicitation for this program. Information about submission of applications, eligibility, limitations, evaluation and selection processes and other policies and procedures are specified in 10 CFR Part 605.

DATES: Applications may be submitted at any time in response to this Notice of Availability.

ADDRESSES: Applications must be sent to: Director, Grants and Contracts Division, Office of Science, SC-64, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290. When preparing applications, applicants should use the Office of Science Financial Assistance Program Application Guide and Forms located on the World Wide Web at:

<http://www.sc.doe.gov/production/grants/grants.html>. Applicants without Internet access may call 301-903-5212 for information.

SUPPLEMENTARY INFORMATION: This Notice is published annually and remains in effect until it is succeeded by another issuance by the Office of Science. This annual Notice 00-01 succeeds Notice 99-01 which was published November 12, 1998.

It is anticipated that approximately \$400 million will be available for grant and cooperative agreement awards in FY 2000. The DOE is under no obligation to pay for any costs associated with the preparation or submission of an application. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this Notice.

In addition, the following program descriptions are offered to provide more in-depth information on scientific and technical areas of interest to the Office of Science:

1. Basic Energy Sciences

The Basic Energy Sciences (BES) program supports fundamental research in the natural sciences and engineering leading to new and improved energy technologies and to understanding and mitigating the environmental impacts of energy technologies. The science divisions and their objectives are as follows:

(a) Materials Sciences

The objective of this program is to increase the understanding of phenomena and properties important to materials behavior that will contribute to meeting the needs of present and future energy technologies. It is comprised of the subfields metallurgy, ceramics, condensed matter physics, materials chemistry, and related disciplines where the emphasis is on the science of materials.

>Program Contact: (301) 903-3427

(b) Chemical Sciences

The objective of this program is to expand, through support of basic research, knowledge of various areas of chemistry, chemical engineering and atomic molecular and optical physics with a goal of contributing to new or improved processes for developing and using domestic energy resources in an efficient and environmentally sound manner. Disciplinary areas where research is supported include atomic molecular and optical physics; physical, inorganic and organic chemistry; chemical physics; photochemistry; radiation chemistry; analytical chemistry; separations science; actinide chemistry; and chemical engineering sciences.

>Program Contact: (301) 903-5804

(c) Engineering Research

This program's objectives are: (1) to extend the body of knowledge underlying current engineering practice in order to open new ways for enhancing energy savings and

production, prolonging useful equipment life, and reducing costs while maintaining output performance, and environmental quality; and (2) to broaden the technical and conceptual base for solving future engineering problems in the energy technologies. Long-term research topics of current interest include: foundations of bioprocessing of fuels and energy related wastes, micro- and nano-scale energy transport, fracture mechanics, fundamental studies of multiphase flows and heat transfer, robotics and intelligent machines, nanotechnology, and diagnostics and control for plasma processing of materials.

>Program Contact: (301) 903-3427 (Telephone number revised 8/30/00)

(d) Geosciences

The goal of this program is to develop a quantitative and predictive understanding of geologic processes related to energy, and related to environmental quality. The emphasis is on the upper levels of the earth's crust and the focus is on geophysics, geomechanics, hydrogeology and geochemistry of rock-fluid systems and interactions emphasizing processes taking place at the atomic and molecular scale. Specific topical areas receiving emphasis include: high resolution geophysical imaging; rock physics, physics of fluid transport, and fundamental properties and interactions of rocks, minerals, and fluids. The resulting improved understanding and knowledge base will form the foundation for utilization of the Nation's energy resources in an environmentally acceptable fashion.

>Program Contact: (301) 903-5804 (Telephone number revised 8/30/00)

(e) Energy Biosciences

The primary objective of this program is to generate the fundamental understanding of biological mechanisms in the areas of botanical and microbiological sciences that will support biotechnological developments related to DOE's mission. The research serves as the basic information foundation with respect to an environmentally responsible renewable resource production for fuels and chemicals, microbial conversions of renewable materials and biological systems for the conservation of energy. Research focusing on the fundamental mechanistic biosciences underlying carbon management is a particular emphasis. This office has special requirements for the submission of preapplications, when to submit, and the length of the applications. Applicants are encouraged to contact the office regarding these requirements.

>Program Contact: (301) 903-2873

2. High Energy and Nuclear Physics

This program supports about 90% of the U.S. efforts in high energy and nuclear physics. The objectives of these programs are indicated below:

(a) High Energy Physics

The primary objectives of this program are to understand the ultimate structure of matter in terms of the properties and interrelations of its basic constituents, and to

understand the nature and relationships among the fundamental forces of nature. The research falls into three broad categories: experimental research, theoretical research, and technology R&D in support of the high energy physics program.

>Program Contact: (301) 903-3624

(b) Nuclear Physics (Including Nuclear Data Program)

The primary objectives of this program are an understanding of the interactions and structures of atomic nuclei and nuclear matter at the most elementary level possible, and an understanding of the fundamental forces of nature as manifested in nuclear matter.

>Program Contact: (301) 903-3613

3. Computational and Technology Research

This program fosters and supports fundamental research in advanced computing research (applied mathematics, computer science and networking), and operates supercomputer, networking, and related facilities to enable the analysis, modeling, simulation, and prediction of complex phenomena important to the Department of Energy.

(a) Mathematical, Information, and Computational Sciences

This subprogram supports a spectrum of fundamental research in applied mathematical sciences, computer science, and networking from basic through prototype development. Results of these efforts are used to form partnerships with users in scientific disciplines to validate the usefulness of the ideas and to develop them into tools. Testbeds on important applications for DOE are supported by this subprogram. Areas of particular focus are:

Applied Mathematics

Research on the underlying mathematical understanding and numerical algorithms to enable effective description and prediction of physical systems such as fluids, magnetized plasmas, or protein molecules. This includes, for example, methods for solving large systems of partial differential equations on parallel computers, techniques for choosing optimal values for parameters in large systems with hundreds to hundreds of thousands of parameters, improving our understanding of fluid turbulence, and developing techniques for reliably estimating the errors in simulations of complex physical phenomena.

Computer Science

Research in computer science to enable large scientific applications through advances in massively parallel computing such as very lightweight operating systems for parallel computers, distributed computing such as development of the Parallel Virtual Machine (PVM) software package which has become an industry standard, and large scale data management and visualization. The development of new computer and computational science techniques will allow scientists to use the most advanced

computers without being overwhelmed by the complexity of rewriting their codes every 18 months.

Networking

Research in high performance networks and information surety required to support high performance applications - protocols for high performance networks, methods for measuring the performance of high performance networks, and software to enable high speed connections between high performance computers and networks. The development of high speed communications and collaboration technologies will allow scientists to view, compare, and integrate data from multiple sources remotely.

>Program Contact: (301)-903-5800

4. Fusion Energy Sciences

The mission of the Fusion Energy Sciences program is to advance plasma science, fusion science, and fusion technology - the knowledge base needed for an economically and environmentally attractive fusion energy source. This program is supported by the Office of Fusion Energy Sciences (OFES), which fosters both applied and basic research and emphasizes international collaboration to accomplish this mission.

(a) Research Division

This Division seeks to develop the physics knowledge base needed to advance the Fusion Energy Sciences program toward its goals. Research into physics issues associated with medium to large scale confinement devices is essential to studying conditions relevant to the production of fusion energy. Experiments on these scale of devices are used to explore the limits of specific confinement concepts, as well as study associated physical phenomena. Specific areas of interest include: (1) the production of increased plasma densities and temperatures, (2) the understanding of the physical laws governing plasma energy of high plasma pressure, (3) the investigation of plasma interaction with radio frequency waves, and (4) the study and control of particle transport and exhaust in plasmas.

Research is also carried out in the following areas: (1) basic plasma science research directed at furthering the understanding of fundamental processes in plasmas; (2) improving the theoretical understanding of fusion plasmas necessary for interpreting results from present experiments and the planning and design of future confinement devices, (3) obtaining the critical data on plasma properties, atomic physics and new diagnostic techniques for support of confinement experiments, (4) supporting exploratory research on innovative confinement concepts, and (5) carrying out research on issues that support the development of Inertial Fusion Energy, for which target development is carried out by the Department of Energy's Defense Programs.

>Program Contact: (301) 903-4095

(b) Facilities and Enabling Technologies Division

This Division is responsible for overseeing the facility operations and enabling research and development activity budgets within the OFES. Grant program opportunities are in the enabling research and development activity. (Grants for scientific use of the facilities operated/maintained by this Division should be addressed to the Research Division.) The enabling technologies program supports the advancement of fusion science in the nearer-term by carrying out research on technological topics that: (1) enable domestic experiments to achieve their full performance potential and scientific research goals, (2) permit scientific exploitation of the performance gains being sought from physics concept improvements, (3) allow the US to enter into international collaborations gaining access to experimental conditions not available domestically, and (4) explore the science underlying these technological advances.

The enabling technologies program supports pursuit of fusion energy science for the longer-term by conducting research aimed at innovative technologies, designs and materials to point toward an attractive fusion energy vision and affordable pathways for optimized fusion development.

>Program Contact: (301) 903-3068

5. Biological and Environmental Research Program

For over 50 years the Biological and Environmental Research (BER) Program has been investing to advance environmental and biomedical knowledge connected to energy. The BER program provides fundamental science to underpin the business thrusts of the Department's strategic plan. Through its support of peer-reviewed research at national laboratories, universities, and private institutions, the program develops the knowledge needed to identify, understand, and anticipate the long-term health and environmental consequences of energy production, development, and use.

(a) Life Sciences Research

Research is focused on utilizing unique DOE resources and facilities to develop fundamental biological information and advanced technologies for understanding and mitigating the potential health effects of energy development, energy use, and waste cleanup. The objectives are: (1) to create and apply new technologies and resources in mapping, sequencing, and information management for characterizing the molecular nature of the human genome; (2) to develop and support DOE national user facilities for use in fundamental structural biology; (3) to use model organisms to understand human genome organization, human gene function and control, and the functional relationships between human genes and proteins; (4) to characterize and exploit the genomes and diversity of microbes with potential relevance for energy, bioremediation, or global climate; (5) to understand and characterize the risks to human health from exposures to low levels of radiation and chemicals; (6) to develop

novel technologies for high throughput determination of protein structure; and (7) to anticipate and address ethical, legal, and social implications arising from genome research.

>Program Contact: (301) 903-5468

(b) Medical Applications and Measurement Science

The research is designed to develop beneficial applications of nuclear and other energy-related technologies for medical diagnosis and treatment. The research is directed at discovering new applications of radiotracer agents for medical research as well as for clinical diagnosis and therapy. A major emphasis is placed on application of the latest concepts and developments in genomics, structural biology, computational biology, and instrumentation. Much of the research seeks breakthroughs in noninvasive imaging technologies such as positron emission tomography. The measurement science activities focus on research in the basic science of chemistry, physics and engineering as applied to bioengineering.

>Program Contact: (301) 903-3213

(c) Environmental Remediation

The research is primarily focused on the fundamental biological, chemical, geological, and physical processes that must be understood for the development and advancement of new, effective, and efficient processes for the remediation and restoration of the Nation's nuclear weapons production sites. Priorities of this research are bioremediation and operation of the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL). Bioremediation activities are centered on the Natural and Accelerated Bioremediation Research (NABIR) program, a basic research program focused on determining the conditions under which bioremediation will be a reliable, efficient, and cost-effective technique. This subprogram also includes basic research in support of pollution prevention, sustainable technology development and other fundamental research to address problems of environmental contamination.

>Program Contact: (301) 903-3281

(d) Environmental Processes

The program seeks to understand the basic chemical, physical, and biological processes of the Earth's atmosphere, land, and oceans and how these processes may be affected by energy production and use. The research is designed to provide the data that will enable an objective assessment of the potential for, and consequences of, global warming. The program is comprehensive with an emphasis on understanding the radiation balance from the surface of the Earth to the top of the atmosphere (including the role of clouds) and on enhancing the quantitative models necessary to predict possible climate change at the global and regional scales.

The Climate Change Technology Initiative (CCTI) seeks the understanding necessary to exploit the biosphere's natural processes to enhance the sequestration of atmospheric carbon dioxide in terrestrial systems and the ocean. The CCTI includes research to identify and understand the environmental and biological factors or processes that limit the sequestration of carbon in these systems, and to develop approaches for overcoming such limitations to enhance sequestration. The research includes studies on terrestrial and ocean carbon sequestration, including the role of marine microorganisms and other types of terrestrial ecosystems.

>Program Contact: (301) 903-3281

6. Experimental Program to Stimulate Competitive Research (EPSCoR)

The objective of the EPSCoR program is to enhance the capabilities of EPSCoR states to conduct nationally competitive energy-related research and to develop science and engineering manpower to meet current and future needs in energy-related fields. This program addresses research needs across all of the Department of Energy research interests. Research supported by the EPSCoR program is concerned with the same broad research areas addressed by the Office of Science programs that are described above. The EPSCoR program is restricted to applications which originate in eighteen states (Alabama, Arkansas, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, South Dakota, Vermont, West Virginia, and Wyoming) and the commonwealth of Puerto Rico. It is anticipated that only a limited number of new competitive research grants will be awarded under this program due to prior commitments to ongoing EPSCoR grant projects.

>Program Contact: (301) 903-3427

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