
	<u>Amount</u>	<u>Payment Schedule</u>
Annual Student Stipend	\$19,800 per year	Monthly
Practicum Allowance	\$750 per month (prorated)	Prorated
Tuition and Fees	Actual Cost	As Appropriate
Travel Allowance	As Appropriate	As Appropriate

ORAU

Oak Ridge Associated Universities (ORAU) is a university consortium leveraging the scientific strength of 88 major research institutions to advance science and education by partnering with national laboratories, government agencies, and private industry. ORAU manages the Oak Ridge Institute for Science and Education for the U.S. Department of Energy.

ORISE

The **Oak Ridge Institute for Science and Education (ORISE)** is a U.S. Department of Energy facility focusing on scientific initiatives to research health risks from occupational hazards, assess environmental cleanup, respond to radiation medical emergencies, support national security and emergency preparedness, and educate the next generation of scientists. ORISE is managed by Oak Ridge Associated Universities.

EQUAL OPPORTUNITY POLICY

It is the policy of the Oak Ridge Institute for Science and Education to recruit and select participants without regard to race, age, gender, religion, color, national origin, mental or physical disability, or special disabled or Vietnam Era veteran status.

CONTRACT ACKNOWLEDGEMENT

This research was performed under an appointment to the Fusion Energy Sciences Fellowship Program, administered by the Oak Ridge Institute for Science and Education under contract number DE-AC05-00OR22750 between the U.S. Department of Energy and Oak Ridge Associated Universities.

2005 FUSION ENERGY SCIENCES FELLOWSHIP PROGRAM
PROGRAM DESCRIPTION/APPLICATION

Prepared for

U.S. Department of Energy
Office of Fusion Energy Sciences

by

Oak Ridge Institute for Science and Education

Web Site: <http://www.ornl.gov/orise/edu/DOE/FES/fesfelhome.htm>

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INTRODUCTION

Each year, the U.S. Department of Energy (DOE), Office of Fusion Energy Sciences, www.ofe.er.doe.gov, sponsors the Fusion Energy Sciences (FES) Fellowship Program. The program is administered for DOE by the Oak Ridge Institute for Science and Education (ORISE), <http://www.ornl.gov/orise/edu/DOE/FES/fesfelhome.htm>, operated by Oak Ridge Associated Universities (ORAU). Fellowships are awarded for one-year renewable terms from September 1 through August 31 in support of full-time graduate study and thesis research within the United States. Study and research under the fellowship are to be conducted in the area of fusion energy sciences and technology related to the development of fusion energy. This booklet contains information and a student application for the Fusion Energy Sciences Fellowship Program.

The potential importance of fusion in national energy priorities underscores the necessity of ensuring an adequate supply of appropriately trained engineers and physicists to develop the scientific basis and technology leading toward commercially viable fusion energy systems. The basic objective of the FES Fellowship Program is to encourage talented students to enter a period of study and research in fusion energy sciences and technology accompanied by practical work experiences at recognized research facilities. The fellowship program is designed to provide incentive and encouragement to students with outstanding academic records and research interests to continue their study in graduate school in preparation for careers in fusion energy. Fellows are encouraged to accept career appointments with either DOE or DOE contractors.

The Fusion Energy Sciences (FES) program leads the national research effort to advance plasma science, fusion science, and fusion technology – the knowledge base needed for an economically and environmentally attractive fusion energy source. Fusion offers the potential for abundant, safe, environmentally attractive, affordable energy.

The FES Fellowship Program has two separate components; these components are listed on the following pages. Applicants are required to indicate on their FES application which component they choose.

Fusion Science Component

The Science subprogram develops the basis for reliably predicting the behavior of plasma in a broad range of plasma confinement configurations and uses advances in the tokamak concept to enable the start of the burning plasma physics phase of the U.S. Fusion Energy Sciences program. OFES-funded research advances the understanding of plasma, the fourth state of matter, and enhances predictive capabilities, through comparison of experiments, theory and simulation. Research focuses on plasma issues including turbulence and transport, macroscopic stability, wave particle interactions, and multiphase interfaces and on methods for sustaining and controlling high temperature, high-density plasmas, based on improved understanding of fundamental physical processes. Advanced computational techniques are integrated into research to provide significantly improved predictive capability for plasma behavior.

Fusion science shares many issues with plasma science. For Magnetic Fusion Energy (MFE) these include: (1) chaos, turbulence, and transport; (2) stability, magnetic reconnection, and dynamos; (3) wave-particle interaction and plasma heating; and (4) sheaths and boundary layers. Progress in all of these fields is likely to be required for ultimate success in achieving a practical fusion energy source. For Inertial Fusion Energy (IFE) the two major science issues are: (1) high energy density physics that describes intense laser-plasma and beam-plasma interactions, and (2) non-neutral plasmas, as in seen in the formation, transport, and focusing of intense heavy ion beams.

The largest component of the Science subprogram is research that focuses on gaining a predictive understanding of the behavior of the high temperature, high-density plasmas typically required for fusion energy applications. The tokamak magnetic confinement concept has thus far been the most effective approach for confining plasmas with stellar temperatures within a laboratory environment. Many of the important issues in fusion science are being studied on the two major U.S. tokamak facilities, DIII-D at General Atomics and Alcator C-Mod at the Massachusetts Institute of Technology. In addition to the advanced toroidal research on DIII-D and Alcator C-Mod, exploratory work is conducted on two university tokamak experiments, the High Beta Tokamak (HBT) at Columbia University and the Electric Tokamak (ET) and UCLA.

The next largest research component is work on alternative concepts, aimed at extending fusion science and identifying concepts that may have favorable stability or transport characteristics that could improve the economic and environmental attractiveness of fusion energy sources. The largest element of the alternative concepts program is the NSTX at the Princeton Plasma Physics Laboratory. Exploratory research will also continue on more than a dozen small-scale, alternative concept devices and basic science experiments, focusing on the scientific topics for which each experiment is optimized. These include, but are not limited to, the Madison Symmetric Torus at the University of Wisconsin, The Levitated Dipole Experiment, a joint Massachusetts Institute of Technology/Columbia University program, and the Magnetic Reconnection Experiment at the Princeton Plasma Physics Laboratory.

An entirely different set of science explorations is being carried out in the area of high energy density plasma physics, the underlying field for Inertial Fusion Energy (IFE). Efforts in IFE in OFES focus on understanding the physics of systems that will be needed to produce a viable inertial fusion energy source. These include heavy ion beam systems for heating and compressing a target pellet to fusion conditions, the experimental and theoretical scientific basis for modeling target chamber responses, and the physics of high-gain targets.

The theory and modeling program provides the conceptual underpinning for the fusion sciences program. Theory efforts meet the challenge of describing complex non-linear plasma systems at the most fundamental level. These descriptions range from analytic theory to highly sophisticated computer simulation codes, both of which are used to analyze data from current experiments, guide future experiments, design future experimental devices, and

assess projections of their performance.

The general plasma science program supports basic plasma science and engineering research and advances the discipline of plasma physics. Topics explored include a broad range of fundamental research efforts in wave-plasma physics, dusty plasmas, non-neutral plasmas, and boundary layer effects.

Fusion Technology Component

The technology subprogram develops the cutting edge technologies that enable current fusion research facilities to achieve their goals and explores innovations that are needed to create attractive visions of designs and technologies for future fusion experiments and energy systems. There are two major elements of this subprogram: Engineering Research and Materials Research.

The Engineering Research element is responsible for developing the enabling R&D for both magnetic and inertial fusion energy systems for both the near term and longer term. The activities in this element focus on critical technology needs for enabling both current and planned U.S., as well as foreign plasma experiments, to achieve their research goals and full performance potential, with emphasis on the following technologies: superconducting magnets, plasma heating, fueling, and surface protection. The R&D effort on these technologies extends from evolutionary development advances in present day capabilities to research on next-generation technologies that will make it possible to enter new plasma experiment regimes with advanced plasma control capabilities.

For the longer-term, basic research is conducted on both magnets and inertial fusion chamber concepts for potentially attractive fusion energy systems and on critical issues of the technologies that will be needed in these concepts, such as heat removal, tritium breeding, control and processing, and safety which are important for both magnetic and inertial concepts and target production and tracking for inertial fusion concepts only. Another important activity is conceptual design of the most scientifically challenging systems for next-step fusion research facilities as well as future power plants. Also included are analysis and studies of critical scientific and technological issues, the results of which will provide guidance for optimizing future experimental approaches and for understanding the implications of fusion research on applications to fusion energy.

The Materials Research element focuses on the key science issues of materials for practical and environmentally attractive uses in both magnetic and inertial fusion research facilities, and for the longer-term, fusion energy systems. This element continues to strengthen its modeling and theory activities, which makes it more effective at using and leveraging the substantial work on nanosystems and computational materials science begin funding elsewhere. This element also conducts irradiation testing of candidate fusion materials in the simulated fusion environments of fission reactors to provide data for validating and guiding the development of models for fusion materials.

ELIGIBILITY

Students who meet either of the conditions listed below are eligible to apply for the Fusion Energy Sciences Fellowship Program:

- 1) Students applying to graduate school with undergraduate degrees in engineering, the physical sciences, mathematics or a related discipline.
- 2) Current graduate students are eligible to apply providing that when the fellowship begins on September 1, 2005, **they will not have progressed beyond the end of the 2nd year of graduate studies.**

Appropriate Undergraduate Majors

Applied Mathematics	Electrical Engineering	Metallurgical Engineering
Applied Physics	Engineering Physics	Metallurgy
Chemical Engineering	Materials Science	Nuclear Engineering
Chemistry	Mechanical Engineering	Physics

Students must be planning full-time, uninterrupted study toward a Ph.D. degree. No other graduate degrees in the physical sciences, engineering, or mathematics may have been completed before application to this program.

Applicants must be either U.S. citizens or permanent resident aliens. It is the policy of Oak Ridge Institute for Science and Education to recruit and select participants without regard to race, age, gender, religion, color, national origin, physical or mental disability, or special disabled or Vietnam Era veteran status.

FELLOWSHIP TENURE

The award is limited to a maximum of 36 months and must be renewed each year. Renewal of the fellowship is based on excellent academic progress and research consistent with the DOE Fusion Energy Sciences mission.

APPLICATION DEADLINE

Application forms will be available from approximately September to January of each year. Applications from previous years or from other fellowship programs may not be used. Completed applications will be accepted until the last Monday in January for fellowships beginning the following September. An application is made up of:

Background Information and References (3 Requested)
Statement of the Applicant's Academic and Career Goals
List of Current and Planned Courses
Current Transcript and GRE Scores

Please note: **All parts of the application must be received at Oak Ridge Institute for Science and Education by January 31, 2005.** GRE scores are **required** for a complete application. Late and/or incomplete applications will not be reviewed for awards. GRE scores earned before October 1981 will not be accepted.

Completed Applications

Mail completed applications to:

Fusion Energy Sciences Fellowship Program

Oak Ridge Institute for Science and Education

Science and Engineering Education

120 Badger Avenue, MS 36

Oak Ridge, Tennessee 37831-0117

Attention: Debbie Alcorn

Please include the fellowship program name on **all** of your correspondence to Oak Ridge Institute for Science and Education. ORISE administers many different fellowships for the Department of Energy and mail without the program name included in the address may be delayed.

If you have questions about the application or need additional information, please call Debbie Alcorn at (865) 576-3428 or e-mail her at alcornd@ornl.gov. Again, please identify the program name when requesting materials or information.

FELLOWSHIP OBLIGATIONS

Enrollment. During the fellowship period, fellows are expected to be registered and enrolled as full-time graduate students, conducting study and research within the objectives of the fellowship program. During the summer, students should be conducting full-time research related to the completion of their degree, be enrolled in classes, or be on practicum assignments. Fellows are required to participate in a practicum for at least three months at a DOE facility to gain hands-on experience.

Terms and Agreements. Each fellow must agree to the conditions contained in the letter of appointment and its accompanying "Terms of Appointment." A fellow also agrees to entertain employment with DOE or one of its contractors at the end of a fellow's academic program should a reasonable offer be extended.

Annual Renewal of Fellowship. During the fellowship appointment period, fellows will be required to complete Fellowship Renewal Forms regarding academic performance and course of study. These forms are completed in January of each year. In addition, continuing evaluation of the fellowship program continues for five years after the fellow has completed the program. Fellows must inform **ORISE** of their current addresses and must complete any evaluation/assessment questionnaires sent by ORISE for program information and/or evaluation.

Practicum. Each fellow is required to complete a three-month practicum at a DOE facility. The practicum is normally held during the summer at the end of the first academic year. To encourage a broad range of experience, a practicum assignment will ordinarily only be approved for a practicum facility more than 50 miles from the fellow's university.

Programs at Participating Universities. Fellowship awardees must attend a university designated as a participating university in the Fusion Energy Sciences Fellowship Program. A list of participating universities and University Fellowship Coordinators is included in this booklet. Fellowship Coordinators may be contacted directly by interested applicants for in-depth information on their fusion programs. All participating universities must undergo an application process and a university's inclusion on the participating university list represents the Department of Energy's acknowledgment of the strength of its program. **Note: Fellowships may only be held at DOE-specified institutions appearing on this list.**

Applicants should list more than one university preference on the FES fellowship application form. Awards are distributed geographically and only a limited number of awardees may hold appointments at a particular university at any given time. Should an award not be available at the applicant's first choice university, an award may be offered at the second-choice university listed on the application. If an applicant's university preferences change after the application is submitted, ORISE must be notified immediately.

EVALUATION OF APPLICATIONS

When an application is received the staff at ORISE checks it to ensure that the applicant meets the basic criteria and has returned all application materials. If time permits, staff will attempt to contact applicants who have submitted incomplete applications. **However, it is the applicant's responsibility to check with ORISE to ensure that the application is complete.**

After an application is checked and designated complete it is submitted, along with all other complete applications, to a review panel. The review panel is composed of university and laboratory personnel who are directly responsible for instruction and research in the area of fusion energy. The panel reviews each application and recommends award recipients. Applications are reviewed on the basis of grades, courses taken, GRE scores, career and goals statement, and references. Other factors, including geographical criteria and professional personnel needs of the DOE Fusion Energy Sciences Program, are also considered. DOE reviews the applications and the panel's recommendations and approves the final selection.

The number of awards given each year is dependent on the number of graduating fellows currently in the program and on the funding available. The number of fellows at each institution is limited so it is important that applicants select more than one university when listing their university preferences on the FES Student Application. Some applicants who do not receive awards are selected for "Honorable Mention" status. This status recognizes their achievements and places them on a list for a possible award should additional funding become available.

After DOE approves the award recipients, ORISE notifies applicants of their award status. Notification usually occurs in mid-April. Once fellowships are awarded, Oak Ridge Institute for Science and Education handles the administration of the fellowship for DOE. Questions about stipends, payment of tuition and fees, practicum assignments, travel, etc. should be referred to ORISE during a student's fellowship tenure.

PROGRAM BENEFITS

Stipends

Fellows receive a monthly stipend in the amount of \$1,650. The fellow's basic stipend is augmented by \$750 (prorated) each month during the practicum. Stipends for fellows are mailed or direct deposited on the last business day of each month.

The Department of Energy attempts to provide adequate funding to its fellowship participants for meeting the costs of graduate school. **If the fellow accepts a research assistantship or other responsibilities, ORISE must be informed in advance and any resulting income will be deducted from the fellow's stipend.** However, the fellowship participant may accept scholarship awards, prizes, and other payments (including Veteran's benefits) that do not require a service.

Tuition and Fees

The fellow's required tuition and fees are paid by ORISE directly to the participating university upon receipt of invoice. Optional, refundable and penalty fees (such as late registration and duplication fees) are not payable by ORISE. Health insurance fees will be paid by ORISE only if they are certified to be required for all graduate students. All tuition and fee charges must be certified as consistent with those made to regular graduate students and necessary for enrollment into the graduate program.

In August of each year, ORISE notifies the bursar's office at each university regarding procedures of invoicing for fellowship students. Students will receive a copy of this correspondence and should retain this copy for use in discussing any billing errors with their university's bursar office.

Practicums

Fellows are required to serve one practicum of at least three months in duration and may serve more than one practicum if funding is available. Travel expenses will be reimbursed for the fellow for one round trip to/from the practicum site - providing that the distance is more than 50 miles one way from the fellow's university. Transportation expenses for travel actually performed will be paid. Travel by private automobile will be reimbursed at the current ORISE rate per mile; travel by air will be reimbursed at the cost of the lowest commercial airfare. No expenses are paid for food or lodging enroute to the practicum site. All travel must be authorized in advance by ORISE.

Conference Travel

Fellows have the opportunity, depending upon the availability of funding, to attend national or international fusion conferences. Conference travel is approved only when the student is presenting a paper or poster. Normally, only two trips of this nature are approved for each fellow.

Thesis Research at Participating DOE Centers

A fellow may request to spend all or part of the time working on thesis/dissertation research at one of the participating DOE facilities. To request off-campus research, a fellow should complete a request form (available from ORISE) and have it endorsed by the faculty advisor, university coordinator, and DOE facility coordinator. The faculty advisor must agree to continue to supervise the fellow's progress throughout the research work and must participate in the necessary coordination with DOE facility personnel. The faculty advisor will be reimbursed for travel expenses, in accordance with ORISE Travel Policy, for one round trip to the facility for supervision and coordination of the research.

Travel expenses for one round trip to/from the research facility will be reimbursed for the fellow providing that

the distance is more than 50 miles one way. Travel expenses will also be reimbursed for one round trip to/from the facility for the fellow to consult with the university graduate committee and/or to present a seminar on results of the thesis research.

A research advisor from the DOE facility should be assigned by the facility for the fellow. This advisor should also be nominated for appointment to the fellow's graduate thesis research committee.

Publication Acknowledgment

DOE and ORISE encourage fellows to publish reports and articles in scientific and engineering journals. The fellow must submit any articles, reports, or thesis to ORISE for patent review only, concurrently with the submission for publication. All publications will show the joint affiliation of the fellow with the university and, if appropriate, with the laboratory in which the research was conducted.

Fellowship support should be acknowledged in the following manner:

The research was performed under appointment to the Fusion Energy Sciences Fellowship Program administered by Oak Ridge Institute for Science and Education under a contract between the U.S. Department of Energy and the Oak Ridge Associated Universities

PARTICIPATING UNIVERSITIES

Please contact the Fusion Energy Sciences Coordinators at the universities listed below to learn more about the fusion technology or fusion and plasma physics programs available at each institution.

FUSION TECHNOLOGY UNIVERSITY COORDINATORS

UNIVERSITY OF CALIFORNIA - BERKELEY

Lisa Zemelman
University of California
Department of Nuclear Engineering
4149 Etcheverry Hall
Berkeley, CA 94720-1730

(510) 642-5760
FAX: (510) 643-9685
E-Mail: lisaz@nuc.berkeley.edu
<http://www.nuc.berkeley.edu>

GEORGIA INSTITUTE OF TECHNOLOGY

Professor Yogendra Joshi
Professor and Associate Chair for Graduate Studies
Georgia Institute of Technology
G.W. Woodruff School of Mech. Engineering
801 Ferst Drive
Atlanta, GA 30332-0405

(404) 894-3204
FAX: (404) 385-4545
E-Mail: joshi.gradprog@me.gatech.edu

UNIVERSITY OF ILLINOIS - URBANA/CHAMPAIGN

Dr. James F. Stubbins
Department of Nuclear, Plasma and
Radiological Engineering
University of Illinois
Fusion Studies Laboratory
214 NEL, MC234
103 South Goodwin Avenue
Urbana, IL 61801

(217) 333-6474
FAX: (217) 333-2906
E-Mail: jstubbins@staff.uiuc.edu

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Dr. Richard Temkin
Massachusetts Institute of Technology
167 Albany Street, NW16-186
Cambridge, MA 02139

(617) 253-5528
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UNIVERSITY OF MICHIGAN

Dr. Ronald M. Gilgenbach
Department of Nuclear Engineering
& Radiological Sciences
University of Michigan
1941 Cooley Building
2355 Bonisteel Blvd.
Ann Arbor, MI 48109-2104

(734) 763-1261
FAX: (734) 763-4540
E-Mail: rongilg@engin.umich.edu

UNIVERSITY OF WISCONSIN - MADISON

Professor Gerald Kulcinski
Dept. of Engineering Physics
University of Wisconsin-Madison
1500 Engineering Drive
Madison, WI 53706

(608) 263-2308
FAX: (608) 263-4499
E-Mail: kulcinski@enr.wisc.edu

FUSION SCIENCE UNIVERSITY COORDINATORS

AUBURN UNIVERSITY

Dr. James Hanson
Department of Physics
107 Allison Laboratory
Auburn University
Auburn, AL 36849-5311

(334) 844-5044
FAX: (334) 844-4613
E-Mail: hanson@physics.auburn.edu

CALIFORNIA INSTITUTE OF TECHNOLOGY

Dr. Paul Bellan
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1200 E. California Blvd.
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http://ve4xm.caltech.edu/Bellan_plasma_page/

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UNIVERSITY OF CALIFORNIA - IRVINE

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UNIVERSITY OF CALIFORNIA – LOS ANGELES

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UNIVERSITY OF CALIFORNIA-SAN DIEGO

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COLUMBIA UNIVERSITY

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(212) 854-4455
FAX: (212) 854-8257
E-Mail: mauel@columbia.edu

UNIVERSITY OF MARYLAND

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College Park, MD 20742-3511

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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167 Albany Street, NW16-186
Cambridge, MA 02139

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PRINCETON UNIVERSITY

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RENSSELAER POLYTECHNIC INSTITUTE

Dr. Paul M. Schoch
Electrical, Computer, and Systems
Engineering Department
Rensselaer Polytechnic Institute
Troy, NY 12180-3590

(518) 276-6072
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E-Mail: schoch@ecse.rpi.edu

THE UNIVERSITY OF TEXAS AT AUSTIN

Dr. Philip Morrison
Institute for Fusion Studies
The University of Texas at Austin
RLM 11.314, Speedway & Dean Keeton
Austin, TX 78712

(512) 471-1527
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E-Mail: morrison@physics.utexas.edu

UNIVERSITY OF WASHINGTON

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WEST VIRGINIA UNIVERSITY

Dr. Earl Scime
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UNIVERSITY OF WISCONSIN - MADISON

Dr. David T. Anderson
HSX Plasma Laboratory
University of Wisconsin-Madison
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Madison, WI 53706

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FUSION ENERGY SCIENCES FELLOWSHIP PROGRAM
Participating Practicum Centers and Center Coordinators

FUSION TECHNOLOGY PRACTICUM COORDINATORS

ARGONNE NATIONAL LABORATORY, Dr. Dale L. Smith, (630) 252-4837, dale-smith@qmgate.anl.gov

GENERAL ATOMICS, Ms. GERALYN M. KOEHLER, (858) 455-2114, geraldyn.koehler@gat.com

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY, Dr. Dave Petti, (208) 526-7735,
petti@inel.gov

LAWRENCE LIVERMORE NATIONAL LABORATORY, Dr. Ronald H. Cohen, (925) 422-9831, cohen2@llnl.gov

LOS ALAMOS NATIONAL LABORATORY, Dr. Richard Siemon, (505) 667-7857, rsiemon@lanl.gov

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Dr. Richard Temkin, (617) 253-5528, temkin@psfc.mit.edu

OAK RIDGE NATIONAL LABORATORY, Dr. E. Fred Jaeger, (865) 574-1316, jaegeref@ornl.gov

PACIFIC NORTHWEST NATIONAL LABORATORY, Ms. Michelle L. Nichols, (509) 375-2476,
michelle.nichols@pnl.gov

PRINCETON PLASMA PHYSICS LABORATORY, Dr. Samuel A. Cohen, (609) 243-3185, scohen@pppl.gov

SANDIA NATIONAL LABORATORIES-CALIFORNIA, Dr. Rion Causey, (925) 294-3326, causey@ca.sandia.gov

SANDIA NATIONAL LABORATORIES-NEW MEXICO, Dr. Dennis Youchison, (505) 845-3138, dlyouch@sandia.gov

FUSION SCIENCE PRACTICUM COORDINATORS

UNIVERSITY OF CALIFORNIA - LOS ANGELES, Dr. Nasr M. Ghoniem, (310) 825-4866, ghoniem@ucla.edu

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LOS ALAMOS NATIONAL LABORATORY, Dr. Alan Glasser, (505) 667-7723, aglasser@lanl.gov

UNIVERSITY OF MARYLAND, Dr. Bill Dorland (301) 405-1608, bdorland@ipr.umd.edu

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Dr. Miklos Porkolab, (617) 253-8448, porkolab@psfc.mit.edu

OAK RIDGE NATIONAL LABORATORY, Dr. E. Fred Jaeger, (865) 574-1316, jaegeref@ornl.gov

PRINCETON PLASMA PHYSICS LABORATORY, Dr. Nathaniel J. Fisch, (609) 243-2643, fisch@princeton.edu

UNIVERSITY OF TEXAS AT AUSTIN, Dr. Philip J. Morrison, (512) 471-1527, Morrison@physics.utexas.edu

UNIVERSITY OF WISCONSIN, Dr. Stewart Prager, (608) 262-7768, scprager@facstaff.wisc.edu

WEST VIRGINIA UNIVERSITY, Dr. Earl Scime, (304) 293-3422, ext. 1437, escime@wvu.edu

STUDENT APPLICATION

COMPLETING THE FELLOWSHIP APPLICATION FORM

The fellowship application contains several sections. It is important that you fill out the sections accurately.

Student Data Section

*All of the following components are **REQUIRED** for a complete application:*

- X **College/University and School Residence** - complete these sections for the school that you are currently attending. Write "N/A" (not applicable) if you are not currently enrolled in a college or university. If your permanent address is the same as your school address write "same" on the permanent address line.

- X **Telephone Number** - a telephone number is requested for both your school and permanent residence. Please make sure that the telephone numbers listed are current. ORISE should be notified if your telephone number changes after your application is submitted.

- X **Educational Information** - list all the universities that you have attended. If you are currently enrolled in a graduate program, be sure to include it and your anticipated graduation date. **Transcripts should be provided for each university listed.** If you are already in graduate school, the undergraduate transcripts should clearly indicate completion of an undergraduate degree.

- X **GPA** - if university grading scale is other than 4.0 (for example, 5.0 or 6.0) please compute to 4.0.

- X **GRE** - list GRE scores if available at the time of application. GRE scores are **required** for a complete application. However, an official copy is still needed for the application file. Applicants should designate Oak Ridge Institute for Science and Education as a score report recipient, code number 1590, department number 00. **Because of testing schedules and deadlines, applicants are advised to seek GRE testing information early.** The generally scheduled test dates in October and December are acceptable; however, test scores from the February date will not be received in time for the application review.

- X **Participating University Choices** - select two university choices from the list of participating universities contained in this booklet. Whenever possible, a fellowship participant will be offered an appointment at the first choice university. Occasionally, however, the fellowship appointment may be offered at the second choice university. If an applicant's university preferences change after the application is submitted, ORISE must be notified immediately.

Note: Selecting universities on the FES application is in no way related to completing an application for entrance to a graduate program at a specific university.

Current and Planned Courses

List current academic year courses as well as planned courses for next year. For example, a graduating senior would list, in the first half of the table, all of the courses taken during the senior year. In the bottom half of the table, the courses planned for the first year of graduate school would be listed. If you do not know what courses you will take during your first year of graduate school, you should contact the coordinator at your first choice university to obtain a listing.

Statement of Career and Academic Goals and Objectives

Do not exceed more than one sheet for your career statement.

References

Three reference forms are enclosed. Please remember that references must be returned to ORISE by the application deadline.

Applications for Other Programs

ORISE administers many other programs for the Department of Energy. Due to the large number of applications received, we can no longer make copies of an applicant's material in one applicant file for use in another program file. **If applying to more than one program, an applicant must submit separate application materials for each program. This includes transcripts and reference forms. Only GRE scores will be copied for the files.** While this represents a change in policy from previous years, it provides more control to the applicant in ensuring that each application file is complete for each program.

Note: All parts of the application (including GRE scores) must be received at Oak Ridge Institute for Science and Education by the last Monday in January. Late or incomplete applications will not be reviewed for awards.

**FUSION ENERGY SCIENCES
GRADUATE FELLOWSHIP PROGRAM**

NOTIFICATION OF INTENT TO APPLY

Please fax or mail this notification form to the address below as soon as possible after receiving this application form. Receipt of this form will alert the FES Graduate Fellowship Office to expect an application from you. (NOTE: You may also e-mail the information requested to the FES Graduate Fellowship Office at the e-mail address listed below).

The FES Graduate Fellowship Office will place your notification on file and will contact you if your application is not complete by January 31, 2005.

NAME: _____
First M.I. Last Ext.

Please contact me regarding questions on my application at the following:

ADDRESS: _____
Street Address City State Zip

PHONE: _____ **FAX (if available):** _____

E-MAIL: _____

*Please determine which component of the FES Fellowship Program you will be applying to by placing a check in the appropriate space provided below:

Fusion Science or **Fusion Technology**

Return this form to:

**Debbie Alcorn
FES Fellowship Program
Oak Ridge Institute for Science and Education
120 Badger Avenue, MS 36
Oak Ridge, TN 37831-0117**

**Phone: (865) 576-3428
Fax: (865) 241-5219
E-Mail: alcornd@ornl.gov**

FES APPLICATION CHECKSHEET

<p>This checklist is provided to assist applicants in accurately completing the application.</p>	/
The application form is either typed or printed neatly in black ink.	
I have provided an address at which I may be reached after the completion of the Spring 2005 semester (page 1).	
If a Permanent Resident Alien, a copy of my Alien Registration Card (both sides) is attached (page 1).	
I have requested transcripts to be sent to ORISE from each college or university I have attended (page 2).	
The undergraduate cumulative GPA I listed is a GPA from ALL undergraduate universities I have attended (page 2).	
The graduate cumulative GPA I listed is a GPA from ALL graduate universities I have attended (page 2.)	
I have or will soon be taking the Graduate Record Examination (page 2) which is required for this application.	
I have defined my first- and second-choice universities. I have labeled my first choice with a 1 and my second choice with a 2 in the left hand space. I have also listed the proposed academic discipline and specific topic of interest for my first-and second-choice universities (page 3).	
I understand that I must notify ORISE IMMEDIATELY if I wish to change my first- and second-choice universities. I also understand that once my application has been reviewed, I may not change my preferences (page 3).	
I have listed 3 individuals in the references section of the application and I have given those individuals the reference forms to fill out and return to ORISE. I understand that if these reference forms are not received by ORISE by the application deadline, my application will be considered incomplete and I will not be considered for a fellowship award (page 4).	
I have included page 6 in my application packet even if I have not attended graduate school. I have marked the page with N/A if I have not yet taken graduate courses.	
I have computed the overall GPA for all science, math and engineering courses and have included it at the bottom of pages 5 and 6.	
I have filled out the Planned Courses section of the application with all planned courses for the 2005-06 academic year (page 7). THIS IS MANDATORY FOR A COMPLETE APPLICATION.	
I understand the purpose of the fellowship program and have written my statement of career goals accordingly. On my statement I have included my signature (page 8).	
I do not have to submit the Applicant Data Sheet, but I understand that this information will not be given to those who will be evaluating my application and the information I provide will help ORISE assess their effectiveness in distributing application to a diverse population.	
I have included the FES Fellowship Survey Form in my application packet.	

**U.S. Department of Energy
Fusion Energy Sciences Fellowship Program
Fellowship Application**

Instructions: Refer to the current fellowship program description before completing the application. Please note the deadlines for the receipt of application materials by Oak Ridge Institute for Science and Education (ORISE). *Type or print all information clearly.*

The following application components are REQUIRED:

1. Fellowship Application Form
2. Current Official Transcript(s) from each university attended and Course Sheets
Note: Transcript(s) must be mailed by the university to the address listed. If the applicant has already received a degree, the transcript should show evidence of the completion of the degree program.
3. Statement of Career and Academic Goals and Objectives
4. Three (3) Reference Forms. Have forms completed by faculty members and mailed directly to the address below. To return a reference form with the application packet, the applicant should have the person providing the reference place the form in an envelope, seal it and sign across the seal.
5. Graduate Record Examination (GRE) Scores. **No application will be reviewed without official GRE scores.** Have the Educational Testing Service send your GRE general aptitude scores directly to the address below. Seek GRE information promptly to ensure timely receipt of test results.

Please make sure that you have completed all parts of the application, including your signature where requested. **Keep a copy of this application and supporting materials for your files.**

Deadline – January 31, 2005

All information must be submitted by the application deadline. It is the applicant's responsibility to check with the Oak Ridge Institute for Science and Education, FES office regarding the completeness of the application file. Incomplete applications will not be reviewed. **Any changes to the university preferences must be communicated to ORISE immediately.**

Applications for Other Programs

ORISE administers many programs for the Department of Energy. **If applying for more than one program, an applicant must submit separate application materials for each program. This includes transcripts and reference forms. Only GRE scores will be copied for files.**

Return the completed application and any correspondence to:

**Fusion Energy Sciences Fellowship Program
Oak Ridge Institute for Science and Education
Attention: Debbie Alcorn
120 Badger Avenue, MS 36
Oak Ridge, Tennessee 37831-0117**

**Telephone: (865) 576-3428
Fax: (865) 241-5219
E-mail: alcornd@ornl.gov**

Application information will be used solely for the purpose of selecting fellows and administering the program. Disclosure of this information is made subject to Public Law 93-579 (the Privacy Act of 1974) and U.S. Department of Energy Regulations as published in the Federal Register on September 30, 1977, ff.

APPLICANT DATA

Applicant data is important in assessing the effectiveness of our efforts to solicit applications from a diverse population. Your completion and submission of this form will assist use in this regard, however, your failure to do so will not affect our decision regarding your application. We appreciate your cooperation:

RACE

- Caucasian (*Having origins in any one of the original peoples of Europe, North Africa, or the Middle East*)
- African American (*Having origins in any of the Black peoples of Africa*)
- Hispanic (*Of Mexican, Puerto Rican, Cuban, Central/South American or other Spanish culture of origin, regardless of race*)
- American Indian (*Having origins in any of the original peoples of North America, and maintaining cultural identification through tribal affiliation or community recognition*)
- Asian or Pacific Islander (*Having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Island - for example, India, China, Japan, Koreas, Philippine Islands, and Samona*)

SEX Female Male

BIRTHDATE

Month/Day/Year

Physical/Mental handicap (*physical or mental impairment that substantially limits one or more major life activities - for example, blindness, deafness, or mobility impairment*): Yes No

**U.S. DEPARTMENT OF ENERGY
FUSION ENERGY SCIENCES FELLOWSHIP PROGRAM
STUDENT APPLICATION**

STUDENT DATA (Please type or print using black ink)

Name _____
(First) (Middle) (Last) (Ext)

Social Security Number _____

Current Academic Status: Undergraduate Student
 Graduate Student
 Baccalaureate Recipient Not Currently Enrolled
 Other

Number of Years of Graduate studies (all disciplines and years) that will be completed by September 1, 2005
(*Graduate Students who will have progressed beyond the end of their second year of graduate school studies by September 1, 2005 are not eligible to apply.*)

COLLEGE/UNIVERSITY _____

Department _____ Major _____
City _____ State _____ Zip _____ Phone _____
_____ (e-mail address)

SCHOOL RESIDENCE _____
City _____ State _____ Zip _____ Phone _____
_____ (e-mail address)

Address effective through: _____ After this date, all correspondence will be sent to the permanent address listed below unless otherwise requested.

PERMANENT ADDRESS

City _____ State _____ Zip _____ Phone _____

FAX NUMBER: _____

E-MAIL: _____

CITIZENSHIP

U.S. Citizen: Yes No If no, are you a Permanent Resident Alien: Yes No

If PRA, Country _____ PRA Number _____

Country of Birth _____ Port of Entry _____

Attach copy of Alien Registration Receipt Card (both sides)

DEGREE PROGRAM

Ph.D. degree expected (date) _____

DISCIPLINE AREA: (choose one) Fusion Technology _____ Fusion Science _____

EDUCATION

List Technical Schools, Universities/Colleges. Begin with most current institution. Please submit transcripts from each institution listed below.

Undergraduate Institution(s)

INSTITUTION	DATES ATTENDED	MAJOR	DEGREE RECEIVED/EXPECTED	MONTH/YEAR	GPA

Graduate Institution(s)

INSTITUTION	DATES ATTENDED	MAJOR	DEGREE RECEIVED/EXPECTED	MONTH/YEAR	GPA

GRADE POINT AVERAGE

List the **cumulative** undergraduate and graduate GPAs for all institutions listed above. Use 4.0 scale to compute (A=4, B=3, C=2, D=1). If your institution uses a different grading scale other than 4.0 (for example, 5.0 or 6.0) recompute to 4.0. Please round to two decimal places (for example: 3.55 or 3.90).

Undergraduate Cumulative GPA _____ (Include all institutions attended)

Graduate Cumulative GPA _____ (Include all institutions attended)

GRADUATE RECORD EXAMINATION (REQUIRED)

Verification of these scores is required. (Note: Official Graduate Examination (GRE) Scores must be sent directly by the Educational Testing Service to ORISE/Fusion Energy Sciences Fellowship Program. ORISE's Institution Code is 1590, Dept. 00). The GRE is required for all applicants.

GRE TEST RESULTS TEST TAKEN/TO BE TAKEN (DATE)

EXAMINATION	SCORE	PERCENT (%)
Verbal		
Quantitative		
Analytical		

Have you taken or passed the first set of competency graduate exams in your discipline that is required at your academic institution [] Yes; [] No. If yes, please list the name of this exam and the date you passed it.

[] Taken; [] Passed Date Passed _____

Name of Exam _____

PARTICIPATING UNIVERSITY

Place a 1 beside the university of your first choice and a 2 beside the university of your second choice. Notice that there are designated schools for the fusion technology component and designated schools for the fusion science component of the FES Fellowship Program. *If, after submitting this application, you change your preferred university, please notify ORISE immediately. Failure to do so will jeopardize your award status.*

FUSION TECHNOLOGY	FUSION SCIENCE
<input type="checkbox"/> University of California - Berkeley <input type="checkbox"/> Georgia Institute of Technology <input type="checkbox"/> University of Illinois <input type="checkbox"/> Massachusetts Institute of Technology <input type="checkbox"/> University of Michigan <input type="checkbox"/> University of Wisconsin-Madison	<input type="checkbox"/> Auburn University <input type="checkbox"/> California Institute of Technology <input type="checkbox"/> University of California-Berkeley <input type="checkbox"/> University of California-Irvine <input type="checkbox"/> University of California-Los Angeles <input type="checkbox"/> University of California-San Diego <input type="checkbox"/> Columbia University <input type="checkbox"/> University of Maryland <input type="checkbox"/> Massachusetts Institute of Technology <input type="checkbox"/> Princeton University <input type="checkbox"/> Rensselaer Polytechnic Institute <input type="checkbox"/> University of Texas-Austin <input type="checkbox"/> West Virginia University <input type="checkbox"/> University of Washington <input type="checkbox"/> University of Wisconsin-Madison

List your academic discipline and topic of interest for your first- and second-choice universities.

FIRST UNIVERSITY CHOICE ACADEMIC DISCIPLINE	FIRST UNIVERSITY CHOICE TOPIC OF INTEREST
SECOND UNIVERSITY CHOICE ACADEMIC DISCIPLINE	SECOND UNIVERSITY CHOICE TOPIC OF INTEREST

EXTRACURRICULAR ACTIVITIES

Include technical societies and service organizations (*include offices held*)

ACADEMIC AWARDS AND HONORS

Include undergraduate and graduate honors (*if applicable*).

UNDERGRADUATE/ GRADUATE HONORS	UNDERGRADUATE OR GRADUATE	BRIEF DESCRIPTION

PUBLICATIONS AND PRESENTATIONS

List below all of your publications and presentations. If a presentation, list if it was oral or a poster.

TITLE	DATE	CONFERENCE/JOURNAL	POSTER OR ORAL

EMPLOYMENT RECORD

Begin with current or most recent employment.

EMPLOYER/JOB TITLE	FROM/TO	MAJOR AREAS OF RESPONSIBILITY

REFERENCES

List three persons familiar with your academic preparation and your technical capabilities. Please have these individuals transmit the attached reference forms directly to ORISE. A reference may be returned with the student application packet if it is placed in a sealed envelope with the reference's signature across the seal.

1.
2.
3.

CURRENT AND PLANNED COURSES

COURSES FOR THE CURRENT ACADEMIC YEAR (List all courses to be taken during the 2004-2005 school year.)

If you are not currently enrolled in school and all of your completed courses are listed on the transcript submitted with this application then the Current Courses section does not apply (indicate N/A).

University: _____

COURSE NAME Example: General Plasma Physics I	STATUS CP = COMPLETED C = CURRENT P = PLANNED	HOURS

THIS SECTION IS REQUIRED.

PLANNED COURSES FOR THE NEXT ACADEMIC YEAR (List all courses to be taken during the 2005-2006 school year.)

In this section, you should list courses totaling 18-24 hours of full-time study. If you are not currently enrolled in graduate school, it may be necessary for you to contact your first choice university to obtain the required first year courses. Please type or print clearly.

University: _____

COURSE NAME	COURSE NUMBER	HOURS

STATEMENT OF CAREER AND ACADEMIC GOALS AND OBJECTIVES

Submit a brief summary of your academic and career plans (**limit this summary to one typed page**). Indicate the relationship between these plans and the objectives of the fellowship program. For additional information, visit the Office of Fusion Energy Sciences web site at <http://www.foe.er.doe.gov/>. This statement should specifically address your interest and plans for pursuing research in fusion science or fusion technology.

If you are a 2nd year graduate student, please include a very clear description of any research you undertook in the first year of graduate school.

THIS STATEMENT IS VITAL TO THE OVERALL EVALUATION OF YOUR APPLICATION.

Signature _____ Date _____

My signature acknowledges that I am aware that this program is supported by funding from the United States Government, and therefore is subject to Federal law regarding false statements and fraud, particularly the criminal provisions of 18 U.S. code Section 1001. I certify, under the penalty of law, that the original submitted student application contains no false, fictitious or fraudulent representations, statements or entries.

Reference Form

Applicant (Please type or use black ink)

Last Name	First	Middle
How long and in what association have you known the applicant?		

In a group of 100 other science, engineering and math students of comparable age and experience, how would you rate the applicant with respect to the following PERSONAL CHARACTERISTICS?

	Below Average	Average	Above Average	Outstanding	Superior	Inadequate Observation
<i>Motivation Toward a Productive Career</i>						
<i>Growth During Total Period Observed</i>						
<i>Imagination and Originality of Thought</i>						
<i>Emotional Maturity and Stability</i>						
<i>Ability to Work with Others</i>						
<i>Independence and Self-Reliance</i>						
<i>Leadership Potential</i>						

In a group of 100 other science, engineering and math students of comparable age and experience, how would you rate the applicant with respect to the following SCIENTIFIC CAPABILITIES?

	Below Average	Average	Above Average	Outstanding	Superior	Inadequate Observation
<i>Mastery of Fundamental Knowledge in Field</i>						
<i>Skill/Originality of Research Project Design</i>						
<i>Laboratory Skill and Technique</i>						
<i>Ability to Communicate (Written/Oral)</i>						

Add any descriptive comments that will assist in providing a complete picture of the applicant's character, attitude, abilities, and potential for research. Please comment on both the applicant's weak and strong points. Use additional sheets if necessary.

COMMENTS:	
Signature:	Date:
Typed/Printed Name:	Title:
Address:	Phone:

RETURN TO: Fusion Energy Sciences Fellowship Program, Oak Ridge Institute for Science and Education, 120 Badger Avenue, MS 36, Oak Ridge, Tennessee 37831-0117, Attention: Debbie Alcorn; Phone: (865) 576-3428; Fax: (865) 241-5219

Reference Form

Applicant (Please type or use black ink)

Last Name	First Middle
How long and in what association have you known the applicant?	

In a group of 100 other science, engineering and math students of comparable age and experience, how would you rate the applicant with respect to the following PERSONAL CHARACTERISTICS?

	Below Average	Average	Above Average	Outstanding	Superior	Inadequate Observation
<i>Motivation Toward a Productive Career</i>						
<i>Growth During Total Period Observed</i>						
<i>Imagination and Originality of Thought</i>						
<i>Emotional Maturity and Stability</i>						
<i>Ability to Work with Others</i>						
<i>Independence and Self-Reliance</i>						
<i>Leadership Potential</i>						

In a group of 100 other science, engineering and math students of comparable age and experience, how would you rate the applicant with respect to the following SCIENTIFIC CAPABILITIES?

	Below Average	Average	Above Average	Outstanding	Superior	Inadequate Observation
<i>Mastery of Fundamental Knowledge in Field</i>						
<i>Skill/Originality of Research Project Design</i>						
<i>Laboratory Skill and Technique</i>						
<i>Ability to Communicate (Written/Oral)</i>						

Add any descriptive comments that will assist in providing a complete picture of the applicant's character, attitude, abilities, and potential for research. Please comment on both the applicant's weak and strong points. Use additional sheets if necessary.

COMMENTS:	
Signature:	Date:
Typed/Printed Name:	Title:
Address:	Phone:

Reference Form

Applicant (Please type or use black ink)

Last Name	First Middle
How long and in what association have you known the applicant?	

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<i>Growth During Total Period Observed</i>						
<i>Imagination and Originality of Thought</i>						
<i>Emotional Maturity and Stability</i>						
<i>Ability to Work with Others</i>						
<i>Independence and Self-Reliance</i>						
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	Below Average	Average	Above Average	Outstanding	Superior	Inadequate Observation
<i>Mastery of Fundamental Knowledge in Field</i>						
<i>Skill/Originality of Research Project Design</i>						
<i>Laboratory Skill and Technique</i>						
<i>Ability to Communicate (Written/Oral)</i>						

Add any descriptive comments that will assist in providing a complete picture of the applicant's character, attitude, abilities, and potential for research. Please comment on both the applicant's weak and strong points. Use additional sheets if necessary.

COMMENTS:	
Signature:	Date:
Typed/Printed Name:	Title:
Address:	Phone:

FES FELLOWSHIP SURVEY FORM

Dear Applicant:

Please complete this form and return it with your fellowship application. The information that you provide will allow us to target our advertising more effectively. This information is confidential and is **not** used in review of the fellowship application.

1. How did you find out about the program?

Bulletin Board Announcement

Advertising in Journal (list name of journal)

Word of Mouth
from faculty student administrator

Laboratory Staff

Campus Recruitment

Institutional Announcement

Campus Newspaper

Conference or Meeting (list name of meeting)

Internet Site (please list name of site)

Other (please list) _____

2. Have you applied for other fellowship programs? Yes No
If yes, please check the source below:

From ORISE (names of fellowships)

From other sources

University-Sponsored (names of fellowships)

Other (NSF, DOD, etc.)
