

National Science Foundation

Industry/University Cooperative Research Centers Program

PROGRAM ANNOUNCEMENT

Introduction

The Industry/University Cooperative Research Centers (I/UCRC) Program was initiated in 1973 to develop long term partnerships among industry, academe and government. The National Science Foundation invests in these partnerships to promote research programs of mutual interest, contribute to the Nation's research infrastructure base and enhance the intellectual capacity of the engineering workforce through the integration of research and education.

The Centers are catalyzed by a small investment from NSF and are primarily supported by Center members, with NSF taking a supporting role in their development and evolution. The I/UCRC Program offers five-year awards to Centers that meet the I/UCRC Program requirements. This five-year period allows for the development of a strong partnership between the academic researchers and their industrial and government members. After five years, Centers that continue to meet the I/UCRC Program requirements may apply for a second five-year award. These awards allow Centers to continue to grow and diversify their industrial membership. After ten years, the Centers are expected to be fully supported by industrial, other Federal agency, and state and local government partners.

Defining Characteristics of an I/UCRC

A Center in the I/UCRC Program:

- develops a partnership among academe, industry and other organizations participating in the Center;
- consults with Center members to set a research agenda focused on shared research interests and opportunities;
- shares the intellectual property developed by the Center equally among Center members;
- has Center members monitor and advise on the progress of the research, which speeds two-way transfer of knowledge between universities and industry;
- has industrial and other partners that are the primary financial resource for the Center;
- has a formal structure and policies for Center members outlined in an I/UCRC membership agreement;

- relies primarily on graduate student involvement in the research projects, thus developing students who are knowledgeable in industrially relevant research;
- has a Center Director, based at a university or college, who is responsible for all Center activities; and
- has formal evaluation of the partnership conducted by an independent evaluator.

Eligibility

Universities and colleges with sufficient research and graduate education capabilities are eligible as lead institutions for I/UCRC Program support. Since a comprehensive range of disciplines and skills is necessary to address the research issues of interest to industry, a critical mass of interdisciplinary research capabilities is required to form a Center. In order to ensure a sufficiently broad base of research expertise, multiple universities or colleges are encouraged to partner in forming a Center. Each partner university or college is expected to attract industrial support to the Center.

I/UCRC Program Operational Requirements

Non-NSF Support

To be eligible for the I/UCRC Program, a Center is required to obtain a total of at least \$300,000 annually in cash membership fees from a minimum of six Center members. This is the minimum funding needed to support a vital research agenda and to ensure the Center can support a number of students and research projects. The minimum number of members required produces a critical mass of partners and encourages a more generic research program. In general, Center members are industrial firms, although some may be other organizations such as Federal agencies. A Center may designate a number of membership categories with varying levels of membership fees and member benefits. However, there must be at least one membership category with membership fees of \$25,000 or higher per year with at least three members participating in the Center at that level. Other membership categories with lower fees may be designated to encourage small company participation in the Center.

University cost sharing is required for a Center in the I/UCRC Program.

Center Policies and Management

A Center differs from a group of researchers performing collaborative research in that it has a formal structure that encompasses a substantial number of projects, several investigators and a group of students whose research is part of the Center. For Centers in the I/UCRC Program, this structure includes a management organization and policies that are outlined in a membership agreement signed by all Center members. The membership agreement delineates policies dealing with intellectual property rights, publication delays, membership fees and rights, university cost sharing, etc. A sample membership agreement, which may be used as a guideline, is available on the I/UCRC web site at <http://www.eng.nsf.gov/eec/i-ucrc.htm>.

In order to integrate the research skills and desires of Center faculty and the research needs of the Center members, a successful Center in the I/UCRC Program has the following management structure:

- A Director who is responsible for all aspects of Center operation. The Center Director is the NSF Principal Investigator (PI) and has primary responsibility for administering the award in accordance with NSF's Grant General Conditions (GC-1) and the I/UCRC Program.
- An Industrial Advisory Board (IAB) that reviews ongoing and completed activities and selects new projects.
- A University Policy Committee that facilitates the operation of the Center within the university or universities to help assure recognition for participation in the Center in tenure and promotion decisions, and to assure that the research is appropriate for graduate education.

NSF Oversight and Evaluation

Operating Centers are required to submit a short annual report on progress and plans 90 days prior to the anniversary of their NSF award date. The report, which will be used as a basis for continued I/UCRC Program support, will include:

- major accomplishments for the Center's most recently completed fiscal year (i.e. scientific and technological developments and significant technology transferred to members);
- research goals for the current year;
- a short description of the processes used to interact and communicate with Center members (i.e. the project selection process used by the Center, reports generated, etc.);

- quantitative information from the most recently completed fiscal year such as number of students, faculty, and industrial members involved in the Center, degrees granted to students involved in Center activities, amounts and sources of income to the Center, and lists of patents, licenses and publications created;
- NSF budget forms, statement of fund obligation and statement of university cost-sharing; and
- a certification of the receipt of annual cash membership fees signed by the Center or Site Director and an official from the Sponsored Research Office.

NSF requires that the industry/university interaction of each Center be independently observed and evaluated during its operational phases by an independent evaluator, who is usually chosen from within the university but not from the department receiving Center funding. This gives both NSF and the Center's management feedback on the health and evolution of the partnership between Center researchers and members.

The Center evaluator is responsible for:

- preparing an annual review of Center activities with respect to industrial collaboration during the previous year (which is appended to the Center's annual report to NSF);
- conducting a survey (using an instrument common to all Centers) of all Center participants to probe the participant satisfaction with Center activities;
- compiling a set of quantitative indicators to analyze the management and operation of the Center;
- participating in the IAB and any other relevant meetings;
- performing exit interviews to determine why departing companies chose to withdraw from the Center; and
- feeding information on the quality of the industry/university partnership back to the Center for continuous improvement.

Establishment of a Center

The phases for I/UCRC Program funding are described below. Faculty interested in forming a Center may submit a proposal to plan a new Center or to begin full operation of a Center under I/UCRC Program support. Concept papers are required in both cases, but a planning grant is not required in order to apply for an operational Center award, as some Centers are able to move from the concept phase to a fully operational Center without a planning grant. Concept papers are not required when competing to start a new I/UCRC funding cycle.

Concept Paper

A concept paper describing the proposed Center must be submitted to NSF for internal review. The concept paper must be approved by an I/UCRC Program Director before a proposal for either a planning grant or operational Center award will be accepted. Approval decisions will be made periodically, but no later than three months after receipt of a concept paper. The proposed Centers that fit within the industry/university collaborative scope, are considered potentially viable, and do not significantly duplicate the research focus of other Centers funded in the program will be encouraged to submit a proposal for a planning grant. Those Centers that are ready for full operation under the requirements of the I/UCRC Program may submit a proposal for an operational Center award.

Planning Grant Proposal

A planning grant supplies funds to study the feasibility of developing the industry/university interaction necessary to establish and support a Center. The funds are used to bring together potential members to establish a research plan that fits their needs. Planning grant proposals may be reviewed internally or through external peer review and awards do not exceed \$10,000.

Operational Center Awards

Operational Centers may be based at a single university or college, or may be initiated by more than one institution. The initial I/UCRC award to a Center has a potential duration of five years, assuming sufficiently meritorious achievement and success at maintaining leverage of NSF support. I/UCRC Program support shall be up to \$100,000 annually for the duration of the initial award to enable the Center to manage its proposed research and education program effectively in partnership with its other sponsors. NSF support is intended to augment the support the Center receives from industry and other sponsors. Proposals for operational Center awards are evaluated using external peer review.

Some funds are available to support institutions joining existing Centers in the I/UCRC Program. For multi-university Centers, additional funds are available to the lead institution to offset the added administrative burden.

The initial I/UCRC award may be extended for an additional period of up to five years following a successful renewal review guided by peer evaluation and favorable recommendation by the NSF Program Director. NSF I/UCRC Program support for the second five-year award shall be up to \$50,000 annually.

Competition to Start New I/UCRC Funding Cycle

Because the goal of a Center is to become self-sufficient after

* No concept paper is required in this process.

the full ten-year funding cycle, the I/UCRC Program will not continue to fund operating Centers after ten years. This allows the limited I/UCRC Program funds to be used to establish new Centers. However, if an operating Center, in or beyond its tenth year of I/UCRC support, adds significantly new intellectual substance to its research program and continues to meet the criteria of the I/UCRC Program, it may submit a proposal for a new I/UCRC award with the same operating parameters as an initial award.* Proposals to begin a new funding cycle compete against other such proposals from Centers that are beyond the ten-year funding cycle. These proposals will be subjected to a combination of individual and panel review. Awards will be based on the relative merit of the proposals and on a balance of support for both new Centers and those requesting the initiation of a new funding cycle.

Augmented Funding for Connectivity and Long Term Discovery Research

Partnerships with State Government

In order to foster partnerships between industry sectors, the academic community, and state governments, NSF may provide up to \$200,000 annually per center to Centers in the I/UCRC Program that form strong partnerships with and receive financial support from state governments.

Exploratory Research Projects

Most Centers do not have enough resources to fund all projects of interest to Center members. In making the difficult decisions concerning which projects to fund, it is often the longer term or more basic research projects that are the hardest to justify for funding as the benefits of the research may not be immediately apparent to Center members. However, these exploratory projects are often the ones with the greatest potential return for Center members and the Nation in the long run. In order to foster longer term, higher risk research projects, NSF may supply up to \$200,000 annually (depending upon the quality of the proposal and the availability of funds) to fund exploratory projects. These projects must be approved by the Center's industrial advisory board.

Cross-Center Collaborative Projects (Tie Projects)

In order to broaden the research base of a Center, a proposal may be submitted for a collaborative project involving researchers from a Center in the I/UCRC Program with other I/UCRC or NSF funded Centers. This type of project may address industrial research interests that could not be addressed by a single Center. The experimental plan for a cross-Center collaborative project must be developed jointly by all researchers involved and must result in a single proposal submitted by all Centers collaborating on the project. Each Center may request up to \$25,000 annually for two years. The funds requested by each Center must be matched by that Center, and a letter supporting the use of Center funds for this purpose from the industrial advisory board of each collaborating Center must be included in the proposal.

Industry/University Cooperative Research Fellowships (I/UF)

It can be valuable for Center researchers to spend time performing research at a member company. The researcher gains a better understanding of the research needs of the company and experience with production processes in an industrial setting. In addition, the presence of the researcher at the member company is an efficient and effective mechanism for knowledge and technology transfer. NSF supports Center researchers in residence at a member company through Cooperative Research Fellowships. A proposal for an I/UF must present an experimental plan for the research to be done by the Center researcher at the member company. Funding for a fellowship is cost-shared equally with the company, with NSF funding up to \$25,000.

Other I/UCRC Supplemental Programs

Centers in the I/UCRC Program are eligible for \$5,000 per year to support a woman, under-represented minority or disabled undergraduate research assistant to perform Center research. Additionally, the I/UCRC Program will supply up to \$25,000 per year for one or two years to support Center research performed by a faculty member from an undergraduate or predominately undergraduate institution. This proposal must be approved by the IAB, and the research may be performed either at the Center's or the faculty member's home institution.

NSF-Wide Initiatives

Centers in the I/UCRC Program also may submit proposals to other NSF programs such as Research Experiences for Undergraduates (REU); Grant Opportunities for Academic Liaison with Industry (GOALI); Combined Research-Curriculum Development; etc. Further information on these programs may be found on the NSF web site at <<http://www.nsf.gov>>. Proposals for these programs should follow the guidelines given in the Grant Proposal Guide (NSF 98-2) and the appropriate program announcement. Centers in the I/UCRC Program also may apply for funds from other Federal agencies, and NSF can act as an intermediary in processing these funds.

Connectivity and Discovery Proposal Review

Proposals for Exploratory Research Projects, Cross-Center Collaborative Projects and Industry/University Cooperative Research Fellowships are given normal peer review. Proposals to other I/UCRC supplemental programs and NSF-wide initiatives are processed as outlined in their program announcements.

Proposal Submission

For information on how to submit a concept paper, visit the

I/UCRC Program Web site at <<http://www.eng.nsf.gov/eec/i-ucrc.htm>>. Information on the submission and evaluation of planning and operational center proposals is available from the I/UCRC Program office.

There are no specific closing dates for concept papers, planning or operational Center proposals. Proposals competing to start a new I/UCRC funding cycle and proposals requesting funding for Connectivity and Long Term Discovery Research must be received by COB March 31 in any year. For concept papers, allow up to three months for notification of the approval decision. For proposals, allow about six months between receipt of the formal proposal and the final decision. Proposals for operational Center awards are limited to 30 pages, not including any appendices.

For More Information

For further information, visit the I/UCRC Program web site at <<http://www.eng.nsf.gov/eec/i-ucrc.htm>> or contact an I/UCRC Program Director, below.

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Grant General Conditions

Awards are administered in accordance with the NSF Grant General Conditions (GC-1), copies of which are available on the NSF home page (<http://www.nsf.gov>) or may be requested from the National Science Foundation, P.O. Box 218, Jessup, MD 20794-0218, (301) 947-2722 or by e-mail at pubs@nsf.gov. More comprehensive information is contained in the NSF Grant Policy Manual (NSF 95-26) available on the NSF home page or through a subscription offered by the Superintendent of Documents, Government Printing Office, Washington, DC 20402.

Awardees may elect to retain principal patent rights to any inventions made with NSF support, subject to the terms and conditions in the Foundation's Patent Rights clause (see the NSF Grant Policy Manual or 45 CFR Part 650). In previously funded Centers, the participating university or the Center itself usually has held the patents on NSF-supported inventions, with participating firms generally receiving royalty free, nonexclusive rights or options.

The Foundation provides awards for research and education in the sciences and engineering. The awardee is wholly responsible for the conduct of such research and preparation of the results for publication. The Foundation, therefore, does not assume responsibility for the research findings or their interpretation.

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 (FASSED) 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.

Privacy Act and Public Burden. The information requested on proposal forms is solicited under the authority of the National Science Foundation Act of 1950, as amended. It will be used in connection with the selection of qualified proposals and may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees; to provide or obtain data regarding the application review process, award decisions, or the administration of awards; to government contractors, experts, volunteers, and researchers as necessary to complete assigned work; and to other government agencies in order to coordinate programs. See Systems of Records, NSF 50, Principal Investigators/Proposal File and Associated Records, and NSF-51, 60 Federal Register 4449 (January 23, 1995). Reviewer/Proposal File and Associated Records, 59 Federal Register 8031 (February 17, 1994). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

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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 programs, employment, or general information. To access NSF TDD, dial (703) 306-0090; for FIRS, 1-800-877-8339.