

**OHIO BOARD OF REGENTS
RESEARCH INCENTIVE PROGRAM**

**UNIVERSITIES PLANS FOR USE OF FUNDS
DURING THE FY 2008-2009 BIENNIUM**

THE UNIVERSITY OF AKRON
RESEARCH INCENTIVE PLAN
FY 2008 & 2009

INTRODUCTION

The University of Akron's *Research Incentive* Plan is designed to stimulate scholarly and creative activities resulting in high quality basic and applied research that will improve the status of the University and foster economic development of the Akron area and the State of Ohio. The Plan is intended to meet the objectives of the *Research Incentive* Program by:

- Increasing externally sponsored federal research dollars;
- Supporting research that has the potential to grow stronger university-industry partnerships;
- Assisting the long-term economic revitalization of the state by fostering development in areas that are critical to the state's economy, including advanced scientific and technological research, cultural and intellectual activities; and
- Strengthening the emphasis that will be placed on increasing commercialization activities as outlined in Ohio's Third Frontier Project.

To accomplish the objectives, both established research faculty and newer faculty will be supported. The support will take the form of start-up funding for highly qualified new faculty; supplemental funds for established, successful faculty to broaden their base of federally funded programs; and matching funds for major instrumentation or other equipment to support the University's expanding research infrastructure.

INSTITUTIONAL OBJECTIVES AND GOALS

The strategic planning process at The University of Akron has established institutional program directions, one of which calls for the University to assert its recognition as the public research university for northern Ohio. Although the research direction is especially strong in science and engineering, all academic units will benefit by the emphasis on research and creative activity. Attention will also focus on strengthening ties to Ohio constituencies, such as state agencies, private industries, trade associations, foundations, professional groups, and local educational centers.

Critics of American industry continue to argue that the time to translate new knowledge from laboratory to practice has been too long, and that reducing this time is central to global competitiveness. Corporations seek new technology and are becoming more adept at rapidly integrating these technologies into new products and

processes as well as instilling a positive thought process necessary to meet future goals. Industry now recognizes new approaches earlier in the development process; however, its sponsorship of basic research at universities is still limited. Basic research is increasingly being left to the universities as industry turns to the acquisition of new technologies, rather than develop them in-house. The universities thus turn to the federal government for this support in tandem with industry.

To achieve the above research objectives, *Research Incentive* funds will be allocated to worthy activities and projects within three categories designed to increase the competitive status of The University of Akron and to aid economic development in Ohio: **individual supplemental awards, start-up funds for new faculty, and equipment/instrumentation matching awards.**

PLANNING EXPENDITURES BY CATEGORY OR STRATEGY

- Individual Supplemental Awards: approximately 35% of available funds
- Start-up Funds for New Faculty: approximately 40% of available funds
- Equipment/Instrumentation Matching: approx. 25% of available funds

DESCRIPTION AND RATIONALE

Individual Supplemental Awards *

In this strategic initiative, *Research Incentive* funds will be used to supplement basic and applied research and scholarly and creative activities that receive support from non-state, non-industrial grants that include fu

The program is designed to support and encourage the development of strong, externally supported programs of research by faculty members through the University. These matching grants will supplement external funding to ensure that the faculty members are adequately supported to obtain the results needed for competitive future renewal proposals.

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The supplemental funds will be made available for grants resulting from proposals submitted during the period from July 1, 2007, through June 30, 2009. Supplemental funds will be distributed to successful grantees in chronological order until the allotted funds are expended. The awards will be for 10 percent of the external grant amount (total direct costs) up to a maximum award of \$20,000 per proposal.

For eligibility in this program, the total University matching share, including equipment matching, *Research Incentive* funding, etc., must not exceed 25 percent of the total amount requested from the non-state external funding source. Specified

allowable costs for *Research Incentive* Matching Funds are all categories of direct costs normally incurred during the conduct of sponsored research work: salaries with the exception of faculty salaries, equipment, supplies, domestic travel, publications, time charges on computer systems or major instruments, and other direct costs.

Start-up Funds for New Faculty Members *

These funds will be used to assist The University of Akron in attracting highly qualified research faculty, who will be expected to establish federally-funded research programs. The Research Incentive start-up funds will be used primarily for the purchase of equipment; however, in some cases they may be approved for all other categories of direct costs except faculty salaries. Funds will be allocated with the concurrence of the department chair, the dean, and the Vice President for Research and Dean of the Graduate School.

Engaging highly motivated faculty members capable of establishing visible, well funded research programs is vitally important as the University takes its place as the research university of northern Ohio.

Allowable Expenditure Categories

Specified allowable costs are all categories of direct costs normally incurred during the conduct of sponsored research work; salaries, equipment, supplies, domestic travel, publications, time charges on computer systems or major instruments, and other direct costs. Non-equipment expenditures will generally be limited to 25 percent of the total proposed budget.

Equipment/Instrumentation Matching Awards

The need for state-of-the-art instrumentation and other equipment is a fundamental component in a vibrant research university and the growth of strong industrial partnerships, especially new spin-off companies. These funds truly constitute an investment in the research enterprise that will pay dividends beyond the scope of a particular research project.

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Research Incentive funds will be used to provide matching dollars required under specific sponsor guidelines. Also, matches may be provided to enhance the probability

* Salary support to any individual may not exceed a total of 12 months for a single project. Funds may not be used to train students in research methods or techniques as part of course work, workshops, or conferences; to sponsor conferences, symposia, or workshops; or to travel internationally.

of an award being made to The University of Akron by demonstrating the institution's willingness to participate in the project costs.

These funds will be available for research programs proposed by both new and established faculty investigators. Special consideration will be given to equipment and/or instrumentation requests proposed by interdisciplinary groups in keeping with the University's goal for increased synergy and collaboration between academic units.

Requests for matching funds will be coordinated with the Office of Research Services and Sponsored Programs.

Allowable Expenditure Categories

All equipment/instrumentation normally allowed under federal guidelines are eligible for consideration in this category.

Incentive for Collaboration Funds

Collaboration with industry and with other state-supported institutions of higher education is a transcending element of all of the goals of the Institutional Plan for the use of Research Incentive funds.

Alliance Support

As a member of the Alliance for research and graduate studies, The University of Akron encourages and will support proposals that foster collaborations among Alliance partners to conduct research supporting the Third Frontier. The Alliance is a partnership of northeast Ohio universities and research organizations, including Cleveland State, Kent State and Youngstown State Universities, the University of Akron, the Northeastern Ohio Universities Colleges of Medicine and Pharmacy, NASA Glenn and the Lerner Research Institute of the Cleveland Clinic. Collaborative proposals will include investigators from at least one other alliance partner. Alliance partners will be expected to provide support for the portion of the research conducted at their institution. Alliance partners plan to coordinate review of collaborative proposals to maximize the impact of the state's research Incentive funds.

BOWLING GREEN STATE UNIVERSITY

RESEARCH INCENTIVE PLAN

FY 2008 & 2009

INSTITUTIONAL GOALS AND OBJECTIVES:

In 2004, Bowling Green State University engaged in a process to identify its major research strengths and to establish an investment strategy to support the expansion of research in specific areas where the institution could realize the most significant returns on investment. Those returns are characterized primarily by the attraction of research faculty both at new and established career stages and the increase in procurement of federal funds for research. The areas specifically designated for support through both university internal resources and Research Incentive funds include: molecular photonics, neuroscience, demographic research, geospatial research, and cognitive learning.

BGSU intends to continue focusing resources in these areas but also intends to identify emerging research areas. We will continue to use a portion of the Research Incentive funds to support BGSU research that falls in alignment with the intentions of the Third Frontier. More opportunities will be provided to enhance research capacity where substantial headway has been made to establish areas with interdisciplinary focus and inter-institutional collaboration can be further facilitated. We intend to expend Research Incentive funds in programs that encompass the core objectives:

- *To enhance the quality of research and scholarship at Ohio's universities;*
- *To increase the level of federal and private research funding received by Ohio's universities, and;*
- *To encourage research efforts that support the Third Frontier Project and economic growth of Ohio.*

PLANNED EXPENDITURES BY CATEGORY:

The university will utilize Research Incentive funds to support the following:

20% Technology Innovation and Enhancement (TIE) Grant Program (*To encourage research efforts that support the Third Frontier Project and economic growth in Ohio*)

25% Research Enhancement Initiative (*To enhance the quality of research and scholarship at Ohio's universities*)

30% Research Capacity Expansion Initiative (*To increase the level of federal and private research funding received by Ohio's universities*)

25% Research Support: New Faculty/Matching Funds/New Collaborations (*To increase the level of federal and private research funding received by Ohio's universities*)

DESCRIPTIONS AND RATIONALE:

1. Technology Innovation and Enhancement (TIE) Grant Program.

The TIE Program has been in effect for the last two biennial funding periods and will continue into the next. Its purpose is to support and enhance research projects based on active, on-going research that either does have or soon will have inter-institutional and industrial collaborations underway. Funding under this program serves to position investigators to compete more successfully for federal funding and for support under the state's Third Frontier program. Both basic and applied research projects are considered, but projects that move toward developing a product are given priority consideration.

Primary use of Research Incentive funding includes support for interdisciplinary faculty research collaborations and support for faculty research groups within disciplines. Past awardees have been faculty and research groups in the photochemical sciences, communication disorders, physics, and the neurosciences. Funding through the TIE mechanism has placed several faculty members in the position to leverage federal funding both through the competitive arena and through congressionally directed funding. Support has been forthcoming from the Office of Naval Research, the Army and the Air Force Office of Scientific Research. Work performed here will ultimately result in the development of emerging technologies important to both industry and the military.

There are three obligations awardees of this program must fulfill. First, projects funded under this initiative will name at least one inter-institutional collaborator and at least one industrial partner with whom investigators will develop a working partnership over the next twelve-month period. Second, investigators must develop at least one proposal to a federal agency to support further progress on this grant. And third, as a result of having received a TIE Grant award, investigators will submit proposals to the next eligible competition for any applicable state initiative. TIE funding is associated with BGSU's successful Wright Capital Fund grant in 2003 and with BGSU's participation in the most recent Wright Center awarded to the University of Toledo in photovoltaics.

Some selection criteria include the following: Scientific merit; Past achievement of the investigators (university and industry); Potential for long-lasting, effective collaborations with other institutions and continuation of the research beyond this funding, for continued partnerships with industry beyond this project, for national excellence in a specific area of research, for leveraging future federal funding, for developing intellectual property, and for future commercialization opportunities.

2. **Research Enhancement Initiative (REI)**

The *Research Enhancement Initiative* (REI) has been both a tool to assist the university in determining future directions of a limited number of research focused areas and as a process to provide enhancement for increasing successful competition for research funding at the federal level. The REI is based on the cluster model of interdisciplinary research and has brought together disciplines within the institution that are benefiting from intensive collaboration. Since significant expansion of the institutional research capacity is a goal of this initiative, the review and recommendation process is set up to assure that the selected research clusters are capable of conducting nationally and internationally recognized research that will result in external funding. Research clusters consist of one core (focused) research area supported by an interdisciplinary cluster of faculty that enhances the research capacity of the core. Research clusters may or may not contain existing or proposed interdisciplinary centers/institutes; however they must address the research areas that align with the *Academic Plan*, the state's *Third Frontier Initiative*, and initiatives defined by the federal funding agencies.

The purpose of this initiative continues to be: a) to assess present research assets b) develop criteria for research enhancement that align with the mission of the University and State of Ohio initiatives c) select a limited number of specific research clusters for enhancement d) determine investment strategies that produce external funds, and e) set specific outcomes and expectations relative to external funds for each of the selected research clusters.

Primary emphasis is placed upon the ability of each research cluster to produce significant additional external funding in order to elevate the research environment and productivity of the faculty.

In addition to Research Incentive dollars, the University is committed to identifying additional research investment funds for new faculty positions, start-up funds, and other research infrastructure needs. Innovation Incentive funds are currently reinvested in the molecular photonics cluster. Emphasis will be on continuing to enhance the Center for Photochemical Sciences, the Center for Neuroscience, Mind and Behavior, and the Center for Family and Demographic Research (CFDR). As a result of previous Research Incentive investments, the CFDR has leveraged federal support as an NICHD Population Research Center and will soon realize status as a center with NICHD. We hope to move other centers toward this type of national recognition.

3. **Research Capacity Expansion Initiative (RCE)**

The Research Capacity Expansion Grants provide the opportunity for new and existing research teams to broaden their research capabilities by increasing the capacity to do research. Broadening capacity may mean increasing the workforce by hiring post doctoral associates or individuals who qualify for appointments in the Research

Professor Series. It may mean supporting advanced doctoral students in their final years of assistantship support or adding large-ticket special purpose equipment to the laboratory. It may mean cost-sharing with the department or college on any of these or other items that serve the purpose of increasing research capacity.

This opportunity is open to all tenure-track/tenured faculty members engaged in collaborations with partners both internal and external. Collaborations must be intended as long-term and evident in subsequent proposals to major funding agencies. Each member must have a clearly defined, substantive role in the research. A portion of the funds specifically allocated to BGSU as “Incentive for Collaboration” will be used in this program.

The collaborative team must demonstrate how the Research Incentive funding will enable them to strengthen their efforts as well as their proposals to major funding agencies. The proposal must make it clear why the university should make a strategic investment in the research or infrastructure and how exactly capacity to do research will be enhanced.

4. **Research Support: New Faculty/Matching Funds/New Collaborations**

Bowling Green State University will focus efforts in three areas:

a. New faculty member investments:

Funds will be allocated to support the research agendas of new faculty hires in areas that enhance the research capacity of the university in the identified primary areas of research. Additional areas of research will be considered as opportunities for investment arise from demonstrated efforts to firmly establish specific cores of research faculty with successful, active programs. BGSU will utilize these resources in coordination with and in support of the chosen investment component areas. By investing the resources in a limited number of focused areas, we hope to encourage multidisciplinary and inter-institutional collaborative research efforts, stimulate and improve the quality of research and scholarship at BGSU, and to further broaden the base of support for successful, federally funded programs.

BGSU has a hiring plan for each college and department. The Vice Provost for Research will work with deans, department chairs and program directors throughout the recruitment and hiring processes to develop investment plans for Research Incentive funds each year. Investments may include support of new Research Series (non-tenure track) Faculty who are expected to provide for their own grant support within a two year window, postdoctoral research assistants, limited faculty summer support, graduate assistantships in highly specialized areas, and the purchase of additional research equipment.

b. Matching funds for externally supported projects

As Bowling Green State University moves forward in its targeted research areas, the ability to leverage funding for new and replacement research equipment is extremely important. The university will continue to commit matching funds in support of proposals submitted to federally funded, nationally competitive programs if such proposals demonstrate increased research capability as a result of acquiring a major piece of equipment. In some cases funds may be allocated as a match to provide for technical support needs in projects that show outstanding potential for on-going federal support. Institutional commitments on the part of departments and colleges will illustrate the importance both entities place on the value of each project. The level of illustrated importance will assist the Vice Provost for Research in assigning the appropriate level of Research Incentive support. We hope to increase the level of federal funding for research and to more closely link such research to graduate programs and increased faculty scholarship efforts.

c. Incentive for Collaboration: New Research Collaborations

BGSU is already a partner in collaboration with the University of Toledo and its Health Science Campus. Additionally, the institution has developed collaborative partners all over the State of Ohio and in many other states as well. BGSU recognizes the advantage of combining resources and sharing ideas. The Office of Research Collaboration which serves the two institutions, BGSU, UT/HSC, works in partnership with the research offices to develop competitive research partnerships. BGSU intends to continue investing in collaborative projects and in developing new, competitive mechanisms for supporting faculty efforts to leverage external support. With incentive for collaboration funding, we can continue the efforts to establish real collaborative strengths in northwest Ohio.

CENTRAL STATE UNIVERSITY
RESEACH INCENTIVE PLAN
FY 2008 & 2009

In accordance with the Ohio Board of Regents Research Incentive Guidelines dated December 2006, Central State University submits the following plan for FY 2008-2009 Research Incentive Funds.

1. INSTITUTIONAL OBJECTIVES/GOALS

Central State University has an academic strategic plan that underscores the importance of scholarly research as a support to teaching and faculty and student development. Research Incentive funds will be used for the following purposes at Central State University:

- To strengthen research opportunities for faculty and students in the sciences, engineering and evolving computer technologies;
- To promote collaborative research involving faculty at member universities of the Southwestern Ohio Consortium for Higher Education (SOCHE); and
- To increase the number of collaborative research projects involving area businesses and industry.

2. PLANNED EXPENDITURES BY STRATEGY

Research Incentive Funds for FY 2008-2009 will be expended in the following manner:

- Approximately 50% will be distributed to the Departments of Manufacturing Engineering, Water Resources Management, Natural Sciences and Mathematics, and the National Environmental Technology Incubator (NET incubator) on a competitive basis;
- Approximately 35% will be distributed on a cooperative basis to faculty in sciences and mathematics (e.g., Biology, Chemistry, Physics, Mathematics and Computer Science) and faculty from the Social and Behavioral Sciences for the pursuit of scholarly research within their respective fields.
- Approximately 15% will be distributed to the Arts and Humanities Department on a cooperative basis.

3. DESCRIPTION AND RATIONALE

Historically, reportable CSU biennium research expenditures for externally sponsored basic and applied research and scholarly and creative activities have been primarily attributable to activities within the science and engineering departments. To continue and build upon the leveraging success of these programs, the Research Challenge funds will be expended as follows:

A. Manufacturing Engineering, Water Resources Management and Natural Sciences (50%):

The Manufacturing Engineering Program at Central State University is one of only 13 in the nation, and is the only accredited manufacturing engineering program at a Historically Black College/University in the nation. In order to retain accreditation by the Accreditation Board for Engineering and Technology (ABET), CSU will strengthen two areas of research: (1) working with industry to solve applied research problems; and (2) providing greater opportunities for students to participate in research and practical problem solving. Research Incentive funds will be used as a catalyst to attract additional external research funding in the areas of computer-aided-design and manufacturing (CAD/CAM), machine vision inspection, dexterous robotics and artificial intelligence applications.

The International Center for Water Resources Management is the host department for the National Environmental Technology Incubator (NET Incubator). The Incubator provides services to accelerate the commercialization and adoption of scalable environmental technologies. The incubator stimulates economic development, promotes the creation of new firms, products, and processes, and enhances educational opportunities for Central State students. The incubator is positioned to become the premier environmental technology incubator in the country, and can help position Ohio as the leader in the world market for environmental technologies. The NET incubator will play a major role in supporting Ohio's Third Frontier Project and the Wright Centers of Innovation. Research Incentive funds will be used to collectively support and promote cooperative basic and applied research efforts between the NET Incubator, Water Resources Management and the Natural Sciences and Mathematics Departments.

B. Strengthening Science and Mathematics Research Capabilities (35%)

Research Incentive Funds will be used as seed money and matching money to be used by faculty in the sciences and mathematics to support the University's technology transfer efforts with area businesses. The technology transfer efforts will be coordinated through the NET Incubator. Faculty affiliated with other potentially

effective research programs such as Social and Behavioral Sciences will also be afforded the opportunity to compete for these funds.

C. Stimulating the Arts and Humanities Department (15%)

Traditionally, the Arts and Humanities Departments have not been as active in seeking external funds as the sciences and engineering departments. The Research Incentive funds will be used as an incentive to get faculty in these departments more actively involved.

4. INCENTIVE FOR COLLABORTION FUNDS

Central State University will use incentive funds to accomplish the following objectives related to research collaboration with local universities and businesses:

- Contact each of the SOCHE universities to determine compatibility of research interests between CSU faculty and those of the other universities;
- Explore current and potential research or technology transfer projects that lend themselves to greater collaboration with neighboring universities-- especially those industry and institutional affiliates associated with CSU's Speed to Scale and Academic Enrollment Management plans and the Clean Energy Alliance of Ohio (UCEAO) partnership;
- Identify three to five opportunities for collaboration that can be implemented in FY 2008-2009; and
- Report on the results of the collaboration effort.

The collaboration efforts will be aimed at providing opportunities for students and faculty at CSU to work with faculty and graduate students at other institutions, and to provide opportunities for undergraduate students to participate in research that will prepare them for graduate school. Faculty-to-student relationships of this type will provide better pathways to the students' chosen careers.

UNIVERSITY OF CINCINNATI
RESEARCH INCENTIVE PLAN
FY 2008 & 2009

Institutional Objectives and Goals

The Research Incentive funds allocated to the University of Cincinnati from the State of Ohio for the two upcoming fiscal years (FY08 and FY09), will be allocated to support new research programs at the University of Cincinnati, as well as to support the research infrastructure in the various research-intensive colleges and departments. The funds will be used to support interdisciplinary programs which have high potential for obtaining additional extramural research funding, are strong scholarly and research programs, and involve research efforts that support the Third Frontier Program and economic growth in Ohio.

The Research Incentive Program of the Ohio Board of Regents has had a major impact on the University of Cincinnati and its research and scholarly programs. All awards made using Research Incentive funding are directed toward achieving greater success in obtaining external research funding and increasing the national visibility of research programs at the University of Cincinnati. Research Incentive funds will be leveraged to yield grants, contracts, and licensing revenues far beyond the initial investment. Sponsored Program activity at the University of Cincinnati has increased from \$163M in FY02 to over \$190M in FY06, at a time when federal funding for research has actually decreased.

The University of Cincinnati has increasingly collaborated with researchers at other state universities, fostered in part by OBR and State initiatives such as the Third Frontier. Research Incentive funds will continue to be directed toward enhancing these efforts. As a result of extensive collaborations with industry, state agencies, and locally supported technology-oriented business incubators, many of the research programs supported by Research Incentive funds are directly related to economic development in the region and across the state. The target technologies all have significant potential for inventions, and for increased funding through sources such as the federal business start-up programs (SBIR and STTR); funding mechanisms that encourage strong interactions with local and regional industry. These efforts have been significantly augmented at the University of Cincinnati with an expanded Intellectual Property Office, an Office of Entrepreneurial Affairs, an active biotechnology incubator, BioStart and CincyTechUSA, a regional initiative to increase economic development in the area related to technology. Two to three new start-up companies have been launched each year for the past several years from technologies discovered at the University of Cincinnati. With the recent award to CincyTechUSA, of

a Third Frontier Entrepreneurial Signature Program, we have high hopes for significant improvement in the translation of discoveries made in laboratories at the University of Cincinnati into the public domain through new start-up ventures.

Planned Expenditures by Category or Strategy

Over several biennia a strategy has been adopted at the University of Cincinnati that allows funding decisions to be made both at the central, university-wide level and at the college/departmental level. This allows resources to be directed to institutional initiatives as well as to needs that develop within college units as a result of recruitment of new faculty, the pursuit of new research directions, and acquisition of new laboratory and instrumentation facilities. Research Incentive Funds (40%) will be awarded to each college in proportion to their external research awards that are included in the OBR base for Research Incentive distribution calculation. Overall, the distribution of Research Incentive Funds (including funding distributed to the colleges) is as follows:

- Recruitment and Retention of World-Class Faculty - 30%
- Faculty Development Programs – 10%
- Interdisciplinary Research Institutes/Centers (with shared core facilities) - 30%
- Third Frontier Initiatives - 10%
- Cost-sharing for Extramural Grant Proposals and Equipment Funds - 10%
- Undergraduate, Graduate and Postdoctoral Fellow Research Programs - 10%

Descriptions and Rationale

UC|21 is the Academic Strategic Plan for the University of Cincinnati. Research is at the heart of three of the six UC|21 goals, which include Research Excellence, Students at the Center and Partnerships. Building a world-class faculty, creating and sustaining research centers/institutes and promoting entrepreneurial efforts through partnerships are all part of these goals and will be supported with Research Incentive funding. A Research Strategic plan was developed in the Spring of 2006 that is aligned with UC|21 and provides more specifics on how to promote interdisciplinary research efforts, recruit world-class faculty, translate discoveries into the public domain and improve partnerships within the region, state and nationally.

Recruitment and Retention of World-Class Faculty

The recruitment of outstanding new faculty to the University of Cincinnati is critical for the success of our research programs. In order to successfully recruit junior and senior investigators with either the potential to run internationally recognized research programs or who have already achieved this level of success, significant start-up funding is required.

In combination with funding from the university, industry and Research Incentive funding, we have been able to recruit several outstanding faculty in the past several

years. Theresa Reineke (College of Arts & Sciences, Dept of Chemistry) has recently been recognized with an NSF Career Development Award, a Beckman Young Investigator Award and a Sloan Foundation Award. In addition, she has several patents and has licensed her technology to Procter & Gamble. Jason Heikenfeld (College of Engineering), also recently received NSF Career Development Award. George Thomas (Director, Genome Research Institute) is an internationally recognized investigator in cancer biology, who was recently recruited from Switzerland along with many members of his research team. He leads our research efforts in the area of cancer. Our most recent Ohio Eminent Scholar, Jay Lee (College of Engineering), is partially supported using Research Incentive funds. Recently, we have recruited Peixuan Guo from Purdue University, who is considered a star in the area of nanomedicine. He will be partially supported by Research Incentive Funds, but also brings with him significant NIH and NSF funding, including an NIH Center for Nanomedicine. Stars of this stature, and exceptional new faculty at the junior level, are recruited by providing first class facilities and access to outstanding students. Research Incentive funds have been critical in making this possible.

Faculty Development Programs

Research Incentive support has been used each year to support grant writing workshops open to all faculty, postdoctoral fellows and graduate students at the University of Cincinnati. This past year a general workshop attracted 160 faculty, while specific workshops on NIH K awards and NSF Career Development Awards for new faculty attracted about 50 faculty to each program. A workshop on how to write a biomedical publication attracted 150 participants. A more intensive one-on-one workshop was offered to 30 faculty writing their first extramural grant proposals. From past experience we know that a large percentage of these faculty are successful in obtaining their first grant on their first try after taking this workshop. We will continue to offer programs such as these to our faculty in order to give them every opportunity to run a successful extramurally supported research program.

In the past year, we initiated a new program called the Research Orientation program that was designed to introduce faculty to issues and programs important to running a successful research program. This biweekly program was videotaped. The videos, handouts and PowerPoint presentations are available on a newly created website available to all researchers. This program will continue in the next year and has been viewed as an important complement to the grant writing workshops.

Interdisciplinary Research Institutes/Centers (with shared research cores)

Research Incentive funds have and will continue to be used to provide an incentive for developing programs that address emerging interdisciplinary problems, which span traditional departments and colleges. The goal is to stimulate formation of centers

and institutes that have the potential for national visibility, significant research income and outstanding scholarship. The promotion and funding of new interdisciplinary research efforts is in line with new funding mechanisms at the NIH as part of the Roadmap initiative. With support from the Research Incentive fund, we hope to position ourselves to capitalize on these new funding opportunities.

The Institute for Nanoscale Science and Technology was created in 2004 with Research Incentive funding. This institute brings faculty together from three colleges (Arts & Sciences, Engineering, and Medicine) who all work in the area of nanotechnology. Funding has been used for pilot projects that require collaboration between at least two colleges. A significant number of grant proposals have been submitted to the NIH and NSF based on results from these pilot projects, with a fair number of these awarded funding.

The creation of the Genome Research Institute (GRI) was supported in part by Research Incentive funding. This institute has become a premier research institute that has been supported by the Third Frontier. The Drug Discovery program, which has also been supported by the Third Frontier funded Computational Medicine Center and by a donation from P&G Pharmaceuticals, has been created in the past year. Already, several significant industrial contracts have been negotiated. Over 450 new jobs have been created at the GRI. This has truly been a success story both for Research Incentive support and for Third Frontier initiatives.

Third Frontier Initiatives

At the University of Cincinnati there are several areas of expertise that put us at a unique advantage with respect to the potential commercial development of our ongoing research programs. With the diversity of thirteen colleges, the Genome Research Institute (GRI), the unique relationship with Cincinnati Children's Research Foundation and with the local industry in the region, we feel that we are in an excellent position to successfully compete for Third Frontier support. Third Frontier grants require a significant financial commitment from the university; Research Incentive funds have and will be used as part of this commitment. The following are approved and funded Third Frontier programs with UC as a partner where Research Incentive funds have been leveraged.

The Third Frontier recently awarded an Entrepreneurial Signature Program to CincyTechUSA. Faculty at the University of Cincinnati will directly benefit from several new programs including entrepreneurs-in-residence and Imaging grants that will provide seed funds for new and promising ideas.

The University of Cincinnati is a partner with the Cleveland Clinic on their recently awarded MegaCenter grant on cardiovascular biology. Two faculty at UC will be

supported as part of this program, as well as a spin off company from UC called CardioPower.

IDCAST, a Third Frontier funded program housed in Dayton, involves many universities and industry partners. The University of Cincinnati is an active participant in this exciting program involved in the use of sensors for numerous applications.

A \$2M Third Frontier grant on Innovation in Product Development; a joint venture between four University of Cincinnati colleges (Design, Architecture, Art & Planning, Engineering, Medicine and Business) and with TechSolve, a local manufacturing company. A new spin off company resulting from this grant (and with Research Incentive funding) will be announced in the next few months.

The GRI (as mentioned above) has been another Third Frontier success with support through the BRTT mechanism and through the Third Frontier funded Computational Medicine Center. New jobs have been created and joint partnerships have been established with Procter & Gamble, Wright-Patterson Air Force Base and with Wright State University.

The Third Frontier WCI/BRTT program has supported the creation of the Computational Medicine Center, a joint venture between Cincinnati Children's Research Foundation and the University of Cincinnati. Personalized medicine is the theme of this program, which supports patient databases and several research programs in this area. This program also supports efforts at the Genome Research Institute.

Our department of Aerospace Engineering in the College of Engineering is part of a Wright Center of Innovation called the Ohio Center for Advanced Propulsion and Power (OCAPP) with the Ohio State University.

We have been involved with the Wright Center of Innovation at Wright State University. The University of Cincinnati, along with the Ohio State University, the University of Dayton and Kent State University are partners with Wright State and 14 industrial partners to provide cutting-edge database management to the public.

The University of Cincinnati is committed to the success of the Third Frontier program and will continue to support this initiative through the leveraging of Research Incentive funds.

Cost-sharing for Extramural Grant Proposals and Equipment Funds

A portion of the Research Incentive budget is used to cost-share on extramural grant proposals and for equipment purchases that are part of grant proposals. Along with college and departmental support, central Research Incentive funds are provided when appropriate to provide the required institutional commitment to research projects.

Federal support of major instrumentation and research infrastructure requires cost sharing by the university. Research Incentive and Action Fund support has been instrumental for matching required funding and for our success in obtaining these awards. For example, recently we received a \$1 million grant from the NIH to fund a new mass spectrometer. Research Incentive support was used to provide the required institutional commitment to support the service contract for this critical piece of equipment.

Undergraduate, Graduate and Post-doctoral Research Programs

A commitment to providing research experiences to our undergraduates hopefully will excite this generation of students to become our next generation of scholars and researchers. Support from Research Incentive funds is critical for the success of these programs.

An Office of Undergraduate Research has been created in the past year to provide an umbrella program to the numerous undergraduate research programs throughout the university. A website has been created and strategies to highlight and integrate the programs have been initiated. Research Incentive funding will continue to support summer undergraduate research programs. The Women in Science and Engineering summer program supports 25 women who are exceptional University of Cincinnati students working in laboratories throughout the university and at Cincinnati Children's Research Foundation. Funding is also used to support new initiatives in nanotechnology and biomedical engineering, which provide research experiences for undergraduates. NSF and NIH funded undergraduate research programs at UC also receive funding from the Research Incentive Program.

Research Incentive funds are used to support graduate student research through a competitive program where students apply for summer research funding. This past year over 200 applications were received with about 30% funded. Graduate students attend the various grant writing workshops that have been discussed above.

An Office of Postdoctoral Research is in the process of being formed and will be a university-wide initiative to organize and recognize postdoctoral fellows. Lunch time seminars, career discussions and informal gatherings will be supported. In addition, postdoctoral fellows attend the various grant writing workshops and the Research Orientation series.

Summary

In summary, the OBR funded Research Incentive Program has been critical for the success of the University of Cincinnati in obtaining significant extramural support from federal, industrial, private and Third Frontier sources. This support has been crucial for fostering development of innovative initiatives, enhancing the development of excellence and contributing to increased economic development in the region.

CLEVELAND STATE UNIVERSITY
RESEARCH INCENTIVE PLAN
FY 2008 & 2009

1. Introduction

Cleveland State University (CSU) is a comprehensive urban university committed to providing an education of high quality to students, primarily from the metropolitan area, with diverse backgrounds, experiences, interests and educational needs. As an active participant in the development of intellectual, social, cultural and technological growth within the region and beyond, CSU serves as a catalyst, leader, and partner in the ongoing enhancement of the quality of life and economic viability of the region and the State. The education of its citizens is Ohio's best investment in its future. Cleveland State University embraces this public trust. Accordingly, the University is committed to:

- offering excellent educational programs in the arts, the sciences, and selected professional disciplines;
- creating a supportive and stimulating environment for all students;
- discovering and conveying new knowledge;
- offering continuing education opportunities to the metropolitan area;
- providing expertise and assistance in the resolution of urban issues; and
- preparing students to lead productive, responsible, and satisfying lives in a global society.

The goals of the State of Ohio's Research Incentive Program, which are to enhance the quality of research and scholarship at Ohio's universities; to increase the level of federal and private research funding received by Ohio's universities; and to encourage research efforts that support the Third Frontier Project and economic growth in Ohio, are fully consistent with the functional mission articulated for Cleveland State University. The Research Incentive Program has stimulated comprehensive discussions of the University's research strengths and is helping promote the development of a strategic plan to guide appropriate institutional research priorities given the University's current level of maturity and available resources. The planning process involves the highest levels of the University's administration as well as faculty representatives from across the University.

2. Research Challenge Program During the FY06-07 Biennium

During the FY06-07 Biennium (July 1, 2005 through June 30, 2007), Cleveland State used the Research Challenge Program to fund two specific programmatic efforts: 1)

support of our existing scholarly base; and 2) assistance with start-up packages for new research faculty.

2.1 Support of Scholarly Base: The largest effort supported by Research Challenge Funds was the effort to increase and expand the scholarly activities ongoing at CSU through direct support of research activities. This took the form of the Enhancing Full-time Faculty Research Development (EFFRD) Award Program.

2.2 Faculty Start-up: The use of Research Challenge funds to support laboratory and computational equipment needs of our newly hired faculty has been in place since the inception of the State of Ohio Research Challenge Program in 1985. All of the evidence gathered over the course of this period reinforces the conclusion that the plan to support the research start-up costs of our new faculty is successful. With the research initiation funding provided by the Research Challenge Program, highly promising junior faculty have been attracted to Cleveland State University. This has directly resulted in a significant increase in both proposal submission and grant awards.

3. Plan for the 2008-2009 Biennium

The Office of the Vice Provost for Research, which is responsible for the overall management of the research effort at Cleveland State, has developed a detailed process to help ensure that Research Incentive funds are used in a way that optimizes both the goals of the program and the research efforts of the University. The primary body responsible for overseeing this process is the University Research Council, which is comprised of representatives selected from our most active research faculty. As a joint council representing the views of the faculty as well as the administration, this group is the responsible deliberative body for development of the University's Research Incentive Program. The core objectives of the Research Incentive Program, to enhance the quality of research and scholarship at Ohio's universities; to increase the level of federal and private research funding received by Ohio's universities; and to encourage research efforts that support the Third Frontier Project and economic growth in Ohio, have guided the CSU plan for the next biennium.

The institutional plan for the use of State of Ohio Research Incentive funding at Cleveland State University involves:

- (a) investing approximately 50% of Research Incentive support in the research and scholarly base of the current faculty through the on-going Faculty Research Development (FRD) program;
- (b) devoting approximately 25% of Research Incentive support in start-up packages to attract and retain select, highly promising, new research faculty, and towards match for federally and privately funded projects for current faculty; and

(c) using about 25% of Research Incentive support to institute a competitive program to support research activities in collaboration with CSU's Wright Center for Sensor Systems Engineering (WCSSE), a Wright Center of Innovation funded through the Third Frontier Program as well as other Third Frontier Project research activities across the state.

3.1 The Faculty Research Development Program (50%): The largest effort supported by Research Incentive Funds will be efforts to increase and expand the scholarly activities ongoing at CSU through direct support of research activities. This will take the form of the *Faculty Research Development (FRD) Award Program*. This portion of the University's Research Incentive resources will be made available through an open, peer-reviewed competition to full-time faculty with a proven funding track-record to continue and expand their scholarly and research programs. This funding category is intended to incentivize faculty from any discipline who have demonstrated the ability to secure significant external support for their research programs or who have made significant contributions to their individual disciplines.

3.2 Faculty Start-up and Match for Federal Grants (25%): Funding the start-up costs of new faculty will remain an important component of the University's Research Incentive Plan. In this process of developing and building up the University's research base through the support of its most promising faculty, it is understood that faculty in certain disciplines, such as the sciences and engineering, have the greatest potential for impacting positively on economic development as well as attracting significant external grant funding. Yet, getting these faculty properly established by providing state-of-the-art research laboratory instrumentation and computational equipment is extremely costly. It has also been our experience that new faculty in the sciences and engineering consider their laboratory start-up packages far more critical than the specifics of their compensation packages when deciding whether to accept a given job offer as a new member of the faculty. Other universities unable to offer such start-up funding of basic research needs for prospective new faculty are less competitive. In recognition of this fact, the University plans to continue to fund the science and engineering faculty at a higher level of support than is the case in the other disciplines, in particular those that support the Third Frontier Project and economic growth in Ohio.

To further enhance the probability of obtaining successful external funding, funds will be available for match on federal projects which support the Third Frontier Project activities and economic growth in Ohio.

3.3 Competitive Program for Research Related to The Third Frontier Project (25%): The Third Frontier Project is the state's largest commitment ever to expanding Ohio's high-tech research capabilities and to promoting start-up companies to build high-wage jobs for generations to come. In December 2006, it was announced that Cleveland State had been awarded \$23.8 million from the State of Ohio's Third Frontier Program to establish a Wright Center of Innovation for Ohio to support this

important initiative. CSU's Wright Center for Sensor Systems Engineering (WCSSE) will strive to pull advanced sensor technologies and its electronic drivers into the marketplace by bringing together the top component and electronics; packaging; networking; and data management experts to develop sensor-based applications for specific market niches. The WCSSE will bring together both small and large companies, industry and university researchers, and government agencies to attack this growing marketplace and in the process, strengthen and grow the vast instruments, controls, and electronics industry in Ohio.

In support of the Third Frontier Project research activities and working with the WCSSE, a competitive program will be established to support three to four research projects that demonstrate the potential to advance sensor systems engineering and move the technologies into the marketplace.

4. Conclusion

The funds in all categories of Research Incentive support will be used in total conformance with the guidelines of the State of Ohio's Research Incentive Program and in a way that maximizes alignment with the Third Frontier Project. Cleveland State University is committed to the Research Incentive Program goals of increasing the volume of externally funded research and improving the University research environment. While the full impact of these State of Ohio funds will not be known for several years, our Research Incentive leveraging reports contain the evidence that these monies have been instrumental in garnering a higher level of research support for the faculty and staff of Cleveland State University.

KENT STATE UNIVERSITY
RESEARCH INCENTIVE PLAN
FY 2008 & 2009

1. Introduction

In accord with State Guidelines, Kent State University plans to use Research Incentive (RI) funds to increase the amount of federal and other externally funded research; to support projects that increase the quality and impact of research at the university; and to expand research that supports industry and the economy of Ohio. The particular investment categories are detailed in the next sections.

In the current fiscal year, the total amount of extramural funding to Kent State University (KSU) is projected to be about \$31M, with 70% coming from Federal agencies, and 22% coming from State agencies. One of KSU's immediate priorities is to significantly increase the amount of external funding and external recognition of its research. With the help of the State's Research Incentive Program, KSU has in recent years been building research strengths in advanced materials science, bioscience, social science, and computer science. These areas of strength allow our strong participation in Ohio's Third Frontier Program including Wright Projects and Centers. Our past investments are paying off.

For the FY08 and FY09 biennium, we will continue to fund opportunities in these areas while broadening the reach of RI support to include opportunities in related STEMM areas, collaborative research with Northeast Ohio institutions, and attractive opportunities identified by Centers or Institutes.

The advanced materials effort at KSU is spearheaded by liquid crystal research and development in display technology at the Liquid Crystal Institute (LCI) which houses the Chemical Physics Interdisciplinary Program (CPIP) ---a doctoral degree program. The LCI pioneered the modern era in liquid crystal research. It has no peer in Ohio, and there are only several smaller competing groups across the nation. The total campus-wide effort in advanced materials science is conducted by faculty and research staff in the LCI and in the Departments of Physics, Chemistry, Biological Science, and Computer Science. It addresses research issues in a wide array of areas including organic light emitting materials, conductive polymers, organic semiconductors, and nano-structured materials.

KSU has been creating the interdisciplinary strengths to excel in the field of bioscience and biotechnology research. The external funding in bioscience has been one of the fastest growing areas on campus in recent years. Researchers from the Department of

Biological Sciences and the LCI collaborated with faculty from the North Eastern Ohio Universities College of Medicine (NEOUCOM) to develop a liquid crystal based biosensor that greatly reduces the time required to detect lethal pathogens. This discovery is not only important for national defense but also may serve as the basis for an entirely new industry. The Department of Chemistry devotes a significant portion of its research effort to biochemistry. We have utilized federal funding to build excellence in cell imaging, including an advanced 3D classroom that allows students and faculty to view complex molecules and proteins in three dimensions. Most recently, KSU has established an effective partnership with the Oak Clinic for the research on the causes and cures for multiple sclerosis. This partnership has already begun to attract funding from industry and foundations.

KSU has a proven record of leading research and of effectively attracting external research support for psychological and sociological research. We are interested to seed developments that can expand this success. We have partnered with Summa Health Systems to establish a joint Center for the Treatment and Study of Traumatic Stress. The Center integrates research and treatment, builds effective liaisons with the community, and attracts significant federal funding. The Institute for the Study and Prevention of Violence (ISPV) at KSU addresses issues relevant to Homeland Security, and social aspects of public health. It assesses the degree of preparedness in vulnerable communities with respect to emergency management, and social difficulties. ISPV works across a spectrum of disciplines, including justice studies, sociology, nursing, psychology, philosophy and education and it has secured extramural funding that is significant for its size.

In computer science and informatics, KSU faculty are conducting basic and applied research in distributed and parallel processing, networking and net-centric systems, and computational science and visualization. This research supports applications in bioinformatics, materials informatics, database and data mining, image processing, and software engineering. We are participating in the Wright Center for Advanced Data Management. We are also supporting the Northeast Ohio cluster in Instruments, Controls and Electronics, which is committed to greatly increasing the region's research capabilities in electrical engineering and computer science.

2. Planned Categories of Investments

3.

For the 2008 and 2009 biennium, Research Incentive investments will be made in 4 general categories that are consistent with both the RI Program guidelines and the University's desire to leverage increased impact, quality, and extramural research funding. The investment categories, and the proportion of funds allocated, are:

- **Research with High Economic Impact Potential (40%)**
- **General Support of Basic and Applied Research in STEMM Areas (35%)**
- **Research in Collaboration with Northeast Ohio Institutions (15%)**
- **Seed or Development Funding for Centers or Institutes (10%)**

Further elaboration of activities included under these categories follows in the next section. The indicated percentages can vary somewhat depending upon the number and strength of applications. If the quality of proposals is not sufficient in a given area, the awards may be increased in another area.

4. Description of Expenditure Categories

- **Research with High Economic Impact Potential (40%).** We will entertain proposals to support research and development initiatives that have good commercialization potential and/or good prospects for contributing to the high technology or knowledge-based economy of Ohio. Often the available external funding in this category is from State agencies investing in the Third Frontier Program including Wright Centers of Innovation, Commercialization Projects, and other projects that collaborate with industry. Within this category, KSU remains interested in: advanced materials, bioscience and biotechnology, and information science. Some of these areas might also involve efforts that are competitive under other categories as well.
- **General Support of Basic and Applied Research in STEMM Areas (35%).** Note that this includes social sciences. Some strong research programs in STEMM areas, do not necessarily have immediate possibilities for commercialization or economically viable applications, but nevertheless provide enabling support and attract significant extramural funding, especially from the programs of Federal agencies, such as the NSF and DOE, that fund research into basic and fundamental issues. There are also research programs that do not lend themselves well to interdisciplinary structures or multi-institutional collaborations. Some basic and applied research, in both natural sciences and social sciences, falls into this category. Extramural grant support is often in the form of awards to individual faculty, or small groups. In order to ensure that opportunities are not missed for such programs to leverage increased impact, prestige, quality, and extramural funding, we aim to devote 35% of RI funding to proposals that make a strong case for producing significant outcomes under this category.
- **Research in Collaboration with Northeast Ohio Institutions (15%).** As a member of the North Shore Alliance for Research and Graduate Studies, KSU encourages and supports proposals that foster research collaborations among Alliance partners, and other North-East Ohio Institutions. The Alliance is a partnership of northeast Ohio universities and research organizations, including Akron, Cleveland State, Kent State and Youngstown State Universities; NEOUCOM; NASA Glenn; and the Lerner Research Institute of the Cleveland Clinic. Collaborative proposals will include investigators from at least one other NE Ohio institution, and collaborating institutions will be expected to provide support for the portion of the research conducted at their institution. Evaluation of such collaborative

proposals will be negotiated between the participating institutions. The prospects for future extramural funding will be an important element.

- **Seed or Development Funding for Centers or Institutes (10%).** There are a number of KSU Centers and Institutes, either existing or emerging, that do not have the stability or resources that an established Department or School has to develop research programs. This portion of RI funding will be awarded to those existing or emerging Centers or Institutes that make the strongest case that enhanced impact and extramural funding will follow such seed or developmental funding.

5. Evaluation of Internal Proposals

Our past procedures for the evaluation of internal proposals for the use of RI funds have been successful and we will continue them. The Division of Research and Graduate Studies will select several committees of faculty who have research grant experience and whose expertise spans the areas in which proposals are received. As coordinated by the Director of Sponsored Programs, the review committees will evaluate the proposals based on the goals of the RI Program, and more specifically, on the three criteria below. Their recommendations are made to the Vice-President for Research.

Three evaluation criteria will be used. To be funded, it is not necessary for a proposal to rate highly in all criteria if the rating is especially high in one or two. If possible, highly rated proposals in each of the four above categories will be funded. The evaluation criteria are:

- **Criterion A** – Strength of recent track record of extramural funding and/or strength of the case made that Research Incentive funds will lead to an extramural proposal that can leverage additional or new extramural funding;
- **Criterion B** – Strength of the case made that Research Incentive funds will foster high quality research and scholarship, and attract strong external recognition;
- **Criterion C** – Strength of the case made that the proposed research will have an economic impact in the State, possibly through high-technology innovation and commercialization.

Prior recipients of Research Incentive funds who request support will be required to document past outcomes of completed Research Incentive projects. Documentation should include an itemization of published articles, external proposals submitted, and external grants received as a result of the project funded.

6. Evaluation of Success

The success of funded projects can be assessed by external recognition received; the amount of extramural support generated to continue the research; the number of new external partnerships fostered; and new patents and new products developed by RI funding. Annual progress reports will be required to track effectiveness of the RI awards. Since the purpose of these funds is to seed rapid gains in extramural proposals submitted, research quality, impact, and extramural funding, the funds will be awarded with the expectation that they be expended within two years.

Applications for a one-year extension for unusual circumstances will be considered; otherwise such excess funds will be subject to reassignment to a subsequent round of awards.

MIAMI UNIVERSITY
RESEARCH INCENTIVE PLAN

FY 2008 & 2009

I. INSTITUTIONAL OBJECTIVES AND/OR GOALS

Miami University is pleased to provide this plan for the use of Research Incentive Program funds for fiscal years 2008-2009. This plan presents in outline form the categories of investments that will be made with Research Incentive funds at Miami, the rationale for our choice of these categories, and the manner in which specific projects within categories will be selected. The emphases in these categories have been changed to recognize the objectives of the Third Frontier Project. It should be noted that Miami University is currently associated with two Third Frontier Projects, IDCAST and Southern Ohio Creates Companies.

The Research Incentive Program is very important to Miami University over the next decade. Three major changes are challenging the Miami research community. **First**, Miami University is placing a greater emphasis on research, particularly in the areas of the Third Frontier Project. Faculty research is a very important activity at Miami University; research is at the heart of our graduate education programs, particularly the University's doctoral programs. Miami University is also nationally-recognized for its extensive efforts to incorporate research experience into the undergraduate curriculum. Miami University has seen a 110% increase in external research funding since fiscal year 2004. **Second**, over the next 10 years Miami University will replace more than 1/3 of its faculty due to retirements, and also has or anticipates adding 40 net-new faculty positions. **Third**, Miami University has made major enhancements to our School of Engineering and Applied Science. We have replaced an eminent Scholar in Zoology and hired one in Chemistry and Biochemistry. **Fourth**, Miami University is very engaged in economic development in southwest and south central Ohio. All three changes will require substantial funds for faculty start-up and seed money for collaborations.

Miami's Functional Mission Statement states: *"It is the purposeful linkage of scholarship with teaching that creates a special learning environment at Miami University."* The Functional Mission Statement also commits the University to *"selection, design, and implementation of high quality graduate programs that both contribute substantially to the intellectual vitality of the institution and enhance the learning experience of undergraduates"*. The University is committed to the model of faculty activity in which faculty scholarship is a primary means of renewal and

development, and in which faculty scholarship and teaching are mutually supportive. The University attempts to foster this model of faculty activity, and strongly encourages each faculty member to be active in research.

Miami University's objectives in investing Research Incentive funds are in accord with the objectives of the overall OBR program, namely to:

To stimulate and improve the quality of research and scholarship at the University,

To increase the amount of federal and other research funding received by the University,

To increase participation in SBIR and STTR and other cooperative proposals with industry,

To encourage research efforts that address the Third Frontier Project and that provide infrastructure to secure Miami University's participation in Wright Centers of Innovation, and

To establish the Miami Center for Innovation and Commercialization to foster commercialization of Miami University intellectual property and to provide economic development opportunities.

II. PLANNED EXPENDITURES BY CATEGORY

Miami University proposes to invest Research Incentive funds as seed monies in those situations demonstrating the most promise for attracting ongoing external support. Funds will be invested in four categories of support:

Research Incentive, with an emphasis on Research Center Development Seed Projects aligned with the Third Frontier Project including the Miami Center for Innovation and Commercialization **40%**

Start-up Funds for New Faculty **25%**

Discretionary Funds in Support of Research Proposals **10%**

Collaborative (Inter-institution and industrial) Research Projects **25%**

III. DESCRIPTION AND RATIONALE

A. Research Incentive/Collaborative or Center Development Seed Projects (40%)

A.1. Centers and Institutes: In the last biennium Miami University focused on the development of Centers that aligned with the Third Frontier Project. Several of

these centers have now received external funding and continue to expand their activities. Once again Miami University will solicit from small interdisciplinary groups of faculty requests to establish research centers. A major review criterion will be the alignment of the project with the goals of the Third Frontier Project and the potential for extension of this project into a Wright Centers for Innovation. In addition, these seed grants allow the collection of preliminary data that is increasingly important to the success of proposals to federal agencies such as NSF and NIH. Maximum awards will be \$40,000.

A.2. Establishing the Miami Center for Innovation and Commercialization: Miami University will use Research Incentive funds along with other funds to establish this center. ***MCIC's vision is to become the Miami University and small business community's one-stop-shop for innovative product development and commercialization needs.*** Our larger goals are to provide the infrastructure to enhance the viability of Miami University's IP and to help small businesses reach their commercialization objectives by leveraging existing capability within MU and building additional strength in the process engineering and applied technology sectors.

The Miami Center for Innovation and Commercialization is not a new business incubator or a research foundation. It is a new model for university assisted commercialization and economic development. The components are:

Create an entrepreneurial culture both on campus and in the economic development region.

Create educational opportunity for undergraduate and graduate students to be actively involved in product development interdisciplinary teams.

Promote and further develop Miami University's intellectual property by creating a more effective technology transfer process that can include starting-up companies.

Facilitate entrepreneurs' efforts in product development, business planning, and work-force development they need to be successful.

Provide a sustainability strategy and access to funding opportunities that includes SBIR/STTR, and GOALI federal funds, angel funds, and venture capital funds.

Provide venture capitalist with a mechanism to improve prospective business opportunities.

Miami University is poised to take a leadership role in commercialization and economic development in Ohio. MCIC is the concept that will make this goal a reality.

B. Start-up Funds for New Faculty (25%)

Especially in light of the large number of new faculty that Miami University will hire, we believe that a compelling case exists for investing Research Incentive monies

in start-up funds needed to attract talented new faculty. Miami University's long-term success in increasing external funding for research is dependent upon our success in hiring the very best faculty, those who can succeed in a very competitive grants environment. Our ability to hire talented new faculty in the science and engineering area is dependent in turn upon our ability to put together attractive, competitive start-up funding packages. By investing Research Incentive funds in start-up packages, we hope to significantly improve the research profile of the Miami

faculty over a period of time. Miami's College of Arts and Science recently initiated a study comparing start-up funding with subsequent grant success, and intends to track these quantities on an ongoing basis; preliminary data suggest a 5:1 leverage ratio.

C. Discretionary Funds in Support of Research Proposals (10%)

Funding will be available through the Associate Provost for Research to enable the University to respond to grant opportunities identified by faculty researchers. Examples of investments in this category include: key cost sharing on specific research proposals to external agencies; "bridge" funding to maintain continuity of support for faculty who are awaiting renewal or continuation of sponsored research; assistance with travel to meet with prospective sponsors of externally funded research; and other uses judged to be appropriate by the Associate Provost for Research. These discretionary funds also will be used by the Associate Provost to invest in specific faculty research "seed projects" that arise during the biennium, outside the time frame of the competitive program outlined in section A above.

D. Collaborative (Inter-institutional and Industrial) Research Projects (25%)

This category of support is intended to provide incentives and support for collaborative work involving Miami University with other universities and with business and industry, particularly within Ohio. Our experience is that such collaboration often leads to the establishment of new research centers or the strengthening of established research centers at Miami in ways that significantly improve their capacity to generate external support. A major review criterion will be the alignment of the project with the goals of the Third Frontier Project and the potential for extension of this project into a Wright Center of Innovation. As requested by the OBR, this category of investment is described more completely under section VII below.

Projects that will be supported in this category are the revised Shoupp program and the Industrial start-up Collaboration (ISC). The Shoupp proposals have faculty submit potential industry sponsored projects for Phase I funds (\$3,000) to establish the relationship. Phase II up to \$25,000 is used to match cash contributions from the industry to foster the project. The ISC program establishes a start-up business relationship with an Ohio based business using Miami University intellectual property.

IV. SELECTION OF PROJECTS

A Research Incentive Advisory Committee will be appointed by the Associate Provost for Research to encourage research and research proposals at the University. This committee will review the proposed Research Incentive projects and will advise the University regarding projects to be funded. Specific research ideas are to be reviewed and ranked by the Committee utilizing the following criteria:

intrinsic quality of the proposed work and the probability that the proposed work will make a significant contribution to the field of knowledge,

alignment of the project with the goals of the Third Frontier Project and the potential for extension of this project into a Wright Center of Innovation,

extent to which the project will enhance Miami's ability to attract external support for research from the federal government, private foundations, and industry,

importance of the research project in relation to departmental, college, or university priorities,

quality of the project personnel and adequacy of the resources necessary for the project, and

clarity and completeness of the idea.

V. TIMETABLE

January, 2008 Research Incentive Proposals from faculty received under Category A, with emphasis on Collaborative or Center Development Projects.

March, 2008 Research Incentive Advisory Committee reviews proposed projects under Category A; forwards recommendations to Provost.

April, 2008 Distribution of funds to specific Category A research projects at Miami.

July07–June09, Investment of Research Incentive funds in Categories B (Start-up Funds for New Faculty), C (Discretionary Funds in Support of Research Proposals), and D (Collaborative, Inter-institution, Shoupp, ICS Research Projects).

VI. EVALUATION AND REPORTING

Miami University will provide interim and final reports to the Ohio Board of Regents compiled from reports submitted by individual project directors. In addition, the University is committed to ongoing evaluation of the impact of Research Incentive funds in leveraging external support for faculty research projects. On the basis of the

University's experience with Research Incentive funds to date, we are indeed optimistic concerning the results of this ongoing evaluation and the success of the Research Incentive Program.

The impact of previous Research Incentive funding at Miami University has been major. The principal evidence for this conclusion is as follows: External funding for research and other scholarly projects at Miami University has increased funding around the twenty five million dollar level and has set a goal for 2009, Miami University's 200 birthday, at 40-50 million dollars per year. When this goal is met, Miami University will have increased its annual external funding by 200% over 7 years.

Subsequent external research grants to faculty receiving Research Incentive funding have been tabulated on seven occasions at the request of the OBR. These reports have been referred to as "Leveraging Reports". The ratios of resulting external grants to initial Research Incentive funding have been 2.6, 4.3, 8.7, 6.9, 6.1, 9.8, and 14.1 respectively. An analysis also was made of the pattern of success of faculty in seeking external support for their research following a Research Incentive grant. These data showed that more than three-quarters of Miami faculty receiving seed grants through the Research Incentive Program have subsequently received either ongoing or occasional external support for their research. Although these numbers are not accurate measures of the effectiveness of Research Incentive, due to the difficulty with associating an external grant with seed monies, they do indicate a high positive correlation between the faculty receiving Research Incentive funding and the University's subsequent external funding for research. The Federal Government and other funding agencies place increasing importance in funding decisions upon acquiring preliminary data prior to requests for funding. The Research Incentive Program initiated by the OBR has provided seed funding enabling many Miami faculty to initiate research projects and thus be competitive for external funding for ongoing research projects.

VII. USE OF "INCENTIVE FOR COLLABORATION" FUNDS

In accord with their specific purpose, the Incentive for Collaboration funds within Research Incentive will be used as outlined in section IIID. Projects that will be supported in this category are the revised Shoupp program and the Industrial start-up Collaboration (ISC). The Shoupp proposals have faculty submit potential industry sponsored projects for Phase I funds (\$3,000) to establish the relationship. Phase II up to \$25,000 is used to match cash contributions from the industry to foster the project. The ISC program establishes a start-up business relationship with an Ohio based business using Miami University intellectual property.

Miami faculty members are participants in several multi-university research consortia established through the OBR Investment Fund. These research projects represent key areas of opportunity for the University and also represent areas of

economic opportunity for the State of Ohio. "Incentive for Collaboration" funds will be used to enhance these key research collaborations and assist participating faculty in seeking major funding from external agencies. Miami University is also part of state-wide consortiums and alliance such as COUNT and UCEAO.

With the establishment of the Miami Center for Innovation and Commercialization, there will be increased opportunities for Miami University to collaborate with Ohio industry and small business. We anticipate several start-ups that will be housed in the two new research/technology parks that have been established/announced in 2005.

Again in the biennium more than half of Miami University's Research Incentive (categories A and D) will be directed toward incentives for collaborations with Ohio industry and other Ohio institutions.

Summary

In summary, Miami University recognizes the remarkable success of the Research Incentive Program in enhancing the procurement of external research funding for the State of Ohio. The plan above outlines Miami University's plan to expand the leveraging of funds external to the State of Ohio, and we gratefully acknowledge the foresight of the State in providing such funds.

NORTHEASTERN OHIO UNIVERSITIES COLLEGE OF MEDICINE
RESEARCH INCENTIVE PLAN
FY 2008 & 2009

Introduction

This institutional plan for FY 2008/09 is fully consistent with the core objectives of the Research Incentive Program:

- -To enhance the quality of research and scholarship at Ohio's universities;
- -To increase the level of federal and private research funding received by Ohio's universities, and;
- -To encourage research efforts that support the Third Frontier Project and economic growth in Ohio.

Institutional Objectives and/or Goals

Strategic Directions

The fundamental strategy underlying the development of the research program at NEOUCOM has been to focus on defined research strengths and to grow collaborative programs. Through a competitive process involving the submission of detailed research proposals and subsequent external review, two research focus areas were identified. These were Skeletal Biology and Auditory Neurosciences. Currently the 5 principle investigators (P.I.s) in the Skeletal Biology focus area are all funded by NIH or NSF and four out of the five P.I.s in the Auditory Neurosciences focus area are funded by NIH R01 grants. Further, the Skeletal Biology focus area has active and highly productive collaborations with basic scientists and clinicians located at the major hospitals in Akron, namely Children's Hospital, Summa Health Systems, and Akron General Medical Center. These collaborations are focused on translational research related to diseases of the skeleton such as osteoarthritis, tumors of bone and cartilage, and skeletal dysplasias of children. Other basic scientists at the College of Medicine are carrying out world-class research related to evolution of the skeleton. The more senior scientists in both focus areas have consistently utilized the incentive fund process to provide funding for collecting preliminary data that support either new NIH/NSF submissions or to respond to reviewer's comments.

Related to our research focus areas, we have emerging research "clusters" that represent research programs that have great potential for alignment. For example we currently have several junior investigators working in G-protein coupled receptor signaling. This important research has ramifications in many fields including cancer, diabetes, cardiovascular disease and others. The institution is working closely with

these individuals to mentor them toward collaborative grant submissions in order to obtain significant extramural funding. In addition, two senior faculty have stable NIH funding in research areas that have great potential for synergy and growth. Dr. John Chiang is working in the area of lipid/cardiovascular biology and has recently received notification that both of his NIH R01 grants have been renewed. With these renewals, Dr. Chiang's two research grants now have been funded continually for 15 years and 23 years respectively. Also, Dr. William Lynch has 10 consecutive years of NIH funding in the area of degenerative brain diseases and the use of stem cells as a potential therapeutic modality.

An extension of our defined research strategy is to make strategic hires of new faculty scientists who synergize with existing strengths and bring either existing extramural funding or the clear potential for acquiring funding. Dr. William Chilian, former Chairman of the Department of Physiology at Louisiana State University Health Sciences Center will join NEOUCOM on June 1 as the new Chairman of the Department of Physiology & Pharmacology. Dr. Chilian is an internationally-recognized scholar in the area of cardiovascular biology and brings with him active NIH funding and the solid potential for additional funding. In addition, Dr. Chilian has recruited a promising young Assistant Professor, Dr. Petra Rocic who will also join NEOUCOM in the summer of 2007. Dr. Rocic is also bringing existing grant funding and a clear plan for developing and NIH funded research program. Both Dr. Chilian and Dr. Rocic work in the area of cardiovascular biology and will synergize with senior investigators such as Dr. Chiang and junior investigators in the G-protein coupled receptor group.

Coupled with the plan to develop existing research strengths was a strengthening of the research infrastructure at NEOUCOM. Denese Shipp was hired as the new Director of the Office of Research and Sponsored programs and several new staff hires and assignments were made to better position the ORSP to support the new institutional research strategy. Dr. Walter E. Horton Jr., was hired as of February 1, 2007 after a national search as the new Vice President for Research. Dr. Horton rose through the faculty ranks at NEOUCOM reaching the level of Professor of Anatomy and was formally a Senior Staff Scientist at the NIH before coming to the College of Medicine. Dr. Horton currently has two active research grants, one from the Arthritis Foundation and one from the NIH to fund his internationally-recognized research program in the area of cartilage biology and osteoarthritis. The new organization of the ORSP places NEOUCOM in an even better position to efficiently and effectively utilize Research Incentive funds to leverage our research strengths to higher levels of federal research dollars.

Link to State and Federal Initiatives

It is clear that Ohio is working to link economic development and better quality of life to the biotechnology/biomedical industry. In a recent presentation to the Third Frontier Commission (April 27, 2007), the new Chancellor of the Ohio Board of

Regents described his plan for linking research clusters to the development of a talent pool to support the growth of the biotechnology/biomedical industry. NEOUCOM is one of the institutions named as critical for the development of the Biomedical Research Corridor in Akron and one of the lead institutions in a plan to develop a nationally-recognized Orthopaedic Research Institute in Akron. NEOUCOM is also active in pushing technology transfer by focusing on development of basic research that has practical applications. Recently technology was co-licensed between NEOUCOM and Kent State to work with a company that will locate in NE Ohio to develop and market a real-time pathogen detection system. Other patents related to the control of cholesterol metabolism and the use of natural compounds as anti-viral treatments are in development. All of these initiatives are in direct alignment with the Third Frontier Project and support one of the major focus areas of the Third Frontier.

With regard to federal mandates to develop translational and outcomes-based research, there is a long-standing and highly successful group at the College of Medicine focused on clinical outcomes and interventions to improve health care. As a community-based medical school we have over 1700 clinical faculty covering a geographic region of 17 counties in northeastern Ohio. Unlike large urban centers which see a relative homogeneous population, our physician and patient pools are more representative of the national norm. Therefore we can take advantage of this unique niche by facilitating clinical research through our affiliated hospitals and clinics. Clinical scientists led by Tony Costa, M.D., Chairman of our Department of Family Medicine, are working to develop this network by seeking major federal grants directed at translational research and by testing new breakthroughs discovered in our research focus areas and clusters.

Finally with the emergence of our new College of Pharmacy and related faculty hires, we will be in a position to carry out clinical research related to new drug development and clinical trials.

Summary of Planned Expenditures by Category

Category A: Intra-institutional Collaborative Research/Foci of Research Strength
30%

Category B: Inter-Institutional Collaborative Research-Ohio Universities &
Commercial Partners 20%

Category C: Individual Faculty Awards 40%

1. New Faculty Start-up
2. Individual Investigator Competitive Awards

Category D: Contingency Funds 10%

Descriptions and Rationales of Planned Expenditures

Category A: Intra-institutional Collaborative Research/Foci of Research Strength

Description:

This category directly satisfies the first two core objectives of Research Incentive. As mentioned above, research activities on the Rootstown campus have been strategically developed to build on existing strengths as evidenced by publications, acquisition of extramural funding, and the documented national standing of our scientists and clinicians. Opportunities for collaborative research among the biomedical, community health, clinical sciences, and pharmacy divisions and departments are extensive. Allocation of Research Incentive funds to Category A will be used to promote interdisciplinary research among and between these groups, including the targeted research foci and clusters.

Rationale and Implementation:

Targeting support to areas of documented strength with a track record of success is the most efficient and effective use of state funds in terms of the desired outcomes of attracting more federal funding and supporting biotechnology development. In addition, this approach promotes collaboration and interaction among and between strong programs which eliminates unnecessary duplication of equipment and supplies.

The main implementation strategy will be to use this category of Research Incentive funds to support projects developed in collaboration between already existing defined research foci or clusters. The collaborative component will be a major evaluation endpoint in the review of the proposals.

Category B: Inter-Institutional Collaborative Research-Ohio Universities & Commercial Partners

Description:

This category directly satisfies the first two core objectives of Research Incentive and has clear potential to fulfill the third objective as well. The Northeastern Ohio Universities Colleges of Medicine and Pharmacy participates in an extensive network of researchers and research-related resources throughout its consortium of 4 regional universities, 8 major teaching hospitals, and numerous clinics. The Rootstown-based faculty is fully committed to acting as a catalyst to promote research activities and acquisition of non-state funding streams between the consortial partners that would otherwise not be possible by any isolated group. This category of Research Incentive support will promote this synergy between members of the consortium and beyond

Rationale and Implementation:

This approach will nurture the growing networks of research scientists, clinicians, and industrial partners that participate in projects based on the Rootstown campus. NEOUCOM is working to develop our portfolio of signed Memoranda of Understanding with a variety of research partners that will eliminate roadblocks to collaborative ventures to bring federal funding into Ohio as well as new biotechnology-based businesses. A further implementation criterion is the requirement that the partner institution provides matching funds to the level of the award given from Research Incentive monies originating from NEOUCOM.

Category C: Individual Faculty Awards**Description:**

This category directly satisfies the first two objectives of Research Incentive and by extension will support Third Frontier initiatives as well. These funds will be used to support new faculty who are being hired to synergize with existing research foci as well as existing faculty who have a track record of success.

Rationale and Implementation:

The main implementation strategy will be to provide funds to support requests from new faculty to augment start-up packages. Priority will be given to requests for resources that may benefit more than one new faculty member. In addition, priority will be given to more established faculty who are requesting monies to generate data to support a renewal application or to answer criticisms of submitted proposals. The submitted or planned proposals should be to agencies that provide federal or foundation monies and include indirect cost recovery.

Category D: Contingency Funds**Description:**

A contingency fund for the purpose of meeting emergency needs such as unanticipated equipment repairs or special needs will be placed under the control of the Vice President for Research.

Rationale and Implementation:

This type of fund will allow for a relative rapid and flexible disbursement of monies from the perspective of the individual who has a broad view of the research activities of the institution.

Selection Process

Applications will be solicited from among the full-time, Rootstown-based faculty of the Colleges of Medicine and Pharmacy. The call for proposals will outline the Ohio

Board of Regents' core objectives. In addition, this Institutional Plans for use of the Research Incentive Funds will be made available to all potential applicants. The applications will be reviewed by the Institutional Research Committee, a standing committee with broad representation. The committee is chaired by the Vice President for Research. Decisions for approval is based on availability of funds coupled to the clear Rationales and Implementation criteria outlined in this document. In addition, criteria such as scientific merit, the strength of the Principle Investigator, and the relation to the overall mission of the institution are considered. All proposals are scored using a typical NIH 1-5 scoring system and funding recommendations are made to the Vice President for Research who makes the final decisions regarding awards.

Incentive for Collaboration Funds

The consortial nature of the relationship between NEOUCOM and partner universities and hospitals is a natural driver of collaborative interactions. The number of successful funded research programs of this type originating at NEOUCOM are numerous in our overall research portfolio with the intent to develop many more. In addition to these natural collaborative opportunities, our Category B funding option earmarks monies for direct, outside collaborative projects. The fact that awards are made only with evidence of matching funds by the partner assures a commitment to the partnership by both sides.

THE OHIO STATE UNIVERSITY

RESEARCH INCENTIVE PLAN

FY 2008 & 2009

2.0 Introduction:

The Research Challenge Program is an important State effort that has helped The Ohio State University to significantly enhance both its reputation and its externally funded research supported by the federal government and industry. During the past biennium, Research Challenge funds have been used to provide startup funding for a number of prominent, senior scientists recruited to the University, to stimulate and support multidisciplinary research activities, and to procure and operate state-of-the-art research equipment. Such investments support the University's institutional objectives of a) building a world-class faculty, b) establishing or sustaining Ohio State as the nation's and the world's preeminent research institution in selected areas of science and technology, c) expanding the national recognition of Ohio by firmly establishing Ohio State among the top-ten public research institutions in the nation, and d) building Ohio's future by driving innovation forward to commercialization. Consistent with the Third Frontier program goals, Ohio State plans to continue practices supporting these objectives throughout the 2008/2009 biennium, as described below.

According to the federal government's most recently released data (from 2005), Ohio State ranks 8th in the nation for total research expenditures at public institutions and 12th among all institutions – private and public. More recent data compiled by The Ohio State University Research Foundation shows that annual research expenditures have grown by roughly 25% over the past three years, from \$520 million in 2004 to \$652 million in fiscal year 2006.

Research Challenge funds awarded to Ohio State are administered by the Senior Vice President for Research working under direction of the President and in close collaboration with the Provost, the Senior Vice President for Business & Finance and the deans and faculty of all participating colleges. The Office of Research has responsibility for development of the institution's strategic plan for research, including the utilization of Research Challenge funds. Within the Office of Research, The Ohio State University Research Foundation is accountable for identifying and reporting to the Board of Regents (BOR) on externally funded research awards and expenditures eligible for match within the Research Challenge Program. The Office of Research is responsible for the preparation and submission of all reports to the Board of Regents on the expenditure of Research Challenge funds, with participating colleges and centers within the University providing information as required to facilitate those tasks.

The Office of Research maintains overall responsibility for ensuring that Research Challenge investments support the institutional goals and priorities defined within Ohio State's Academic Plan, updated in 2006 (<http://www.osu.edu/academicplan/2006message.php>). Objectives outlined within the Academic Plan call for a) establishment of Ohio State as the nation's premier land grant education and research institution serving the state and the nation, b) improved rankings of selected graduate and undergraduate academic programs, c) continued growth in research funded by the federal government and industry, and d) expanded success in commercialization of innovations devised by OSU researchers, particularly in cooperation with industry partners.

2.1 Institutional Objectives and Goals

The major goal of the Research Challenge Program is to assist the development of research excellence within Ohio's universities. This mission is integral to the underlying objectives of The Ohio State University Academic Plan, which includes recruitment and retention of world-class faculty members and building and maintaining a world-class research infrastructure. Simultaneously, Research Challenge funds will be used to enhance development and implementation of the State of Ohio Third Frontier Programs in biomedical and non-biomedical sciences and to support further development of Ohio's highest priority technology sectors.

Three of the six strategies articulated in Ohio State's Academic Plan are especially pertinent to the investment opportunities afforded by Research Challenge funds:

1. *Build a world-class faculty*—Research Challenge funds will allow us to provide exceptionally competitive start-up packages that are essential in recruiting and retaining some of the most productive and prestigious faculty in the world. Here, the Ohio Eminent Scholar program has been particularly effective in recruitment and productive in terms of return on investment. Nine National Academy of Sciences members reside at Ohio State, including Dr. Lonnie Thompson, our Distinguished University Professor of Earth Sciences, who has just been awarded the 2007 National Medal of Science, the highest honor bestowed for science in the United States, for his pioneering work that has provided explicit evidence of global climate change. Dr. Thompson and the prestigious OSU Byrd Polar Research Center have been and continue to be supported by BOR Research Challenge funding.

2. *Develop programs that define Ohio State as one of the nation's leading public land-grant universities* – Over the next five years, Research Challenge funds are being selectively invested in ten, high priority, multidisciplinary research initiatives at Ohio State. These Targeted Investments in Excellence programs represent areas of scholarship and research where Ohio State is or can be preeminent in the world. As one of the nation's largest and most

comprehensive universities, Ohio State boasts many areas of significant strength including: biomedical research; biomedical engineering; oncology; nanotechnologies; materials science – including polymers, structural materials, magnetic materials and more; energy – including transportation, propulsion, solar and biomass; mathematical & physical sciences - including astrophysics, ultra-dense matter physics, ultra-fast high intensity lasers; biocomplexity in the environment; climate change; adaptation and genetic engineering of crops for disease resistance and improved yield; public policy; behavioral sciences; and more.

3. *Build Ohio's future* - Investment of Research Challenge funds expand Ohio's technology base, leading to expanded partnerships with industry, start-up companies and commercialization that benefit the state by expanding the economy and creating jobs. Ohio State plans to utilize a small percentage of Research Challenge funding during the coming biennium in support of Technology Commercialization activities – this with a goal of further increasing licensing revenue derived from commercial application of Ohio State innovations. At the same time, Research Challenge funding will continue to support OSU researchers who are attracting industry sponsored research. In this category, with now over \$90 million in annual funding, Ohio State has climbed to be ranked as the 3rd largest university in the nation in terms of executing industry sponsored research. This climb to 3rd in the nation, up from 6th in prior years, appears to be a direct result of Third Frontier and Research Challenge investments in research and research partnerships at Ohio State.

2.2 Planned Distribution of Expenditures

Research Challenge investments will focus on five general thrust areas that are pertinent to the University's Academic Plan and are fully consistent with the Research Challenge guidelines. Investment areas, with the approximate percentages noted in parentheses, are listed below.

- **Faculty Recruitment and Retention (20%)**
- **General Research Support (20%)**
- **Multidisciplinary Research (20%)**
- **Science/Technology and Economic Development (20%)**
- **Shared Research Facilities & Matching on Equipment Purchases Supported by Extramural Awards from Federal Agencies and Industry (20%)**

These priorities support the Targeted Investments in Excellence programs mentioned above, the continued growth in extramural research competitively awarded to Ohio State, and innovations supporting the future economic development of the state. The policy guidelines to be followed by Ohio State in implementing the Research Challenge Program under each of these five areas are discussed in the next section. The percentages are approximate and could vary from year to year, depending upon specific research-related needs.

2.3 Description and Rationale:

The more specific program components of the general categories of expenditures described in the prior section include the following:

- **Faculty Recruitment and Retention (20%)** – For the 2008/2009 biennium, OSU plans to use approximately 20% of its Research Challenge funds in support of faculty recruitment and retention. The Office of Research shares costs for faculty recruitment and retention with the colleges and departments typically on a 1/3, 1/3, 1/3 basis, with the Office of Research contribution most often covered by Research Challenge dollars. Research Challenge dollars are then leveraged two to one by OSU matching contribution, thereby enabling Ohio State to recruit and retain outstanding senior faculty and promising junior faculty at the assistant professor level. In recent years, the Office of Research has been able to successfully retain a significant number of key faculty that have received exceptional offers to relocate their research programs to universities outside of Ohio. We expect such recruitments of our best faculty to continue or increase over the next two years as Ohio State's reputation for excellence in many fields of science, medicine, engineering and research continues to grow. At the same time, Research Challenge funding has been instrumental within Ohio State's successful recruitment of Ohio Eminent Scholars, Ohio State's Distinguished University Professors, as well as exceptionally promising young research educators.
- **General Research Support (20%)** – While numerous exciting opportunities are being pursued in interdisciplinary research, the majority of Ohio State's \$652 million worth of research expenditures during FY06 stemmed from individual faculty research programs. Accordingly, 20% of OSU's Research Challenge funds will be applied in support of individual faculty research programs across all of the University's 18 colleges. This support will be provided in the form of seed grants, small equipment grants, grants for undergraduate and graduate student participation in research and development, grants for participation in technical meetings aimed at proposal development, and similar activities supporting the University's overall research enterprise.

- **Multidisciplinary Research (20%)** – For the current biennium, we plan to use approximately 20% of the Research Challenge funds to support multidisciplinary research initiatives. Stimulating large-scale, multidisciplinary (often multi-institutional) research programs is a major focus for the Office of Research. Recent investment areas include Third Frontier initiatives such as nanotechnology for polymer-based biomedical devices, medical imaging for improved cancer diagnosis and treatment, information technology for personalized medicine, new technologies for propulsion being developed in cooperation with Ohio industry and federally-funded labs, technologies to replace petroleum feed materials with soy and corn-based substitutes for development of bio-degradable industrial lubricants and adhesives, and more. Other recent investment areas included climate modeling for understanding global warming, numerous areas of material science, advanced super computing, behavioral sciences, and more. Many of these research themes are the targets of ongoing Third Frontier Programs and Wright Centers for Innovation at Ohio State and we anticipate continued investment in these key areas throughout the coming biennium.
- **Science/Technology and Economic Development (20%)** – For the current biennium, OSU will commit 20% of its Research Challenge allocation to invest in those areas of science and technology that have the most immediate potential to impact the State’s economic development. We anticipate that in many, but not all, cases these investments will leverage with ongoing Third Frontier Projects and Wright Centers of Innovation in which OSU faculty are participating or leading. In situations where opportunities in technology transfer develop more rapidly than can be accommodated by procurement of new Third Frontier program funding, Research Challenge dollars will be utilized to bridge the gap. Special emphasis will be placed on use of these funds to stimulate commercialization of faculty inventions by licensing agreements with Ohio industries and development of start-up companies. These funds will be used not only to leverage federal funds, but also to stimulate direct interactions between faculty scientists and industrial scientists where the potential to commercialize University intellectual property is high.
- **Shared Research Facilities & Matching on Equipment Purchases Supported by Extramural Awards from Federal Agencies and Industry (20%)** – For the current biennium, plans are to use about 20% of the funds for matching equipment on proposals to external agencies and for operation and expansion of core R&D facilities for large groups of faculty and students. Especially within the various federal agencies, many programs require that universities provide cost sharing on capital equipment as part of the proposal budget. Funds are pledged when proposals are submitted, but used only when an award is made. Within OSU, Research Challenge dollars committed by the Office of Research are amplified by dollar-for-dollar match provided by both the college and the department, thereby leveraging every Research Challenge dollar invested by a factor of three. We continue to use Research Challenge dollars to expand the University’s R&D infrastructure support of state-of-the-art research facilities available for use by faculty and students from across the university. These

facilities are also often heavily utilized by collaborators from industry and other universities across the state, the nation and the world. This portion of the program then complements the modest resources that have been available from the Action Fund during the 2006/2007 biennium. The reduction in the Action Fund budget has forced OSU to increase the amount of Research Challenge dollars invested in this category in order to maintain our present level of competitiveness within federally-funded research equipment grant programs.

Nearly every research-oriented unit of the University has benefited from the equipment matching dollars provided by Research Challenge. Consequently, many faculty researchers are encouraged to apply for federally funded equipment grants and this portion of the program directly impacts one of the primary goals of the Research Challenge Program – to increase external research support in the state’s universities.

2.4 Program Evaluation

According to the most recent data published by the federal government, Ohio’s public academic institutions collectively executed nearly more than \$1.1 billion in R&D during FY05, with more than half of that total resident at The Ohio State University¹ as shown in Table 1. As mentioned above, Ohio State’s research awards climbed to \$652 million in FY2006, reflecting significant and sustained growth. Research funding totals over the past decade show a strong correlation between state investments in R&D and growth in competitively awarded research grants from federal government and industry sponsors².

An analysis by the Association of American Universities (AAU) shows that, on average, every \$1 million expended on academic research yields on average 32 peripheral jobs within the local community³. Consequently, R&D programs at Ohio State during 2006 sustained roughly 20,000 jobs within Columbus and the surrounding community.

¹NSF Division of Science Resources Statistics, *Survey of Research and Development Expenditures at Universities and Colleges, Fiscal Year 2005 (most recently published)*

² *Report to the Ohio State Board of Trustees by Sr. Vice President for Research Robert McGrath – March 2007*

³ *Association of American Universities, Employment Impacts of Academic R&D, Latest Data 2001 (last updated August 2003)*

Table 1: Return on State R&D Investments at Ohio Public Colleges and Universities:

Public Institutions	Sources of Funding ^(a)					% of All Public Col & Univ R&D
	Total Funding R&D ('000)	Federal R&D Funding ('000)	State R&D Funding ('000)	Industry R&D Funding ('000)	Other R&D Funding ('000)	
Air Force Inst. of Tech.	14,666	4,934	30	31	0	1%
Bowling Green State U.	9,746	6,418	178	102	848	1%
Central State Univ.	1,579	1,579	0	0	0	0%
Cleveland State Univ.	15,884	7,206	3,704	318	853	1%
Kent State Univ.	11,045	7,619	775	879	0	1%
Medical Univ. of Ohio	21,034	14,756	785	345	1,063	2%
Miami University	18,026	8,014	1,290	632	590	2%
NE Ohio U. Col. of Med.	5,703	3,267	227	84	402	1%
Ohio State Univ.	608,923	294,053	116,747	81,423	20,421	54%
Ohio University	43,229	20,736	1,867	4,345	1,419	4%
Univ. of Akron	26,888	10,246	551	3,408	3,557	2%
Univ. of Cincinnati	286,036	202,654	13,041	8,220	10,776	25%
Univ. of Toledo	32,351	15,521	804	1,050	1,498	3%
Wright State Univ.	40,328	20,527	2,410	3,871	654	4%
Youngstown State U.	1,382	1,138	94	94	0	0%
Totals:	1,136,820	618,668	142,503	104,802	42,081	100%

^a NSF Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges, FY 2005.

The highly successful Ohio Eminent Scholars program has enabled the recruitment of world-renowned scholars and researchers to Ohio State. In addition to the scholarship and prestige that these individuals bring to Ohio, they, too, have significant impact on Ohio's economy. For example, the ten Eminent Scholars recruited to Ohio State prior to 2001 collectively have been awarded over \$72 million in research grants and contracts, averaging over a half-million dollars per year each over the past 14 years. This is a remarkable average considering that some of OSU's Eminent Scholars are in Arts & Humanities where procurement of external research funding is not an element of their scholarly work.

The investment flexibility provided by the Research Challenge Program has resulted in a marked improvement in the caliber of our faculty. Important hires, at both the assistant professor and senior professor levels, have produced an increase in the number of proposals, the number of awards and the associated dollar values of those awards. The impact of these highly qualified faculty members, their associated prestigious R&D awards, and the accompanying expanded research volume must be viewed in terms of the benefit to our students. Ohio State is able to provide a much

higher quality education to all of our science, math, engineering, medicine and technology students as a result of access to state-of-the-art equipment and outstanding faculty. As the reputation of Ohio State for exceptional scholarship, research and education continues to grow, we are better able to attract graduate and undergraduate students of exceptional quality. In addition, as the University graduates more and more exceptionally trained students, the competitiveness of the Ohio workforce also expands.

To address anticipated increases in invention and entrepreneurial activity, OSU has begun to strengthen its capabilities in identifying, protecting and commercializing the intellectual output of OSU's research community. Here, our expanding partnership with Battelle and other important industry research partners is providing valuable assistance. Finally, with the addition of new, entrepreneurial faculty there is a greater emphasis on using University intellectual property to catalyze the formation of new, high-tech industries that offer the promise of accelerated economic development in the state and high paying jobs for Ohio's citizens.

At Ohio State, we look forward to working with the Board of Regents to evaluate the productivity of the Research Challenge Program across the vast spectrum of disciplines supported. Metrics are important, and we plan to evaluate the program during the next biennium based on its success in supporting ongoing Third Frontier Projects and Targeted Investments in Excellence, ability to stimulate highly successful new Third Frontier Projects, continued success in procurement of extramural research funding from federal agencies, research foundations and industry, and expanded recognition of the scholarship, innovation and economic impact emanating from Ohio State. Additional measures of success include success in development of new multidisciplinary statewide or nationwide centers of excellence and numbers of invention disclosures, start-up companies, patents, licenses, royalty revenues and more.

Those receiving Research Challenge funds are required to provide periodic reports and a final report on the project. Evidence of ways in which research results are transmitted to potential users (e.g., publications, patents, and license agreements) is also regularly compiled. This information allows the Office of Research to analyze success rates and return on investments related to competitions for external funding as well as other indicators of research success.

In summary, Research Challenge has had a significant impact on the:

- Quality and productivity of research;
- Level of externally sponsored research funding;
- Undergraduate and graduate student involvement in research;
- Stimulation of University-industrial partnerships; and
- Economic development in the state through commercialization of faculty inventions.

OHIO UNIVERSITY
RESEARCH INCENTIVE PLAN
FY 2008 & 2009

The Research Incentive program proves to be a vital resource as Ohio University (OHIO) pursues its goal of becoming a nationally prominent research university while giving students an outstanding research experience that will become the foundation for future discoveries, leaders, and educators. Overall the Third Frontier Program is helping OHIO to foster economic development by supporting local entrepreneurs and technology transfer. The Research Incentive Program encourages faculty to reach across disciplines to form collaborations whose strengths compound to a greater level than the sum of the individual efforts. They are encouraged to seek out industrial partners throughout the state to create synergies that leverage resources and eventually equate to products and markets that help the State of Ohio grow its workforce.

For the next two years OHIO will use Research Incentive allocations to increase faculty success rates in securing external funding. Through this effort OHIO will give particular emphasis on projects whose strengths are enhanced by acquiring collaborators across the State of Ohio. Before this can happen OHIO needs to recruit and retain additional faculty whose desires are to work in the lab, with students and collaborators to make discoveries and solve problems. OHIO will continue to foster collaborative strengths through its University Research Priorities program which has had early success in moving OHIO to the next level in research.

Planned Expenditure by Category or Strategy

OHIO will utilize Research Incentive funds in the following categories:

- Proposal enhancement and collaboration development (30%)
- Pre-proposal research & development (60%)
- Collaborative team infrastructure (10%)

Proposal enhancement and collaboration development

OHIO will continue to build on its internal “Research Challenge” program that has been in existence for many years. In our last OBOR Outcomes report this program returned a 7:1 leverage ratio. With many other sources of proposal development funds being strained the Research Challenge program has become one of key importance. The guidelines for the 2008 program will be slightly different than in the past as there will now be a bonus allotment for those proposals collaborating with Ohio institutions

of higher education or Ohio based industrial partners. The program offers principal investigators awards up to \$2,500 for the Research Incentive pool when a qualifying proposal is submitted to a non-Ohio external agency. Qualifying is defined as a program or project that, if funded, is eligible to be included in the University's external support base of basic and applied research and scholarship for the Ohio Board of Regents Research Incentive Program. Additionally, programs or projects must have a minimum award value of \$50,000 and an a minimum award period of 24 months, **or** a minimum award value of \$200,000 with a minimum award period of 12 months. The OHIO Research Challenge award must be matched by a local source of funds on a 1:1 basis. The BONUS program allows for an additional \$1,000 award to the principal investigator if the proposal includes a collaboration team with another Ohio university or an Ohio based industrial partner. The purpose of the entire award is to allow the commencement of early stage research in preparation for the award, or an opportunity and a resource for proposal enhancement for resubmission should the proposal be denied. Feedback from previous Research Challenge recipients tells us that this resource is extremely valuable in their resubmission success rates.

Pre-proposal research & development (emphasis on collaboration)

In 2003 OHIO launched a process to identify three areas of research, scholarship, and creative activity that would increase OHIO's track record of external funding and that would enhance the University's national prominence. In 2004 \$11 million in support was earmarked to support the three University Research Priorities over a six-year period. The funds were intended to allow these programs to enhance the ability of the researchers to be competitive in seeking external funds, hire new faculty and research technicians, and purchase scientific equipment and facilities. The three programs consist of the Structure of the Universe, the Consortium for Energy, Economics, and the Environment, and the NanoBioTechnology Institute (NBTI). Because of NBTI's ability to bring together a broad coalition of researchers from various disciplines to explore emerging areas such as biotechnology, nanomedicine, and biomedical engineering, OHIO elected to focus 60% of its Research Incentive allocation in this area. This investment is intended to be used for early stage research and development in the areas of cancer, diabetes, and other autoimmune diseases. These are not only issues that impact millions of Americans, but issues that are especially prevalent in our rural Appalachian region. The early stage research & development from this program will translate into attractive proposals made to such agencies and the NIH, NSF, and DOD as well as many private foundations.

The enhancement of entrepreneurial opportunities is an additional goal of the NBTI program. The group will strive to develop partnerships with industrial entities through contracts and STTR grants. Additionally, several patents, patent applications, provisional patent applications, and invention disclosures have and will continue to be a measure of success of this group.

Specifically, funds will be used to support faculty salaries for research efforts and start-up for new faculty positions.

Collaborative team infrastructure

An additional amount of Research Incentive funds will be dedicated to create a collaborative environment for the BNIT group to be productive. This includes the hiring of an equipment technician to support the shared equipment, an administrative assistant to coordinate activities, maintain budgets, and give general administrative support, a bio-statistician, a bio-materials specialist, and support for the bio-repository, general consumables, travel, and training.

Incentive for Collaboration Funds

An Incentive for Collaboration component is included in both of the programs above. The University's Research Challenge will have the \$1,000 BONUS for collaboration component. The measurement of the success of this investment will be monitored through a separately budget account which will identify the frequency the bonus is utilized, and the success rate of those awards on the first, second, or third submissions.

The NBTI program also has a built-in collaboration component. A major goal of the group is to incorporate biological strategies in the production of new materials with specially tailored properties. The interdisciplinary team will be using state of the art equipment with intentions of application toward medical diagnostics. Proposals, invention disclosures, and contracts will be reviewed to determine the amount and success of industrial collaborations.

SHAWNEE STATE UNIVERSITY
RESEARCH INCENTIVE PLAN
FY 2008 & 2009

Introduction

Shawnee State University's seeks to continue involvement in the Research Challenge Fund for the 2008/2009 fiscal years. As in past awards, Shawnee plans to use the funds to further the core objectives of the Research Challenge Program, mainly:

- To enhance the quality of research and scholarship at Shawnee State;
- To increase the level of federal and private research funding received by Shawnee, particularly in collaboration with other Ohio institutions, and;
- To encourage research efforts that support the Third Frontier Project and economic growth in Ohio.

Shawnee State's involvement with the Third Frontier Project has been aimed at job creation and economic growth. Shawnee's involvement in gaming and simulation degree programs and regional job creation was highlighted at the fourth conference for Interactive Digital Technology, *Shawnee 4.0 Conference*. Keynote speaker at this year's conference was Peter Tamte, the internationally renowned founder of Destineer Studios, and former Executive Vice President at Bungie Studios during the development of Halo, one of the most successful and often played computer games of all time.

Institutional Objectives and/or Goals

The base allotment from the Incentive for Collaboration Funds (ICF) that Shawnee State University (SSU) has received over the years has allowed individual researchers at Shawnee to collaborate with researchers at other institutions. This work has resulted in collaborative proposals for external funding, led to publication of research results in scholarly journals and has been partially responsible for a significant increase in research at the institution. We are requesting the ICF funds for the next two fiscal years.

The ICF funds that have been received at Shawnee State have been awarded competitively to SSU faculty applicants who have demonstrated that they have collaborative links with researchers at other institutions. The ICF funds have been awarded to faculty members in the Departments of Mathematics and Natural Sciences. Faculty from the Dept. of Industrial and Engineering Technologies and Department of Occupational Therapy have indicated an interest in participating in research opportunities through the Research Challenge Funds.

Because SSU is a small, regional teaching institution, with relatively high teaching loads, the support from the ICF funds have been critical to support the research activity of selected faculty and their work with other researchers around Ohio. The ICF funding has allowed Shawnee State University to join several state-wide collaborative research efforts including the newly formed University Clean Energy Alliance of Ohio (UCEAO), of which Shawnee State is a founding member.

Planned Expenditures by Category or Strategy

During the past several years, 100% of the ICF funds have been awarded through a competitive, university wide process. The funds have gone to the Department of Mathematics (10%) and biologists in the Department of Natural Sciences (90%). The plan for FY 2008/2009 is to continue funding successful projects and partnerships as well as expand activity to other departments and initiatives including participation in UCEAO.

The anticipated allocation of funds will be:

1. Department of Natural Sciences – Approximately **50%** - primary core objective is to increase the level of federal and private research funding received by Ohio's universities;
2. Department of Mathematical Sciences – Approximately **10%** - primary core objective is to enhance the quality of research and scholarship at Ohio's universities;
3. Department of Industrial and Engineering Technology and Department of Fine, Digital and Performing Arts – Approximately **20%** - primary core objective is to encourage research efforts that support the Third Frontier Project and economic growth in Ohio, primarily through the gaming and digital simulation programs and research of these departments, and;
4. New competitive proposals requested from Shawnee faculty – Approximately **20%** - primary core objective is to enhance the quality of research and scholarship at Ohio's universities.

Descriptions and Rationale

Shawnee State University's use of Research Challenge Funds has been used to promote collaborative efforts with researchers at other institutions. Descriptions of the existing projects are listed below under Incentive for Collaboration Funds. Funds for new projects in the preceding expenditure categories will be awarded on a competitive basis. A university review committee receives and evaluates proposals before making recommendations for funding. A four page proposal explaining the nature of the research, the details of the collaboration, a budget and the time frame for the project are reviewed by a local committee. This procedure will continue for awarding ICF funds at Shawnee.

The goal is to increase research and scholarship opportunities for faculty at a less research-intensive university. The other two core objectives of the Research Challenge Program will also be addressed this year. Federal funding from USEPA through the Wetland Research collaboration has been received and the project is being implemented. Shawnee State University has also started programs in digital arts and gaming-simulation that are connected with the Third Frontier Project and economic growth in south eastern Ohio.

Incentive for Collaboration Funds

Natural Science Collaborative Projects

A long term collaboration of SSU faculty and the Olentangy River Wetland Research Park at The Ohio State University will continue to receive support through ICF funds. This collaborative research involves biologists from the Department of Natural Sciences. This collaboration has resulted in the submission of a number of proposals for external funding that includes the work of the Shawnee State University faculty. This project will continue and has recently garnered external funding from the United States Environmental Protection Agency for river and wetland restoration research. Shawnee State will receive \$35,000 from this grant to establish a water quality monitoring station in southern Ohio.

Mathematics Collaborative Project

A mathematics faculty member has been involved in a collaborative project with faculty from Kent State University and other institutions related to the Ishikawa iteration scheme and nonexpansive mapping. This work has resulted in a number of publications, presentations and seminars. Junior faculty members in mathematics have been brought into these research efforts. This collaboration is expected to continue.

Plastics/Wood Products Industry Collaborative Project

A faculty member from the Department of Industrial and Engineering Technology has started a project for using wood industry waste in plastic processing. This project has energy and resource conservation implications that may be linked to UCEAO.

THE UNIVERSITY OF TOLEDO

RESEARCH INCENTIVE PLAN

FY 2008 & 2009

Institutional Objectives and Goals

The University of Toledo is continuing to improve its standing as a premier metropolitan research university that is engaged with its community partners in building a diverse, technology-based economy in Northwest Ohio. Not only has The University of Toledo risen dramatically as a research university in recent years, but the University has taken major steps to invest in areas that support collaborative projects for the benefit of the region. In addition, the merger of The University of Toledo with The Medical University of Ohio has created the third largest public university in the state that offers a broad range of programs including a Medical School and a research hospital.

On the main campus, Research and Development expenditures, according to NSF data, has risen substantially in recent years. R&D expenditures stood at \$8.7 million in FY97; \$11.5 million in FY98; \$11.8 million in FY99; \$13.7 million in FY00; \$16.3 million in FY01, and grew dramatically to \$32.3 million in FY05. From FY01 to FY05, the University of Toledo's main campus rose in the national NSF rankings from 215 to 194 in total R&D expenditures. R&D expenditures at the Health Science campus stood at \$21 million in FY05 placing the Health Science campus at #225 in the ranking of research universities. Combined, the new University of Toledo would be ranked at #159 in the national rankings.

The University aims to provide leadership to the transformation of Northwest Ohio by building programs of research preeminence that serve as sources of innovation in the region as well as magnets to attract investment and new talent into the region. The University's research investment efforts provide the foundation for the University of Toledo's Science and Technology Corridor initiative that is working with community leaders to develop and attract technology intensive business and government laboratories into the community.

To improve the University's standing as a premier research university, a major focus has been on increasing *federal* research funding and linking these research programs to areas of regional and state interest. The University has been successful in increasing its federal research awards. In FY06, total federal awards to the main campus were \$25.5 million and \$19.4 million to the Health Science Campus.

To increase competitiveness, the University has targeted selected areas for research enhancement. On the main campus areas selected include: thin films for photovoltaics; astrophysics; biotechnology; environmental remediation; geographic information systems; and science and technology education. At the Health Science Campus areas of focus are: Cardiovascular and Metabolic Diseases; Cancer Biology; Neurosciences & Neurological Diseases; and Infection, Immunology, and Transplantation. The University's Research Council is now in the process of evaluating areas of research excellence for the new campus. The Research Council received instructions from Dr. Lloyd Jacobs that The University of Toledo must be narrower and deeper and that areas of research focus should emphasize translational research. Research Incentive funds are a critical element in this strategy to build a stronger research university with selected areas of research excellence.

The following sections summarize the plans for both the main campus and the Health Science campus.

University of Toledo Main Campus

FY 2008-2009 Research Incentive Plan

The main campus of The University of Toledo will use Research Incentive Funds as a mechanism to improve the University's overall research competitiveness by assisting the University in 1) providing seed funding for new investigators to assist them in developing their research program; 2) encouraging faculty to develop collaborative, multidisciplinary, and multi-institutional basic research initiatives in areas important to the University and State of Ohio's Third Frontier Project; 3) attracting research-intensive faculty in selected areas through competitive start-up packages; 4) supporting new research-oriented faculty member positions created through the faculty hiring plan to build strengths in areas of university research focus; and 5) providing research support for the Toledo Science and Technology Corridor and for the technology clusters of Northwest Ohio (that are consistent with Third Frontier Project goals).

As shown below, our plan provides funds in each of these areas to foster collaboration with industry and other universities in support of existing or future Third Frontier investment. Our estimate is that about 25% of the Research Incentive funds will be used on Third Frontier Project related efforts.

Planned Expenditures

University-Wide Competition	20.0%
Multi-disciplinary and Multi-institutional Research Programs	20.0%
Strategic Start-up Funding	25.0%

New Research-Challenge Faculty	25.0%
S&T Corridor and Technology Clusters	10.0%

Description and Rationale

A. University-Wide Competition (20%)

Description. The University of Toledo has internal grant programs to improve the University’s position as a research university and to help leverage federal funds. Research Incentive Funds will be dedicated to assist faculty in the support of *summer research projects*, the *revision and resubmission of proposals to federal agencies*, and the *development of SBIR and STTR proposals* with industry.

Rationale. The investment in faculty research through these three internal grant programs is designed to increase the level of competitive funding at The University of Toledo, establish stronger ties to federal agencies, position the University to compete for Third Frontier funding, and to develop stronger ties to local industry so that the basic research at the University aids in state economic development.

The *summer research projects* are generally single-investigator awards directed toward junior faculty and are used to assist faculty in conducting small studies and collecting data that can be used in strengthening proposals and in improving the qualifications of the faculty so that they are more competitive for larger competitive awards from federal agencies. A requirement of receiving funds is that the faculty member submits a proposal for external support.

The *proposal preparation mini-grants program* provides funds to junior faculty members (and senior faculty members who are moving into new areas) for the rewriting and resubmission of proposals that were *not* funded in the first submission to a competitive federal program. To qualify for funding, the faculty member must submit copies of the written reviews (e.g., NSF mail and panel reviews) along with a plan on how a revised proposal will respond to the reviewers’ comments. The idea is to provide this type of funding so that a faculty member may not need to seek summer teaching support so that a period of dedicated time is devoted toward the preparation of a quality proposal.

The Phase 0 SBIR/STTR program provides funds to a faculty member who will *collaborate* with a small Ohio technology company in the preparation and submission of a proposal to a SBIR/STTR program. The SBIR/STTR support is to link UT faculty with Ohio businesses both to support small business proposals to federal agencies as well as to strengthen the collaboration between

University faculty members and small business enterprises. Preference is on proposals in support of the Third Frontier Project.

These funds are not necessarily directed toward immediate Third Frontier projects but to broaden the base of competitive research faculty at The University of Toledo.

B. Multi-Disciplinary and Multi-Institutional Research Programs (20%)

Description. The University of Toledo's main campus has a competitive internal program to encourage faculty to develop multi-investigator, multi-institutional and multi-disciplinary proposals. Research Incentive funds are used to support selected projects for one year to assist the group in organizing their research and developing a track record of collaboration in preparation for external submission. Faculty members are encouraged to establish projects with other Ohio institutions of higher education (particularly Bowling Green State University and The Medical University of Ohio) to build programs that may compete for Third Frontier Project funding. UT, BGSU and the former Medical University of Ohio have formed an Office of Research Collaboration that is assisting in the development of multi-institutional collaborative projects. The Office of Research Collaboration will continue to support projects across the two UT campuses and with BGSU.

Rationale. The University of Toledo will become a more competitive research institution if the University develops strong multi-disciplinary and multi-institutional research areas. In order for multi-disciplinary research groups to be competitive, it is necessary for faculty to have a record of collaboration and joint publications. Research Incentive Funds will be used to support one or two multi-disciplinary projects per year that are selected on the basis on external peer reviews. It is also expected that these multi-disciplinary research groups will be important to the State in support of research for Third Frontier funding, and this funding will lead to the strengthening of a critical mass of faculty who will be able to develop Wright Centers of Innovation or Wright Projects.

C. Strategic Start-Up Funding (25%)

Description. Research Incentive Funds will be used to develop competitive start-up packages for new faculty who are likely to develop strong, externally funded research programs. The University of Toledo's main campus is now completing a three-year faculty-hiring program that added 10 new faculty members per year in support of areas of research focus. One of the areas for new faculty hiring is in support of The University of Toledo's Wright Center for Photovoltaic Innovation and Commercialization. These funds will be distributed in

discussion with the provost and college deans, based upon the needs of the faculty member and the likelihood that the person will strengthen the University's research position.

Rationale. It is necessary for The University of Toledo to present attractive start-up packages to attract the best possible talent to the University. This is particularly true in the sciences and engineering. Research Incentive Funds will allow The University of Toledo to provide offers that are as attractive as most that the best candidates will receive. The use of Research Incentive Funds for this purpose will be based upon the willingness of the department and dean to provide matching support for the faculty member.

D. New Research Focus Faculty Members (25%)

Description. The University of Toledo's Research Council will assess areas of research focus for the new University and develop recommendations for new faculty lines to support the development of these areas. As noted above, the University is now completing its three-year faculty-hiring program that added 10 new faculty members a year in support of areas of research focus. Research Incentive Funds will be provided to hire new research-intensive faculty in support of the areas selected by the Research Task Force. Research Incentive funds will be used to support a portion the academic year salary for the first two years of their hire at The University of Toledo.

Rationale. This investment will help to increase the critical mass of research faculty in areas determined to be important to the University and relevant to the State of Ohio. It will also encourage deans to prioritize hiring in selected areas. Furthermore, the use of Research Incentive Funds will allow the University to hire additional faculty than would be the case otherwise. These new hires are expected to arrive on campus with externally-sponsored projects underway or have proposals under development and are expected to help create a "critical mass" of expertise in Wright Centers and Wright Center proposals.

E. Science and Technology Corridor and Technology Clusters (10%)

The University of Toledo is committed to using its faculty expertise and specialized equipment to support technology-based development growing in the Toledo Science and Technology Corridor and through the region's technology clusters. The University and its regional partners (RGP, LCIC, Port Authority, etc.) have selected alternative energy, transportation logistics, and agbioscience as technology clusters for advancement. The Toledo Science and Technology Corridor is a long-term initiative of the University of Toledo and its partners to create Toledo's innovation-based economy through a new approach for investment to promote linkages and collaboration among the region's academic

institutions, businesses, and government entities. Led by The University of Toledo, partners include almost all public and private enterprises who are involved in promoting regional development, who have technology assets, who advocate for labor or business, or who will benefit through a more diverse and vibrant community.

The Science and Technology Corridor is a focus of business investment that will access the knowledge assets of The University of Toledo. This plan calls for the expansion of existing clusters and the creation of entirely new clusters that show promise for the region. The development of the alternative energy cluster is well on its way, as indicated by a reference to Toledo in the May 24th, 2007 issue of the Economist as a promising areas for clean energy technology. The Corridor supports the clusters by providing mechanisms to promote collaboration among the region's technology organizations as well as the creation of a "technology district" within Toledo that will focus R&D and educational activities in Toledo between the campuses of The University of Toledo. The Corridor will house university research centers, university incubation facilities, and university capacity-building programs that will train individuals from underrepresented groups to enter the workforce in growing and new industries.

Research Incentive funds will be used to advance research and innovation that will directly support the corridor's development and support of three technology clusters that have a strong foundation in university research. The funds will be used to support technology start-up firms and for projects that provide a basis for collaboration with industry partners.

Incentive for Collaboration

The University of Toledo encourages faculty to develop collaborative programs with Ohio industry and with other Ohio institutions of higher education, and special consideration will be provided to initiatives that involve Ohio industry and other Ohio universities. As mentioned previously, The University of Toledo is a partner in the Office of Research Collaboration. The success in meeting collaboration objectives will be measured and evaluated by tracking our success in developing successful collaborative research projects. These include:

- Successful Phase 1 and Phase 2 SBIR projects with Ohio small businesses
- Successful Hayes Investment projects
- Participation in Wright Centers of Innovation and Wright Projects
- Development of new Third Frontier Projects and projects that use the Third Frontier Network
- Collaboration with Ohio federal R&D agencies (in particular NASA Glenn, NASA Plum Brook; and Wright Patterson Air Force Base)

- Collaboration with Ohio universities and industry
- Collaboration with Ohio universities and industry in federally-funded projects

University of Toledo - Health Science Campus

FY 2008 - 2009 Research Challenge Plan

During the past several years the University of Toledo Health Science Campus (UT-HSC) has developed a research strategy that can best be described as “Narrower But Deeper.” That is, it has been determined that an institution of our size does not have the resources to excel in all areas of biomedical research, but by concentrating our resources in a few key areas, we can excel in those areas. The areas selected represent current research strengths at UT-HSC, particularly in basic research, as measured by federal, peer-reviewed research grant and contract awards. Our goal is to further strengthen these areas of basic research, while also building clinical research strength in these areas. Our overall aim is to foster collaborative, translational, research at UT-HSC, bringing the fruits of basic research to the bedside. To that end, for the foreseeable future, UT-HSC will focus its basic and clinical research efforts and research-support resources in the following areas of biomedical research:

- 1) Cardiovascular and Metabolic Diseases
- 2) Cancer Biology
- 3) Neurosciences & Neurological Diseases
- 4) Infection, Immunology, and Transplantation

The basic science departments of the UT College of Medicine recently have been reduced from five to four and these four departments have been reorganized around these four research focus areas listed above. In addition, the College of Medicine Ph.D. tracks has also been reorganized around these same focus areas. A large portion of Research Challenge funds to be received in FY 2008 - 2009 will be utilized for partial support of start-up resources for new department chairs and faculty whose research expertise is in the above four areas. It is anticipated that, during this biennium, two College of Medicine basic science department chairs (Physiology/Pharmacology, Metabolism and Cardiovascular Sciences, and Neurosciences) and one clinical department chair (Pathology) with demonstrated research expertise in the above research areas will be recruited to fill vacant or retiring chair positions. The “recruitment package” for each of these new chairs will include a number of new/replacement faculty positions in their respective departments. Although it is anticipated that all new chairs will bring with them well established research programs funded by federal, peer-reviewed grants, and that the majority of

the new faculty that they hire will also bring with them significant grant funding, “start-up packages” will still be necessary to recruit these individuals to UT-HSC.

Individuals receiving support from Research Incentive funds will be required to provide annual reports which show: 1) new or competitively renewed grants/contracts for which preliminary data may have been supported by Research Incentive funding; 2) the number of medical or graduate students involved in their research; 3) any UT-HSC industrial partnerships resulting from the research; 4) evidence of dissemination of research results (e.g., presentations, publications, patents, etc.).

With the average start-up package for a new basic science faculty recruit in a medical school being a minimum of \$300,000, it is anticipated that at least 80% of Research Incentive funds received in FY 2008 - 2009 will be devoted to research start-up support for newly hired chairs and faculty.

Center For Clinical Research:

In July, 2005 UT-HSC opened a Center for Clinical Research (CCR), whose primary focus will be to provide infrastructure support for clinical and translational research and to foster collaborations between UT-HSC basic scientists and clinical scientists. The CCR also will facilitate collaborations between UT-HSC clinical scientists and corporate entities (both within Ohio and beyond) engaged in patient-oriented research involving pharmaceuticals or medical devices. The CCR is UT-HSC’s “front door” for companies desiring to contract with UT-HSC for clinical trials of drugs or devices or to collaborate with UT-HSC clinical scientists on research projects of mutual interest. Although, to date, the vast majority of clinical research at UT-HSC has been sponsored by non-Ohio companies, one of the goals of the CCR will be to seek out Ohio companies that UT-HSC might partner with for clinical research projects.

Partial support of the CCR is anticipated to require up to 10% of Research Incentive funds in FY 2008 - 2009. A significant portion of this funding to the CCR will support an intramural competition for Clinical and Translational Research Awards. The last round of this competition elicited over 20 high quality interdisciplinary applications each of which was reviewed by external reviewers. The top six applications were funded and we are confident that these dollars will support the collection of preliminary data that will be utilized in highly competitive applications to national granting agencies such as the NIH.

Incentive For Collaboration:

The UT-HSC is committed to enhancing the environment for research collaborations with scientists on the UT main campus and at other Ohio institutions, in particular with Bowling Green State University (BGSU). Several years ago a joint Bioinformatics/Proteomics/Genomics (BPG) Program was established at UT-HSC, with BGSU as a partner and we anticipate that this program will be funded partially by Research Incentive dollars in the next biennium. UT-HSC and BGSU continue to

support a joint Interinstitutional Research Collaboration Office <<http://www.collaboration.bgsu.mco.utoledo.edu/>>, with each institution sharing in the cost of this office's activities. It is anticipated that the activities of this office will be funded partially by Research Challenge dollars in the next biennium.

Partial support of the above collaborative programs will require at least 10% of UT-HSC's projected Research Incentive award for FY 2008 - 2009.

WRIGHT STATE UNIVERSITY

RESEARCH INCENTIVE PLAN

FY 2008 & 2009

Institutional Objectives

Wright State University's Research Incentive Program will continue to support the specific goals of the OBR Research Incentive Program by supporting basic and applied research projects that have high potential for attracting external support and that also demonstrate both excellence and congruence with the university's *Strategic Plan 2003-2008* and the State of Ohio's Third Frontier Project. [Note: Wright State will keep the name "Research Challenge" for internal use so as not to confuse this program with its own on-going "Research Incentive" program funded by university monies.]

The main tactical objective of the Wright State University Research Incentive Plan is to help individual investigators and investigator teams attract external support for new basic or applied research programs in areas of strategic importance to the University and the State of Ohio. Supporting objectives are to develop synergy between research and graduate education; further develop the University's research infrastructure; promote economic development in the region and in Ohio through support of research in Third Frontier Project technology areas; and encourage collaboration with other Ohio universities, regional industry, and non-profit organizations.

Planned Expenditures by Category

Wright State University will apportion its Research Incentive funds among the five categories listed in the first column of the table given below. Wright State University earns Research Incentive funds based upon "Direct Match" of research expenditures as well as an amount for "Incentive for Collaboration." The expenditure plan divides amounts between these two funding sources assuming that 20% of total funds come by the latter mechanism.

	Direct Match	Incentive for Collaboration	Total
New Investigators of High Potential	25		25
Early Start/Augmentation Competition	30	5	35
Major Collaborative/Infrastructure Programs	7.5	7.5	15
Technology Commercialization	7.5	7.5	15
Contingency for Research Opportunity	10		10

Description and Rationale

Awards to New Investigators of High Potential

Twenty-five percent of the university's Research Incentive funds will be awarded to highly competitive new faculty who are recruited for the academic years 2007-08 and 2008-09. These Research Incentive funds thus become part of a total recruitment package designed to attract faculty who have a high potential for significant research contributions and, thereby, the ability to attract external research support. This support will be centered on those units that have historically achieved a high level of external research funding for basic and applied research, such as the College of Engineering and Computer Science, the College of Science and Mathematics, and the School of Medicine. Support will be negotiated between the Dean of the college/school and the Vice President for Research and Graduate Studies based upon a proposal for initiation of the new investigator's sponsored research program. The fraction of Research Incentive funds assigned to this component may change if hiring is substantially different from that currently projected.

Early Start/Augmentation Competition

Wright State will invest thirty-five percent of Research Incentive funds to encourage and support specific research proposals to external sponsors. Specifically these funds will:

- allow for an early start of research for which proposals are under review;
- support the pursuit of promising, related new directions for an existing project;
- provide cost-sharing to augment funded research projects upon award, for example, to underwrite the cost of additional graduate students to work on the project or match capital equipment expenditures; or
- augment externally-supported projects to make these projects more competitive at renewal time.

These funds will be awarded through a semi-annual competition among a set of eligible investigators. This competition will challenge faculty and encourage them to submit significant proposals that would qualify for meaningful cost sharing by the university through Research Incentive. Guidelines for this competition include: (1) faculty must have submitted a proposal to an external sponsor with a first-year budget of at least \$40,000 in direct costs; (2) the Research Incentive investment will be limited to 25% of the first-year budget of the external proposal with an absolute maximum of \$50,000; and (3) faculty teams may pool their eligibility to qualify for larger awards, up to a maximum of \$50,000 per proposal. The guidelines will be interpreted to promote and encourage collaboration.

Ad hoc committees composed of college/school deans and the Vice President for Research and Graduate Studies will select those proposals for early start and/or augmentation for which a Research Incentive investment will have the greatest impact on the competitiveness of the project and research infrastructure within the units. The deans may utilize faculty (research) committees in their respective schools/colleges to assess the scientific merit of the proposals and overlay their administrative judgment of the relevance of the research area to the strategic goals of the unit as well as university-wide research priorities. The Vice President for Research and Graduate Studies will assure that funding allocations meet Research Incentive guidelines.

Awards in this category to augment research projects supported by industry or by industry-driven federal programs such as SBIR and STTR will qualify for the fraction of funds identified with “Incentive for Collaboration.”

Major Collaboration and Infrastructure Program

Wright State will invest fifteen percent of Research Incentive funds to encourage and support new research initiatives targeted to encourage the formation of collaborative research teams and the development of proposals for major external grants and contracts. Specifically, these funds will:

- encourage major collaborative proposals in areas of broad research strength at WSU,
- develop research strength in areas supporting Ohio’s strategic needs such as information technology, biotechnology, advanced materials, instruments and controls, and power and propulsion,
- establish core shared equipment facilities that will help make external proposals submitted by research teams using these facilities more competitive.

These funds will be awarded at the discretion of the Vice President for Research in consultation with relevant college/school deans. Collaborative partnerships will only be eligible to apply for funding if they satisfy all of the following criteria:

- the proposal has substantive involvement of at least three fully-affiliated faculty (or two fully-affiliated WSU faculty and one external investigator), normally but not necessarily representing at least two different departments or units;
- the team can demonstrate that the Research Incentive effort, if successful, will enable and strengthen submission of applications for specific major grant program(s), for example, State of Ohio Third Frontier Project; NIH Program Project Grants; NSF Science and Engineering Center Grants; NSF IGERT program; clusters of smaller awards from different agencies; etc.
- the designated Principal Investigator and other team members (with the exception of new faculty who have been at WSU less than two years) have received external funding awards, or submitted external proposals as PI, within the 12 months preceding submission of the Research Incentive application.

Collaboration with investigators at other universities will be strongly encouraged but it will be made clear that Research Incentive funds may not be subcontracted outside of Wright State.

Important factors in the review of applications will include the importance of the proposed research, priority for university investment, and an assessment of how much the investigators chances of receiving major external funding will be enhanced as a result of Research Incentive funding. Special consideration may be given to applications that will help fund research in fields that have been designated by the Board of Regents to be of strategic importance to the State of Ohio. An additional review factor will be the ability of the collaborating team to make a convincing and compelling case for funding based on specific, concrete, and/or measurable outcomes and goals.

Technology Commercialization

In alignment with the Third Frontier Project, Wright State University will invest fifteen percent of its Research Incentive funds to support a component of its Research Incentive plan called “Technology Commercialization.” This will consist of awards to faculty and research staff for the purpose of encouraging commercialization of research accomplishments. Goals of this component include developing intellectual property, establishing commercial licenses, and the formation of start-up companies along with securing of seed capital. Intermediate goals could include applications for

leveraging federal technology commercialization grant funds, development of prototypes, and development of a business plan.

The approval of Senate Bill 286 in 2000 that permits faculty equity ownership in university-related start-ups and formulation of the Third Frontier Project have modified the goals of OBR research investments. We believe it is important to assist WSU faculty members who have an interest in the commercialization of research for the public benefit.

Applicants for Technology Commercialization funds will be asked to define project objectives including deliverables and measurable outcomes for the grant period; describe the research to be performed and its relationship to the project objectives; and describe their vision of the commercial opportunities for the technology to be developed. In most cases, an invention or concept disclosure would accompany or precede the proposal. In addition, applicants must discuss “next steps” that will follow the project period, such as licensing the technology, seeking seed funding for a start-up company, or pursuing a federal technology grant (e.g., SBIR). The proposal should outline a management plan for the project including key personnel and the contributions of each, industry partners, existing intellectual property brought to the project, personal commitments beyond the project term, and any actual or perceived conflicts of interest.

Proposals will be evaluated by the Vice President for Research and Graduate Studies based on the following criteria:

- Alignment of the project objectives, deliverables, and outcomes with Research Incentive Technology Commercialization program goals;
- Quality of the work proposed and its appropriateness to project objectives;
- Clarity of the project vision and potential for commercial success;
- Appropriateness of the budget to accomplish objectives; and
- Likelihood, in the long run, of creating new jobs in Ohio. Proposals that seek merely to privatize a WSU faculty member’s operations will not be viewed as favorably.

About half of the funds in this category will be identified as “Incentive for Collaboration” because the projects will involve industry partners.

Contingency for Research Opportunity

Up to ten percent of the university’s Research Incentive funds will be used apart from New Investigator, Early Start/Augmentation, Major Collaboration/Infrastructure, and Technology Commercialization programs as a contingency fund for unanticipated opportunities to further research efforts that have great potential to attract external funding and/or contribute to the development of the regional technology base and the economy. In addition, contingency funds may be used to bridge between periods of

externally funded projects or for short-term support of research faculty, research assistants, and graduate assistants.

The Vice President for Research and Graduate Studies, in consultation with the dean and department chair, will allocate contingency funds to those efforts that have high potential for generating external support, advance the region's economic development, and support the university's strategic goals. Areas in which WSU has programs related to the Third Frontier Project would be given priority, other factors being equal.

“Incentive for Collaboration” Funds

The Incentive for Collaboration component of Research Incentive has been integrated within the overall Research Incentive Plan for Wright State University. It is assumed that approximately twenty percent of the total amount of Research Incentive funding will be awarded according to this mechanism. Plans for these expenditures are identified under the Major Collaboration/Infrastructure (7.5%), Technology Commercialization (7.5%) and Early Start/Augmentation (5%) sections of this Plan. The university will separately account for Research Incentive funds identified as “Incentive for Collaboration” funding.

YOUNGSTOWN STATE UNIVERSITY

RESEARCH INCENTIVE PLAN

FY 2008 & 2009

Youngstown State University (YSU) is committed to fostering high quality, nationally competitive research to promote faculty and student development in support of the teaching mission of the University. In accordance with the core objectives of the Research Incentive Fund Program the University strives:

- **To enhance the quality of research and scholarship at YSU;**
- **To increase the level of federal and private research funding received by YSU, and;**
- **To encourage research efforts that support the Third Frontier Project and economic growth in Ohio.**

In general, during FY2008 – FY2009, Youngstown State University will use Research Incentive Funds to: 1) Support new faculty in developing a competitive research program through provision of start up funding; 2) To assist in the purchase of required research equipment needs; 3) To provide needed match funds for specific grant applications; 4) To provide students with research opportunities with faculty via “Research Scholarships” for undergraduate research experiences; and 5) To provide research funds for collaborative research with other NE Ohio University or industry partners. As a result of the formation of Youngstown State University’s new College of Science, Technology, Engineering, and Mathematics a concerted effort will be initiated over the next several years to focus resources on collaborative, interdisciplinary research projects that support and leverage interdepartmental collaboration, including research activities with local/regional companies which can be advantaged by research activities with the University.

Planned Expenditures:

1. Start-Up Funds: 50%
2. Equipment: 10%
3. Grant Match (contingency funds): 10%
4. Undergraduate Research Scholarships: 10%
5. Collaborative Research with NE Ohio State Universities and Industrial Partners: 20%

Description of Categories and Rationale:

Start-Up Funds: Because YSU has limited funds available for both recruitment of faculty and provision of research initiation funds, a significant portion of Research Incentive Funding will be devoted to these purposes. The establishment of a base of research data and information to enable faculty to compete for external grant funding from all sources is critical to both tenure and promotion at YSU. OBR Research Incentive funds, supplemented with internal funds from our YSU Institution-wide Research Incentive Fund will provide the basic funds for this purpose. Measures of success will include publication resulting from these funds, external grant applications submitted and grants received.

Equipment: Small pieces of equipment may be purchased as needed to support faculty research, especially in instances where the needs will make the faculty more competitive or insure their ability to do research that could result in improved competitiveness. Measures of success will include publication resulting from these funds, external grant applications submitted and grants received.

Grant Match (contingency funds): Some smaller non-governmental sponsors for research expect significant matching funds and commitments from institutional resources. When this requirement exists, OBR Research Incentive Funds provide a means of match in numerous ways through the various categories in the budget. Measures of success will be the receipt of grants for which these funds are used for matching requirements and the resulting leveraging of resources.

Undergraduate Research Scholarships: YSU has a program in place to provide tuition scholarships to undergraduate students who are undertaking independent research project under the direction of faculty mentors. Students are expected to work independently and be fully immersed in a research. These funds are used to reimburse students for such things as travel for field work or other incidental expenses associated with their *personal* research investigations. Students involved in this program *must* submit a report summarizing their accomplishment and present their work in a poster or oral presentation at YSU's annual research day – "Quest."

Collaborative Research with NE Ohio State Universities and Industrial Partners: As a result of the formation of Youngstown State University's new College of Science, Technology, Engineering, and Mathematics a concerted effort will be initiated over the next several years to focus resources on collaborative, interdisciplinary research projects that support and leverage interdepartmental and inter-institutional collaboration, including research activities with local/regional companies which can be advantaged by research activities with the University. As a result of YSU's participation in the North Shore Graduate and Research Alliance (along with UA, CSU, KSU, and NEOUCOM) we are considering the establishment of a funding mechanism to encourage inter-institutional collaboration in research. By each institution's contribution of a portion of OBR Research Incentive funds to encourage faculty to

collaborate we believe we can leverage our resources and develop new strength in areas where collaboration appears to be a reasonable predictor of success for obtaining external funding. Collaboration with industrial partners will also be encouraged. Measures of success will include publication resulting from these funds, external grant applications submitted and grants received.

Incentive for Collaboration: Youngstown State University has been a participant and initiator of an informal initiative to work closely with regional companies in need of access to institutional intellectual expertise for research and facilities access. Some two years ago under the direction of Mr. Bruce Beeghly and President Sweet the Advanced Manufacturing Initiative was begun and has now resulted in an institutional inventory of research expertise in the STEM and business fields as well as an inventory of equipment resources available to the industrial community. The School of graduate Studies and Research also hired a faculty member on a half-time basis as Business Community Liaison, to act as “point of contact” for access to institutional expertise and facilities. Several formal projects have resulted through sponsored programs agreements and OBR Research Incentive Funds will be used to support some of these initiatives through the provision of research funds for collaboration as discussed above.

CASE WESTERN RESERVE UNIVERSITY

RESEARCH INCENTIVE PLAN

FY 2008 & 2009

INSTITUTIONAL OBJECTIVES AND/OR GOALS

Based on the success of previous Research Incentive funding, we wish to continue a “portfolio” strategy. The funds will be used to:

1. support Third Frontier (e.g., Wright Center, BRCP, RCP) and Ohio Board of Regent (OBR) awards (e.g., Innovation Incentive) made to the university thereby leveraging the considerable state, federal, university and industrial commitments to develop research that will lead to economic development in Ohio;
2. contract with one or more professional proposal developers to assist in generating competitive multi-institutional, interdisciplinary applications for funding in Third Frontier focus areas;
3. underwrite part of the cost of Research ShowCASE, an annual research fair that brings together researchers, students, corporations, venture capitalists, government officials and other potential collaborators/sponsors to develop partnerships that will lead to increased external funding for research. This event also includes the development and distribution of the *Value of Research*, the university’s signature research publication that helps attract research partners to the university.
4. provide support for Presidential Research Initiative and Research Infrastructure grants at the university that will lead to externally funded research.

PLANNED EXPENDITURES BY CATEGORY OR STRATEGY

Third Frontier/OBR project or center support:	25%
Proposal Development	5%
Research ShowCASE/ <i>Value of Research</i>	20%
Presidential Research Initiative/Research Infrastructure Grants:	50%

DESCRIPTION AND RATIONALE

Third Frontier/OBR support:

Case has received several Third Frontier awards as the lead institution and, most recently, Innovation Incentive funding from OBR to support doctoral programs in the STEM disciplines conducting research aligned with Third Frontier goals. Some of these awards require significant matching. While we use institutional funds for much of this matching, we propose to use a portion of the Research Incentive funding to help support these awards. Third Frontier awards that are eligible to receive Research Incentive funding include the Center for Stem Cell and Regenerative Medicine, the Wright Fuel Cell Group, the Ohio Neurostimulation and Neuromodulation Partnership, the Biomedical Structure, Functional and Molecular Imaging Enterprise, Targeted Nanoparticles for Imaging and Therapeutics, the Clinical Tissue Engineering Center

Research Incentive funding will be used in one or more of the following ways for these Third Frontier-funded programs so as to enhance their sustainability. These include:

- seeding innovative pilot research projects
- marketing and promoting the research strengths of the program to potential industrial partners
- developing multi-institutional proposals to federal agencies and large foundations for significant research program support
- research symposia that bring together researchers and companies to educate them on the latest research findings
- support for the operating costs of critical facilities at Case that provide the needed resources to support these programs

For example, in the past, Research Incentive dollars have been used to start a pilot grant program within the Center for Stem Cell and Regenerative Medicine (i.e., four \$40,000 awards were made), support the proposal development costs of applications to the Gates Foundation and to NIH, and underwrite the costs of research symposia that brought together researchers, industrial partners and venture capitalists.

Proposal Development

Case is increasingly engaged in developing large, multi-institutional, interdisciplinary proposals as typified by the Third Frontier awards described above. For example, this past year Case was awarded a Science and Technology Center grant by the National Science Foundation in the area of nanolayered polymers. The proposal for this award relied heavily on a proposal development professional working closely with Case faculty and staff.

Case continues to observe an increase in the number of complex applications involving several departments and schools/colleges at Case as well as outside institutions. In these types of situations, Case has begun to engage proposal development professionals to assist the faculty and staff at the university and other participating institutions in developing responsive applications. Based on this experience, we are proposing to continue to use Research Incentive funds to contract on an as-needed basis with proposal development professionals to improve our ability to respond to these opportunities. These applications are often linked to Third Frontier focus areas, e.g., biosciences, advanced materials, power and propulsion, information technology, and instrumentation, controls and electronics.

Research ShowCASE

On April 11-12, 2007, Case held its fifth university-wide research day called Research ShowCASE 2007. Over 2,000 people attended the event which filled the Veale Convocation Center with an exhibition of over 500 research posters and booths featuring faculty, post-doctoral, graduate and undergraduate student research, mostly from Case (63%), but also from the Cleveland Clinic Foundation, MetroHealth Medical Centers, University Hospitals and the VA. Formal sessions were held throughout the day representing the diverse set of research disciplines on campus. For example, a panel discussion focused on bioimaging research that included faculty from Case and selected industry representatives. Another session described how to obtain funding for research, particularly company focused or applied research. Norm Chagnon from ODOD participated as a panelist.

Approximately 80% of the attendees were from Case or its affiliated institutions. However, about 20% of the attendees came from industry, venture capital firms, foundations, government, other educational institutions, or were trustees, alumni, friends of Case, prospective students and their parents, or other interested people.

The goal of Research ShowCASE is to foster partnerships internally and externally so that Case and its affiliated institutions are better positioned to seek external research funding or commercialize their technology. Many new partnerships are formed by this event. For example, a new company, Cleveland NanoCrystals, was started following a meeting between a Case faculty member and an entrepreneur at Research ShowCASE 2004. There is widespread enthusiasm both within the Case community and also within the business and economic development community in Northeast Ohio to continue to make this an annual event. To this end, we plan to use FY2008-09 Research Incentive funds to partially underwrite the cost of the event in 2008 and 2009. As in the past, Research ShowCASE will be organized with a special emphasis on Third Frontier focus areas and goals. For example, the panel discussions,

workshops and sessions will highlight Third Frontier priorities (e.g., advanced materials, biotechnology). It is hoped that the partnerships formed by this event will result in external funding for research, particularly in Third Frontier areas. Anecdotal evidence already exists that Research ShowCASE has produced such partnerships and future events will build on this initial success.

Presidential Research Initiative and Research Infrastructure Grants

Presidential Research Initiative (PRI) grants

The purpose of the PRI grant program using Research Incentive funds is to promote the Case president's vision of "community" by supporting the conduct of multidisciplinary research involving investigators from two or more schools or colleges within Case. It is expected that this research will lead to extramural applications and, eventually, extramural support.

Proposals may request up to \$75,000 for up to two years of support. Applications may only be submitted by faculty members and must include co-principal investigators from different schools/colleges (e.g., School of Medicine and School of Engineering). The proposal must clearly present a project where there is joint intellectual contribution by the co-principal investigators. A project where one of the co-principal investigators is simply providing access to data, specimens or patients is not acceptable. The proposal should not exceed 4-5 pages.

Each proposal is reviewed anonymously by two faculty members who are part of a PRI Review Panel that meets, discusses the reviews, and identifies the "high priority" proposals. Standard merit review criteria are used to guide this review. It is expected that up to 12 awards will be made each year over the two year period. Those individuals who receive an award will be required to submit a final report at the completion of the project describing the results and the efforts to publish and seek extramural support. If this report is not received, the co-principal investigators will not be eligible to apply for future Presidential Research Initiative support.

Research Infrastructure Grants (RIG)

The purpose of Research Infrastructure Grants is to provide schools/colleges with limited funding to meet research infrastructure needs. These infrastructure needs could be related to personnel development or facilities development. For example, funds could be used to purchase an essential piece of core equipment or to support a small seed grant program for junior faculty within the school. The funds cannot be used to support project-specific infrastructure, such as equipment that will only be used for a specific project and not available to others within the school. The goal of this funding is to provide infrastructure support such that it can be leveraged to attract extramural funding for research.

Proposals may request up to \$100,000 for up to two years of support (i.e., no more than \$100,000 that can be spent over a two year period). An application may only be submitted by the dean of the school/college. The proposal must clearly present an infrastructure need that can be addressed by the funds, i.e., the need must not be project-specific but one that is shared by many faculty members within the school/college. Only one proposal per school/college may be submitted.

Proposals will be reviewed by the Associate Vice President for Research and the Vice President for Research and Technology Management. It is expected that up to 16 awards will be made over the two year period. A final report will be required at the end of the support period describing how the funds were used, any extramural support that directly resulted from the RIG support, and efforts to sustain the infrastructure. If this report is not received, the school/college will not be eligible to apply for future RIG support.

UNIVERSITY OF DAYTON

RESEARCH INCENTIVE PLAN

FY 2008 & 2009

I. Institutional Goals

The research mission of the University of Dayton is one of discovery, development and technology commercialization. As a result, the University's research program contributes to graduate and undergraduate education, faculty development, economic development and public service commitments.

The University of Dayton employs a rigorous planning process that is continuously updated with a 5 year planning horizon. The current plan is simply called "Strategic Plan 2006" and it establishes five desired goals for the University. They are:

- Educate for transformation and prepare a new generation of servant leaders
- Cultivate outstanding scholarship, research, and artistic creation
- Strengthen the University's distinctive Catholic and Marianist identity
- Advance international and intercultural citizenship and engagement
- Practice responsible stewardship

Philosophical Considerations

We become excellent when we expect and require the very best from ourselves and from one another, regardless of our different vocations. Given our expectations, we must also provide the support that will make it possible for all members of our community to flourish. In keeping with one of the fundamental hallmarks of Marianist universities, we are committed to integrated learning as a form of excellence and as a way of life that is manifested in all we do, celebrate, and constantly renew.

Excellence calls us to be historically grounded even as we look toward the future and to treasure great traditions even as we prepare for change. At the University of Dayton, excellence means that we think, speak, and write clearly; that we act judiciously and responsibly; that we bring to our work reason and faith, intuition and imagination, that we are receptive, discerning, and critical; and that we seek to be selfless and wise in our respect for, service to, and leadership of others.

University Research Objectives

Scholarship, research, and other forms of creative and intellectual engagement with ideas and the world are the foundation of the academic life of our University. They form the core of both undergraduate and graduate education, define the environment of our institution, and contribute through their economic impact to the life of our community and state. They address significant issues, pose vital questions, provide insightful responses, and generate new understanding. Scholarship and research that emphasize creative, collaborative, and integrated thinking, and that transcend traditional disciplinary boundaries are especially characteristic of the University of Dayton. These types of research efforts will pursue sponsorship from federal and private sources, consistent with activities of Ohio's Third Frontier Project. The Research Incentive Program funding is often the enabling support that is needed to secure large, federally funded research programs. Research Incentive funding is used specifically to move forward programs that will:

- Enhance the quality of research and scholarship at the University of Dayton
- Increase the level of federal and private research funding received by the University of Dayton
- Encourage research efforts that support the Third Frontier Project and economic growth in Ohio

The University and the Research Institute have developed a vision to be recognized worldwide as one of best research organizations ensuring customer success by delivering affordable solutions, leading-edge technologies, and excellent service. This encompasses all phases of our research from basic to developmental to applied. The University of Dayton has developed broad intra-university research collaborations that combine the power of the University of Dayton Research Institute and the depth of knowledge of the academic departments on campus. These four areas are:

- Nanomaterials
- Fuels and energy
- Sensors and electro-optics
- Bioscience and bioengineering

These fields align with the core strengths of the University and the Research Institute, regional and state business goals, the projected needs of the state's federal laboratories, and Ohio's Third Frontier Project. Maintaining a focus on these alignments enables the collaborations and partnerships that are a cornerstone of University strategies. Research programs and policies that support these areas are energetically promoted.

The University of Dayton and its Research Institute recognize that a tremendous opportunity for attracting federal funds exists in all four of the above areas. The National Institutes of Health's budget continues to show strong support for several of these areas and every major federal agency is initiating bio-related programs that support their mission areas. The National Nanotechnology Initiative describes an increasing federal budget in nano-related technology areas. Fuels and energy research are important areas of investigation at the Air Force Research Laboratory and at major industries in the State. This area is also receiving significant attention from Governor

Strickland as well. All of the above areas are connected to key initiatives in the State of Ohio's Third Frontier Project. Finally, *education* research has been receiving increasing interest and funding as our nation struggles to revitalize its education system. The prospects for federal funding of *education* research are likely to improve and because this area also closely aligns with the University's goals and values, we anticipate pursuing new opportunities. A significant part of the effort in education research will focus on science, technology, engineering and math (STEM) projects.

Nanomaterials

OBOR funding has played a critical role in the research program for polymer nanocomposites. Nearly five years ago OBOR funds were used to evaluate the concept for using a nano-tailored maturation of UDRI's epoxy resin fortified with carbon nanofiber as a matrix material for advanced composites. The results from this program provided critical concept validation data to write further proposals to continue the research. These additional programs were leveraged to develop several Third Frontier projects including three Wright Projects, a Wright Center of Innovation, and two Research & Commercialization Projects. The current commercialization effort has spawned collaborations with six Ohio universities and over 50 Ohio companies. Projects include advanced composites for aircraft engines, vehicle armor, wind turbine blades, sporting goods, electronic packaging, specialty adhesives and coating, tooling materials, etc.

UDRI has started two new research groups as a result of the funding and one spin-off company, NanoSpense, has benefited as well. Clearly, not all OBOR funded projects are this successful but the key point is that universities need a source of discretionary funds to try new ideas which could have significant commercial implications.

The new materials revolution which was spawned by the focus on nanotechnology may play a critical role in one of our nations most pressing needs - clean, domestic, renewable energy. Future OBOR funds will be invested to engineer new materials which will facilitate development of emerging technologies in energy generation and storage. OBOR research incentive funding will also be invested in nanomaterials for aircraft engine components, armor systems, adhesives and coatings, sensors, and biomaterials. Some specific examples of future work include:

1. Synthesis and Functionalization of Nanomaterials

a) To develop synthetic methods for the preparation of organic and inorganic nanomaterials, including aligned/nanoaligned single wall and multi-wall carbon nanotubes, carbon nanotube and semiconducting metal oxide hybrids, and size-/shape-controlled metal nanoparticles.

b) To develop physical and chemical techniques for surface modification of carbon nanotubes, fullerenes, nanodiamonds, and metal nanoparticles for multifunctional materials and device applications.

2. Nanomaterials for Optoelectronic and Biomedical Applications

To synthesize linear/dendritic conjugated macromolecules, fullerene-containing polymers, and their composites with carbon nanotubes for various optoelectronic applications, ranging from optoelectronics (*e.g.* polymer light-emitting diodes, polymer photovoltaic cells, thin film transistors) to biomedical devices (*e.g.* biosensors, artificial muscles, drug delivery systems).

3. Bionanomaterials and Biomimicking Systems

- a) To investigate the surface and size effects of nanomaterials on biological systems (*e.g.* cytotoxicity).
- b) To undertake bio-mimicking approaches for the development of smart nanomaterials and devices.

Fuels and Energy

University of Dayton researchers are performing research in the area of assured alternative fuels and emissions. Alternative fuels are non-petroleum synthetic fuels produced using a domestic supply of coal and emissions refer to production of NO_x, CO, and particulate matter (PM). This research supports the broad objectives of the DoD/DoE initiative which seeks to reduce the U.S. dependence on foreign supply of transportation fuel by 2011. It is also focused on using Ohio coal reserves as a domestic source of energy.

A facility is being designed and constructed to produce 10-15 gallons per day of jet fuel from Ohio coal, biomass, or other feedstock. This synthetic fuel will be evaluated as “fit-for-purpose” in gas turbine engine demonstrations at WPAFB and Ohio engine manufacturers. We would work with other Ohio universities in operating the unit and evaluating the results which are expected to enhance Ohio educational opportunities in this highly relevant area. The test results would be used to optimize alternative fuel specifications and production parameters. The test fuels would also be used to demonstrate anticipated benefits of these alternative fuels for advanced applications (*e.g.*, fuels cells). For example, the differing composition of F-T fuels may allow a different boiling range/average molecular weight while maintaining the fuel physical properties required for combustion and low-temperature flowability.

We will also study the effects of synthetic fuel composition on soot mitigation. To meet this objective, a well-stirred chemical reactor (WSR) was designed and built. The WSR provides a unique capability to simulate the chemical kinetics within the combustion zone of a gas turbine combustor. Various synthetic fuel + conventional JP-8 jet fuel blends were prepared, burned in WSR, and gaseous and particulate emissions were measured. Our gaseous emissions research seeks to decrease NO_x emissions to below the ICAO-CAEP 4 standard for engine emissions. Finally, the particulate emissions

research seeks to meet the goals set by the more stringent National Ambient Air Quality Standards (NAAQS) for particulate matter less than 2.5 microns (PM_{2.5}). This effort would be tied to the Ohio Center for Advanced Propulsion and Power (OCAPP), an existing Third Frontier center of excellence.

In addition work will be pursued on fuel cells, polymer batteries, photovoltaic cells, and lightweight wind turbine blades.

The above projects will provide strong strategic positioning for the State of Ohio to pursue additional research funding for the development of new energy sources for our state and our nation.

Sensors and Electro-optics

The University of Dayton recently received a \$28M State of Ohio Third Frontier award to establish the *Institute for Development and Commercialization of Advanced Sensors Technology* (IDCAST). Sensors development within IDCAST will focus on Remote Sensing and Electro-optic Sensors and Chemical/Biological Sensors. The University of Dayton Research Institute has established the Sensors Technology Office to better reflect our sensors research capabilities.

The University's expertise in Chemical and Biological Sensors encompasses a number of technologies and applications is expanding in three primary areas: 1) *nanosensors and nanoprobes for intra- and intercellular sensing and probing*; 2) *nanostructured sensors and arrays* (carbon nanotubes, microcantilevers, varactor technologies) for environmental, chemical, biological, and biomedical diagnostic applications; and 3) *micro-Total analytical systems (Micro-TAS)* based on microfluidic systems development. These three areas focus on significant challenges facing chemical/biological sensors development today: precise delivery of nanosensors to cellular and tissue targets, detection of chemical and biological analytes at very low concentrations in complex environments, and integration of sampling and detection platforms for handheld point-of-care device development. Collaboration currently exists with both Ohio-based businesses (SBIR, STTR) and federal laboratories (contracts, grants). The BRAC expansion of research programs at the Air Force Research Laboratory is fostering collaborations between University researchers and AFRL in the area of Biosensors research; we are currently conducting several workshops to identify areas of common interest. Potential funding sources include: AFRL, Department of Homeland Security (chemical/biological agents), NIH and NSF, Office of Naval Research, EPA, and industry. With the establishment of IDCAST we now have a venue for moving basic sensors research results into development and commercialization.

Remote sensing is a field that is rapidly growing in capability as new technology is developed and commercialized. In the field of active remote sensing, laser sources are developed to provide the needed power and return signal characteristics to identify and track an object. New standoff techniques such as laser detection and ranging

(LADAR) are providing unprecedented sensing and access to information. In 2006 the Electro-Optics Program established an Air Force Center of Excellence to serve the LADAR and free space optical communications community by developing and demonstrating component technology. It is the only institution of its kind in the US. We work on mid infrared (IR) wavelength source development using nonlinear optical techniques and we are developing novel detection methods with nonlinear optics, as well. Our activities in the field have helped to scale up the source power and improved the overall efficiency of the sources by a factor 2 to 3 times.

In the field of nanophotonics we have been fabricating components for mid IR cameras that functionalize the cameras in several different ways: polarization or spectral measurement, and improved their optical response. We have also developed new instruments for non-destructive evaluation of wafers in the semiconductor industry with resolution approaching 10 nm. Other advances have been made in building new sensors with improved detection sensitivity. We are exploring so-called metamaterials to improve resolution beyond the usual diffraction limit by using metallodielectrics, which we believe will be simpler to fabricate and provide wavelength tunability.

Bioscience and Bioengineering

This area is a growing edge for the University of Dayton and we are investing an increasing amount of funds into both curriculum and research areas. We are targeting five areas that make sense in light of our competencies and strengths. These areas show great promise for results that will drive technology based economic development in our region and in Ohio.

They are:

1. Biomaterials
2. Biomimetics
3. Biosensors
4. Bioimaging
5. Tissue Regeneration

Work is planned in all five areas as we move forward and the Research Incentive funding will be valuable in kick-starting many promising avenues of research. The tissue regeneration area is anchored by a world class scientist and we have established the TREND (Tissue Regeneration and ENgineering at Dayton) Center. This center will focus on accelerated regeneration of eye, ear and other tissues in the body. The area of biomaterials has some positive overlap with our nanomaterials efforts, as does the biosensors area with our sensors work. These overlaps present great synergy opportunities for the research and increase the probability of positive outcomes for the projects. We are planning on collaborating with other Ohio universities in these areas and with the Air Force Research Laboratory.

II. Planned Expenditures by Category

The Research Incentive funding is planned to be used in the following manner:

Individual Faculty and Researchers	20%
Interdisciplinary Research Teams	20%
Inter-institutional Collaborative Research	10%
University-wide Competition	20%
Equipment	20%
Contingency	10%

The four strategic areas (nanomaterials, fuels/energy, sensors/electro-optics, and bioscience/bioengineering) referred to above as our broad, intra-university research collaborations are all in alignment with the Third Frontier focus areas. We plan on allocating the funding strategically as follows:

Third Frontier focus areas	60%
Other research areas	30%
Contingency	10%

III Descriptions and Rationale

OBOR funds will be used to support established research areas and to build research programs in the areas of opportunity listed in Section I. Planned uses of Research Incentive Program funds will reflect the Ohio's Third Frontier Project, University's research mission, the operational review process, and individual faculty and staff proposals. Projects fall into the categories listed in Section II minus the equipment and contingency categories.

Individual faculty and researcher awards will be used to help new faculty/researchers establish research programs and to help existing faculty migrate into innovative research areas of new opportunity.

Interdisciplinary Research Team awards encourage University faculty and Research Institute staff across different departments and divisions to collaborate on research projects. Through a long history of interdisciplinary research, the University has learned that this approach provides a unique advantage when competing for research funding. Interdisciplinary research also supports the University's Distinctive Graduates and Excellence in Connected Learning strategies. Collaboration with external organizations is also encouraged.

Inter-institutional collaboration research awards are used to stimulate research collaborations with state and federal organizations as well as small business and industry. These activities should involve seed ventures that will lead to more funding or entrepreneurial and technology transfer activities that will benefit the state's economy. Cost sharing and interdisciplinary research are strongly encouraged.

University-wide Competition is used to stimulate research focused on Third Frontier areas and it is truly competitive. Not everyone wins these awards and the criteria used takes into consideration, among other things, the ability to use the work to attract additional federal sponsorship and the potential for economic development due to the realization of the research effort.

Equipment funding is awarded for the purchase of new equipment or the repair of older equipment that will significantly improve the researcher's ability to attract additional funding. Cost sharing in the form of other University funds or external funds is typically an integral part of these types of awards.

Third Frontier Related Research awards will be used to support Ohio's Third Frontier Project. Special attention will be made to projects supporting UD's involvement in WCI for Advanced Data Management, WCI Ohio Center for Advanced Propulsion and Power, the WCI for Multifunctional Polymers Nano-materials and Devices, IDCAST (WCI) and other Third Frontier awards presented to the University of Dayton.

Other Projects are awards made to projects not related to Ohio's Third Frontier Projects.

Most projects are competitively awarded and are determined by two separate strategies.

1. Campus-wide proposal solicitations that emphasize *Interdisciplinary* and *Inter-institutional Collaboration* research projects that will attract new grants and contracts from federal, industrial, or private sources.

The following criteria are used as a basis for evaluation of proposals:

- a. Interdisciplinary research through internal or external collaborations. Internal collaborations should involve University/Research Institute faculty and researchers. External collaborations should involve faculty/researchers from other Ohio universities or researchers from industry.
- b. Research related to Ohio's Third Frontier Project.
- c. Research of a theoretical or practical significance.
- d. The research should encourage the economic development of the State of Ohio.
- e. Strong evidence should be provided for application of the proposed research to attracting external support from business, industry, foundations, or federal sources.

Awards are typically in the range of \$15-\$30 thousand with larger awards involving more collaboration.

2. Research projects submitted as part of the planning process and by a University-wide committee of the Research Council. The annual Research Council Seed Grant Program has been in operation for over 27 years. Specific projects for University-wide competition will be determined by the proposals submitted as part of the annual Research Council Seed Grant Program. Included in these seed grants are faculty member summer stipends, materials, and research equipment. Typically 25-30 grants are awarded annually.

In general, funds will be allocated to more productive areas on the basis of past success in obtaining external funding. Funds will also be allocated to promising research initiatives of new faculty.

The University will seek leveraging by providing only partial support for a particular project. Whenever possible, additional external funds will be sought. Past experience has shown that when the first portion of project funds is identified, the remaining funds are easier to secure. These funds are provided through the Special Initiatives Interdisciplinary Research Program or by University cost sharing initiatives.

The investment of Ohio's Research Incentive monies at the University of Dayton is money well spent. Since the year 2000, our research revenues have more than doubled and the Research Incentive program has made a measurable contribution to that. Moreover, we are a strong supporter of the Third frontier Project and we are focus on turning research sponsorship into jobs for Ohio. We appreciate the opportunity to be a recipient of these funds and we look forward to our continued participation in this important program.

IV Achievements in Scholarship and Research

Fiscal year 2006 research revenues totaled approximately \$71 million. Revenues from our Ohio business and industry sponsor base totaled approximately \$4 million. Last year, over 245 graduate and undergraduate students earned more than \$1.4 million working on sponsored research projects. During fiscal year 2006, work was performed on approximately 1,667 accounts, of which more than 794 were various industrial accounts.

V Suggested Metrics for Program Outcomes

Since a major emphasis of the Research Incentive Program is to foster additional externally funded research, some relevant metrics for outcomes are immediately apparent.

1. Increase in external funds in support of the program.
 - a. From federal sources to increase Ohio's return.
 - b. From Ohio business and industry to assist in the economic revitalization of the state.
 - c. From any other source to increase research expenditures in the region.
2. Increase in proposals or funds requested.
3. Increase in business and/or industrial relationships will lead to increases in Items 1 and 2.

Other measures that are more indirect ways to increase funding, but support research and economic revitalization in general are listed below.

1. An increase in the number of undergraduates associated with the research program increases the number of research-trained workers for Ohio employers.
2. An increase in the number of graduate students increases the number of researchers for Ohio universities and employers.
3. An increase in presentations and publications to research-oriented audiences.

All of the above support the goals of the Research Incentive Program and Ohio's Third Frontier Project.