CRITERION **4**

Acquisition, Discovery and Application of Knowledge

The organization promotes a life of learning for its faculty, administration, staff, and students by fostering and supporting inquiry, creativity, practice, and social responsibility in ways consistent with its mission.

L EARNING AND THE DISCOVERY constitute the foundation of the research university. The opportunity for intense intellectual and creative growth and development by faculty, students, and staff make the university an unique, critically important institution in society. Whether faculty members are contributing to knowledge through research, graduate students are exploring new avenues of creativity, or undergraduates are broadening their understanding of the world in their general education, the research university provides a site for societal exploration and understanding of the frontiers of knowledge. The NCA's new Criterion 4, on the acquisition, discovery, and application of knowledge, supports this expansive view of learning by expecting that the institution values a life of learning at all levels of activity. All programs, whether they focus on general education, the undergraduate major, or graduate studies must foster both intellectual inquiry and an understanding of the breadth of knowledge. Moreover, these programs need to be relevant in a rapidly changing world, be effective as demonstrated through thoughtful evaluation, and be undergirded by personal and community responsibility toward the acquisition, discovery, and application of knowledge. It is in this context that the University of Wisconsin–Milwaukee has undertaken its self-assessment in relation to Criterion 4.

Valuing a Life of Learning

UWM's commitment to scholarship is expressed in the preamble to the University's strategic plan, Investing in UWM's Future:

> **UWM is at its core a community of faculty, staff and students engaged in learning, discovery, and creative expression. For the sake of generations of students to come, for our immediate neighbors in metropolitan Milwaukee, for the state of Wisconsin, and for our world as it ventures into the twenty-first century, UWM aspires to become a premier doctoral research university.** Our capacity to serve our constituents (students and numerous external communities) is grounded

CRITERION 4a

The organization demonstrates, through the actions of its board, administrators, students, faculty, and staff, that it values a life of learning.

Additional supporting material for 4a is at www.selfstudy.uwm.edu:

- Appendix 4. Undergraduate Accomplishments
- Appendix 8. Graduate Student Accomplishments

in our identity as a research university, engaged in scholarship across the campus. This foundation provides UWM with the capability to meet students at the frontiers of knowledge and to engage the surrounding communities (city, state, world) with a robust base of scholarly expertise.

UWM is a doctoral research university. Excellence in faculty research and creative expression is the expansive and deep foundation upon which the wide-ranging activities of the University are founded. Its scholars reach out to study the world and, in turn, bring the world to UWM and Wisconsin. At UWM, the discovery of knowledge begins with the scholar's basic commitment to intellectual and creative work.

UWM has had a rather remarkable development as one of only two research/doctoral universities in the University of Wisconsin System. As reviewed in the "UWM Overview," the University has grown from its roots as a teachers' college to a Doctoral Research-Extensive university as categorized in the Carnegie Classification of Institutions of Higher Education. Its successful transition to date has required recognition both internally and externally of the culture necessary for successful research universities. At this pivotal time, UWM's future success will depend increasingly on:

1 Recognition within the UW System of the value of UWM's research mission to both the System and the state. In this regard, there has been almost singular focus on the excellence of the University of Wisconsin–Madison as a leading public research university. But, as recognized broadly, the state's economic, cultural, and social success can be greatly enhanced by building a strong research university in the state's major urban and industrial center.

2 Recognition within the Milwaukee metropolitan area and across the state of UWM's comprehensive mission to not only excel in research, but also to continue to provide access to higher education degrees and the lifelong skills of intellectual inquiry for first-generation and historically under-represented populations. This dual role is critical to the region, and it is expensive.

3 Recognition within UWM that research and scholarly productivity must be nurtured within the culture of the University. UWM needs to be able to attract and support leading researchers in departments and selected interdisciplinary areas. But the base of faculty and staff participating actively in research and garnering extramural support must also increase.

The sections below provide an overview of:

❶ The environment for research and creative activity, including the University's commitment to academic freedom and the research support infrastructure

❷ The creation of knowledge among faculty and staff, undergraduate students, and graduate students and how their accomplishments are celebrated by the University community

Academic Freedom

The concept of academic freedom, the idea that universities, their faculty, staff, and students have the right to seek truth freely and without interference, has deep historical roots in the University of Wisconsin System. Going back to the 1890s, the university faculty at UW-Madison, the Board of Regents, and the state legislature debated the independence of the university from political pressure in academic matters. In that era, Wisconsin pioneered in the development of American higher education by positing a profound commitment to the search for truth.

Today academic freedom is recognized as a right having both constitutional dimensions and as a contractually guaranteed freedom and academic norm that is fundamental to the success of the academic enterprise. Academic freedom in the UW System is protected by the Wisconsin Administrative Code, which prohibits nonrenewal of a probationary faculty member for conduct, expressions, or beliefs that are constitutionally protected, or protected by the principles of academic freedom. In addition, the Wisconsin Administrative Code assures that a faculty member is entitled to enjoy and exercise all the rights and privileges of a United States citizen, and the rights and privileges of academic freedom as they are generally understood in the academic community. UWM's strong culture of shared governance, based statutorily on Chapter 36 of the Wisconsin State Statutes (see "Criterion 1"), provides further safeguards for academic freedom among faculty, staff and students.

Support Infrastructure for Research and Creative Activity

Research universities require strong research support mechanisms, ranging from individual research grants to funding for multi-user instrumentation to major institutional support for library holdings and new facilities such as laboratories and performance spaces. The following review surveys the infrastructure for research and creative activity in the Graduate School, the University in general, and the schools and colleges.

The Graduate School

Much of the institution's infrastructure in support of research is provided through the Graduate School. The Research Services and Administration (RSA) office of the Graduate School helps faculty and staff secure external funding for research and creative activities. RSA services include identification of funding sources, proposal development, coordination, and submission services, and post-award administration. Other services include research-related workshops, individual consultation, internal award program administration, and administration of the Institutional Review Board. The Graduate School provides resources for the Technology Transfer Office to protect intellectual property and encourage the licensing of inventions. Recently, it has been able to link UWM researchers to a new UW System-sponsored office, WiSys, which offers a complete suite of patent services In the first 30 months of operation with WiSys, the Technology Transfer Office has handled 48 invention disclosures, from which 25 faculty-invented technologies have been selected by WiSys for protection. As of February 2004, UWM has 56 invention disclosures, five patents, 18 U.S. patent applications, and seven foreign patent applications.

The School also administers cost sharing for extramural proposals. Cost sharing helps fund the purchase of equipment (one-for-one matching on capital instrumentation items on multi-user and individual grant proposals), support for graduate students, and return of indirect costs revenue from grants. For example, in the College of Engineering and Applied Science, matching funds were supplied for a communications laboratory that was funded by the National Science Foundation.

The Graduate School promotes research and creative activity through a competitive research grant award program. In 2003-04 the Graduate School Research Committee awarded $275,932 to 22 faculty members. The awards are made each year to support junior faculty, new research projects, and faculty changing fields. The School's Arts and Humanities Faculty Travel Grants Program supported 15 faculty members' travel to pursue research and creative activities between Oct. 1, 2003, and March 31, 2004. The Graduate School also provides travel support grants for graduate students.

Five university-wide, interdisciplinary organized research units are managed by the Graduate School. The Advanced Analysis Facility houses major one-of-a-kind instruments meeting the research and instructional needs of physical science and engineering faculty and students with analysis services in material analysis, trace components analysis, and molecular structure analysis. The Center for Urban Initiatives and Research conducts numerous community-oriented assessment, program evaluation, and strategic planning projects throughout the Milwaukee metropolitan area. The Laboratory for Surface Studies conducts basic research on the structure and properties of solid surfaces and on the interaction of surfaces with

atoms and molecules. The NIEHS-sponsored Marine and Freshwater Biomedical Sciences Center conducts research in environmental health using nonmammalian aquatic organisms. And the Great Lakes Wisconsin Aquatic Technology and Environmental Research (WATER) Institute, a premier freshwater sciences research institute, conducts an extensive range of freshwater studies aimed at a thorough understanding of the Great Lakes and other aquatic and environmental resources through the Center for Great Lakes Studies, the Great Lakes Aquaculture Center, and the Center for Water Security. Altogether these interdisciplinary research units account for approximately 17 percent of UWM's total sponsored project activity.

The Graduate School plays a critical role in helping the University achieve its research goals. Historically, the School's performance in this role has been examined intensively as UWM has endeavored to increase its research stature. During the past decade, two ad hoc committees were constituted to review the Graduate School. The first was given the charge to consider decentralizing the functions of the Graduate School. Recognizing the key role that this unit has played in representing the interests of research throughout the campus, the committee concluded that the School should be strengthened instead. Among a number of recommendations was a proposal to elevate the Graduate School Dean to Associate Provost in order to give the position some leverage with respect to the other Deans to advocate for stronger support for research. The advice to change the title was taken but without a concomitant increase in authority. In 2003 a second committee, the Graduate School Analysis Group, revisited the structure of the Graduate School. It advocated the restoration of the position of Associate Dean for Research, a faculty position intended to ensure that a strong, dedicated focus on research exists at the upper level of the Graduate School structure. The 2003 report also echoed the call for a higher campus profile for research leadership. Both recommendations are being put into effect. In 2004 the School appointed an Associate Dean for Research. In 2005 a search is underway for the newly created position of Vice Chancellor for Research and Dean of the Graduate School. The new Vice Chancellor will report directly to the Chancellor and have primary responsibility for advancing UWM's research agenda, coordinating the work of the Research Services office in the Graduate School with the Academic Deans Council, as well as with departments, programs, and centers.

A major finding of the 2003 analysis was the need for more comprehensive support in the identification of grant opportunities, coordination of multiple-partner grants, and grant writing. The report has stimulated the Graduate School to pursue a more proactive, client-centered approach to executing its role in the research activities of the campus. For example, the School is working with the Deans regarding their strategic plans for sponsored research. The formation of research clusters within and across school and college boundaries is being encouraged to take advantage of expertise and match faculty interests to funding agency priorities. Graduate School discretionary budgetary

resources will be used as leverage in combination with school/college resources to enhance the sponsored research agenda. The goal is to increase extramural funding of campus research and to attract high-quality faculty and graduate students.

The Campus Environment for Research and Creative Activity

At the campus level, UWM's objective to become a premier research university has become a basis for planning and financial allocation, as evidenced by the 1996 Strategic Plan and the Investment Plan. As outlined in "Criterion 2," the University's hiring plans and its response to budget rescissions have advanced and protected strategic research initiatives. Recently targeted research areas that promise to elevate UWM's expertise have been undertaken in biotechnology, neuroscience, developmental biology and toxicology, and gravitational physics.

In the course of this Self-Study, however, concerns have been expressed about a past disconnect between campus planning and ongoing research interests. Many have noted a strong belief that rather than a basis, the objective to become a premier research university needs to become the basis for planning and financial allocation. Although the current administration is moving forward aggressively to expand UWM's extramural funding base and increase the number of high-quality graduate programs, these campus discussions emphasize that the entire university must develop the ethos and operating structure in which decision making begins with and flows from the objective to achieve major research university status. Such clarity in priority would not dilute the importance of the teaching or engagement functions of the University. Those responding to our open forums and opportunities for discussion relate that without a foundation and the conditioning of research and creative activity, teaching and service soon become dated. A shared understanding across campus is that it is only through the discipline of research and creative activity—through the daily practice of the search for knowledge—that the faculty earns credibility in its teaching and applications. Thus, the research foundation strengthens teaching, learning, and engagement by gathering and aligning them under the umbrella of discovery. It also imparts a unified mission to the campus.

The doctoral array

Doctoral programs are a defining characteristic of the research university because their presence attracts high-quality faculty members and graduate students who are focused on generating knowledge and advancing their disciplines. UWM's efforts to build its doctoral program array were for many years not supported by the UW System administration, as most recently exemplified by the System's

opposition to the History Ph.D. This moratorium seems to have been lifted, as three new doctoral programs have been approved in recent years and three additional programs are under development. This has resulted in renewed energy and optimism in the faculty, which is strongly committed and understands that scholarly development within UWM's many graduate but non-Ph.D. granting programs will depend significantly upon their ability to offer the Ph.D. degree in the future. Moreover, the rapid emergence of new disciplines or combinations of disciplines will necessitate timely access to doctoral degree granting rights. UWM has the scholarly resources in house and opportunities to collaborate with other Milwaukee institutions that will propel UWM's programs to prominence. The Chancellor has set the goal of adding 12 new doctoral programs by 2010. The support of the UW System and the Board of Regents for UWM's doctoral mission will be of critical importance in meeting this goal.

Faculty and staff size and composition

The past 15 years have seen a decline and a partial reversal in the size of the faculty that has been matched by an increase in academic staff. As noted in "Criterion 2," the size of the faculty[1] is larger today (748 FTE) than it was in 1995-96 (707 FTE). However, it is still below the level in prior years (e.g., 777 FTE in 1991). Meanwhile, the number of academic staff has grown from 757 in 1991 to 1,187 in 2003. Because research is primarily conducted by faculty members, the size of the faculty is seen as a limiting factor on research productivity. UWM's research aspirations have grown considerably since 1991, but faculty numbers have not seen a parallel increase.

The campus is addressing faculty resource issues in graduate programs that result from the combination of an undersized faculty and the need for members to teach in their graduate program specializations and at the same time staff the undergraduate course portfolio. Despite the increased use of academic and ad hoc staff to teach in the undergraduate curriculum, the responsibility to ensure comprehensive coverage of the undergraduate program has put pressure on certain graduate programs, resulting in a limitation of the number of discretionary courses offered to upper-level graduate students.

Building the faculty to critical mass

The University fully recognizes that it is cost intensive to rebuild faculty ranks. Start-up packages for new faculty that support the purchase of capital items are a major university commitment to research. Total start up expenditures topped $3.7 million in 2003-04 (See Figure 28). Nevertheless, despite these outlays the University has found it difficult to provide adequate start-up funds for new faculty, a problem most clearly evident in the sciences and engineering. While the College of Letters and Science spends approximately $1 million per year on nationally competitive start-up packages for new faculty, some of the professional schools that have smaller budgets simply can not contribute as much to start-up costs. Recent graduate program reviews in Chemistry and Engineering identified inadequacies in start-up

[1] Data are from the 2003-04 UWM Factbook

funding as a key factor affecting UWM's ability to compete with other universities for outstanding faculty members. To address this issue, in 2002-03, 2003-04, and 2004-05 additional funds have been reallocated from Academic Affairs to fund start-up costs for new faculty.

Figure 28. **Start-up Costs**

Unit	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Arts	7,000	7,000	35,000	10,500	10,500	17,500	14,000	24,500	7,000
Business	—	55,257	43,947	202,144	102,841	220,460	440,652	388,413	226,308
Education	0	32,500	39,500	104,386	74,888	67,560	112,467	118,000	51,200
Engineering	—	251,278	100,166	236,867	703,878	343,000	598,967	696,554	655,000
Health Sciences	0	3,000	1,500	26,500	108,666	93,255	147,500	98,000	489,124
L&S	377,633	296,120	612,718	1,115,300	1,331,200	1,084,800	1,082,188	854,041	2,194,668
Nursing	30,000	30,000	60,000	40,000	10,000	30,000	50,000	90,000	40,000
SARUP	2,500	8,333	0	7,311	25,628	0	18,089	13,800	8,889
Social Work	0	30,000	0	43,389	0	19,500	0	26,500	27,388
SOIS	3,000	0	6,000	9,000	12,000	3,000	6,000	6,000	9,000
TOTAL	420,133	713,488	898,831	1,795,397	2,379,601	1,879,075	2,469,863	2,315,808	3,708,577

The University has also begun to 'replace at rank.' When senior faculty members leave the University, their department's productivity often suffers if replacement hires are made exclusively at the junior rank. In general, expectations for scholarly productivity (funded research, publication in peer-reviewed journals, or a high level of creative activity) are being emphasized to new assistant professors and to faculty going through promotion and tenure processes. There are increased efforts to recruit senior-level scholars with strong track records in external funding. Within the past two to three years faculty numbers have begun to be restored, moving the faculty size closer to the critical mass that is needed to achieve the University's research goals.

In adding to faculty ranks, UWM's hiring and tenure criteria are an asset. Although specific criteria vary by department, school, college, and division, all criteria stipulate that only faculty with great potential as scholars be hired and that only those with substantial, externally recognized merit be granted tenure.

Graduate student support
The caliber of the graduate student body is paramount both for the research portfolio of the campus and the success of its undergraduate programs. Because of uncompetitive teaching assistantships (TA) and stipends, UWM increasingly found itself with declining quality and quantity among its TA population. Sparked by a report of the Graduate Research Policy Committee and by calls from graduate programs, in 2002 the Provost reallocated funds to redress the

inadequate TA stipends with the newly created Chancellor's Graduate Student Fellowships. Two $1 million enhancements have been made (2002, 2003), with the result that programs are seeing the numbers and quality of their new graduate students increase. Considering that these reallocations were made at a time when major budget rescissions were imposed by the State, this program demonstrates that academic program and student quality are first priorities.

Another issue is the research assistantship. While tuition remission is provided for teaching and project assistants, research assistants (RAs) must pay their own in-state tuition from their stipends. In an effort to alleviate this problem, RA stipends were raised several years ago. However, tuition increases have erased the gain of the stipend increase and have made the package uncompetitive, especially for natural and physical sciences and engineering graduate programs. The result has been a precipitous drop in research assistants from 101 in fall 1996 to 30 in fall 2003. For the 2004-05 year, the University has remitted in-state tuition for RAs through a reallocation of one-time state GPR funds; a further commitment has been made to fund remissions from indirect cost returns in future years. There is collective agreement that this reallocation is an investment in UWM's research capacity. It should lead to an increase in the volume of external sponsorship of research through the expected increases in the number of RAs and the quality of graduate students that the possibility of more competitive multiyear compensation packages would create.

Facilities that support research and creative activity

The acquisition of the Helene Zelazo Center for the Performing Arts in 2001 represented an enormous enhancement for the Peck School of the Arts. For the first time, faculty and students had a large, first-class venue in which to perform for the public. Similarly, the renovations of the Klotsche Center and Lapham Hall are providing improved facilities for programs in the College of Health Sciences and excellent research laboratory space for the Department of Biological Sciences. The Great Lakes Research Facility, which houses the WATER Institute and other research centers, is a strategically placed facility with additional potential for built-out space, albeit doing so is very expensive.

With its compact footprint of 93 acres, UWM's main Kenwood campus is fully developed (for a campus tour of facilities, see http://www.uwm.edu/UWM/Map3/). Increasingly, space for research and creative activity will have to be found off campus. The redevelopment of the Kenilworth Building, the leasing of space in the Cozzens and Cudahy Research Center, and the potential acquisition of the Columbia Hospital site represent the kind of creative thinking that will be needed to address these needs in the long term.

UWM's technology infrastructure supports research. UWM has been a member of Internet 2 from its inception and continues to believe in the value and potential of the high-speed connectivity and

new applications that it provides. Participation in Internet 2 is also necessary for recruiting new researchers and meeting the campus targets for research funding. A 2001 review of UWM's information technology infrastructure found that, in total, UWM commits approximately $19.7 million of its operating budget on information technology hardware, software, personnel costs and other IT services or resources. This represents approximately 7.8 percent of UWM's overall operating budget. The percentage parallels the percentage of budget devoted to IT at other large universities such as the University of Minnesota and the California State University System.

The UWM Libraries, which has a collection of more than 5 million catalogued items, is a core facility supporting scholarship. Current library space is at 379,000 square feet (approximately nine acres). Librarians work with faculty liaisons to understand departmental needs. This professional relationship builds and maintains a well-developed collection. The addition of materials to the Libraries' collections occurs in two ways. About two-thirds of the monographic purchases are acquired through automatic acquisition plans established in consultation with faculty liaisons, and the remainder of monographs is added to the collections at the request of faculty members; such requests are given high priority, and ordered as funds permit.

The Schools and Colleges

Research infrastructure needs are also met at the school, college, and unit levels. Several schools and colleges have their own internal research offices. The Center for Architecture and Urban Planning Research encourages faculty to submit proposals, serves as a matchmaker between community clients and potential researchers, and facilitates the grant-writing process for faculty. The staff of the Werley Center for Nursing Research and Evaluation in the College of Nursing provides vital support for the research and scholarship activities of the faculty and staff through consultation particularly for study design and data analysis, grant application preparation including boilerplate and budgets, assistance with transmittal, and assistance with preparation of posters, papers, and manuscripts for dissemination of findings. The School of Education, the College of Engineering and Applied Science, and the College of Health Sciences also have research support offices.

The schools and colleges provide research support for new faculty members by reducing teaching loads in their first year, providing summer support following the first academic year of appointment, and funding start-up packages for new faculty. Many schools provide some travel funds to their faculty to support research conferences and dissemination activities. Release time from courses for proposal writing is provided on an ad hoc basis by schools and colleges. Several units provide monetary awards for research excellence (e.g., the Business Advisory Council Research Award, Dean's Research Awards in Nursing, School of Education Research Awards).

Schools and colleges also pursue joint appointments for research with other institutions or agencies, as illustrated in the following examples from the College of Nursing. The College's joint appointments include the Schroeder Chair for Nursing Research (Aurora Health Care), Aurora Distinguished Professor of Health Care Informatics and Quality (Aurora Health Care), Research Facilitator (Froedtert Hospital), Clinical Nurse Specialist (All Saints Healthcare System), Research Facilitator (St. Francis Hospital), Research Facilitator (Elmbrook Hospital -pending), Research Facilitator (St. Michael's Hospital).

Outstanding research contributions are recognized through the appointment of distinguished professors and endowed chairs. Both the UW System and UWM fund distinguished professor programs to recognize excellence in research. Currently, UWM has seven UWM Distinguished Professors and seven UW System Wisconsin Distinguished Professors. The University also has 11 currently occupied endowed or named research chairs: the Manegold Professor of Management, the Bostrom Professor of Entrepreneurship, the Tata Consultancy Services Professor, and the Hans Storr Professor of Finance in the School of Business; the Harvey and Patricia Wilmeth Professor of Economics, the Shaw Distinguished Professor, the Vilas Professor of English, and the Wilder Crane Professor in the College of Letters and Science; the Rockwell Automation Professor in the College of Engineering and Applied Sciences; the Schroeder Chair for Nursing Research in the College of Nursing; and the Endowed Chair in Applied Gerontology in the Helen Bader School of Social Welfare. Recruitment for the Richard C. Notebaert Distinguished Chair of Global Studies and International Business is underway.

Seminars, colloquia, and visiting artists are supported across the University. The School of Business Administration's Management Science Brown Bag Seminar series has in recent years featured presentations by prominent national and international scholars outside the Business School. In 2003–04 the Dean's Office in the Peck School of the Arts provided the matching funds needed to bring Susan Marshall, a renowned New York-based choreographer and recipient of a MacArthur Foundation "genius" award, to UWM for master classes, performances, and workshops. The College of Letters and Science helped to sponsor the Distinguished Speakers in Molecular Biology and Biochemistry along with the Departments of Biological Sciences and Chemistry.

The UWM Libraries also sponsors scholarly events. The Chancellor's Golda Meir Library Scholar program provides select UWM doctoral students and dissertators with resources to pursue a year's intensive research in their chosen field. Awardees present the results of their research during the Libraries' Scholar and the Library series. The UWM Libraries Morris Fromkin Research Grant and Lectureship is a competitive award to a faculty or academic staff member for research in the area of social justice.

A prime example of support for the humanities, arts and social sciences is the faculty research fellowship program administered by the Center for 21st Century Studies. Each year a research topic is pursued by the Center, and six to eight faculty members who have research interests related to the topic are awarded fellowships on a competitive basis. Lectures, faculty seminars, conferences, and colloquia are coordinated around the year's research theme. The focus of the Fellows' research in 2004-05 is "Geographies of Difference." Jointly supported by the College of Letters and Science and the Graduate School, the Center is a major campus resource for scholars in the humanities, arts, and social sciences.

Schools and colleges also make internal research awards. In Architecture, a small grants program supports faculty research. The Frank Lloyd Wright Initiative, the Institute for Historic Preservation, the College of Health Science's Stimulus for Enhancing Extramural Development (SEED) Program, and the Metro Milwaukee Initiative are just some of the school and college programs that support faculty research.

All of the investments outlined above demonstrate that UWM is making strong efforts to advance the quality and quantity of research and creative activity—yet there is a fundamental tension between the University's aspirations and its current resources. In addition to faculty staffing needs, travel monies for research are very limited, as are funds for disseminating results. Many program review reports mention critical infrastructure needs, citing deficits in office space, seminar rooms, and space for graduate students.

UWM's infrastructure for research and creative activity, while strained by the concerns noted above, has nonetheless enabled faculty, staff, and students to make rich and substantial contributions to knowledge, as reflected in the profiles presented below.

Creation of Knowledge: Faculty and Staff

 Scholars conduct research and work creatively as individuals, in collaborative groups and in centers and other organizations that bring together a critical mass of scholars and support resources. Scholarly productivity and extramural research funding provide two assessments of progress in building UWM's research status.

The University has gathered scholarly productivity information three times: in 1997—as part of the Program Array review; again in 1998 as part of the annual planning process, and in 2004 as part of the NCA Self-Study preparation. For the most recent survey, departments were asked not only to provide quantitative information about scholarly outcomes but also to indicate which measures were most significant in their own estimation. Not surprisingly, for most areas the top-ranked indicators were publications in books, chapters, refereed journals, and invited publications; grant submissions and

awards; and presentations at national or international meetings. Peer-reviewed journal publications represent work that has been favorably judged by external reviewers, signaling acceptance of the work by the community of scholars. For the sciences, engineering, nursing, and some of the social sciences, extramural funding is another key indicator of quality scholarship because it is generally awarded through national competitions based on peer scrutiny and rankings. Finally, participation in national and international meetings provides an indicator of the close connection of the faculty with the frontiers of knowledge in their fields.

Departments were grouped among sciences, social sciences, and humanities and the scholarly activity of each group was analyzed. This grouping strategy was adopted in order to allow for comparisons with earlier surveys such as the PAR, which used these three categories of science, social science, and humanities. Future analyses and data structures may need to address the University's Divisional structure, instead (Professions, Social Sciences, Natural Sciences, and Arts/Humanities). For the purposes of analysis, the standard of one refereed publication per faculty member per year was used as a benchmark. Similarly, the benchmark of one presentation at a national and international meeting per faculty member per year was also used as a productivity indicator. In advancing UWM's research agenda, we must hold ourselves to high standards of scholarly productivity; where ratios are under one, there are a variety of factors that may affect productivity (i.e., absence of a Ph.D. program, lack of funds for research assistants, the quality of work being produced, departmental expectations for service or administration, disciplinary standards, etc.). However, we must still be accountable for our scholarly goals and where ratios are low, identify barriers and determine whether and how they might be eliminated or reduced.

It is important to note that this assessment of scholarly productivity does not address the absolute quality of the aggregate scholarly work reported.

Sciences

According to the survey of 2001–03 scholarly activity, 75 percent of departments (12 of 14 reporting) average at least one refereed journal article/year/faculty member; 50 percent average a strong two papers; and 17 percent have an excellent record of at least three per year per faculty member. Thirty-three percent of departments reported that on average each of their faculty members contributed at least one invited article for a monograph during the past three years. This is a robust indicator of importance of the scholarship being carried out by faculty members within their fields of research. Finally, although book publication is an uncommon activity within the sciences, 50 percent of responding departments have faculty members who published scholarly monographs and text books; this percentage rises to 67 percent if one includes edited books. These findings underscore

the presence of externally recognized expertise among many of the science departments.

More than 90 percent of departments meet the minimum standard of one presentation per year per faculty member; 33 percent reach the higher standard of two. Indicative of the relevance of faculty scholarship within their fields, on average each member from more than 90 percent of departments has been asked to give an invited presentation during the past three years. More than 50 percent of departments average one or more invited presentations per year per faculty member. Two average about two per year per faculty member.

Faculty from 75 percent of the departments served as journal editors between 2000 and 2003; 50 percent provided guest editors. Coupled with the fact that 50 percent of the departments were also represented on editorial boards, these numbers underscore the presence of outstanding scholars among the faculty.

TFigure 29. **2001-2003 Scholarly Productivity Summary: Sciences**

	Monographs		Chapters		Articles		Presentations	
	94-97	01-03	94-97	01-03	94-97	01-03	94-97	01-03
Biological Sciences	0.11	0.00	0.38	0.07	1.80	2.08	4.50	4.93
Chemistry	0.03	0.08	0.50	0.67	3.00	2.33	5.30	8.45
Civil Engineering and Mechanics	0.10	0.07	0.40	0.48	4.47	3.31	7.78	8.48
Electrical Engineering and Computer Science	na	0.13	na	0.28	na	0.89	na	2.88
Geosciences	na	0.11	na	0.07	na	1.30	na	3.78
Health Sciences	0.00	0.00	0.00	0.06	2.80	0.51	4.20	2.49
Human Movement Sciences	0.05	0.00	0.52	0.00	0.90	0.72	2.90	3.05
Industrial and Manufacturing Engineering	0.28	0.06	0.00	0.06	3.56	2.22	4.95	7.00
Materials Engineering	0.80	0.00	0.80	0.00	11.00	6.67	7.90	9.33
Mathematical Sciences	0.07	0.04	0.05	0.15	1.20	1.32	2.00	2.99
Mechanical Engineering	0.37	0.00	0.60	0.15	10.30	11.50	7.20	6.00
Nursing	0.02	0.06	0.94	0.48	1.25	1.38	4.12	3.71
Occupational Therapy	0.40	0.04	0.80	0.32	5.50	1.16	18.14	4.03
Physics	0.20	0.02	0.70	0.20	4.10	3.09	5.80	8.63

*na indicates where departmental restructuring does not allow for historical comparisons

Finally, indicators of scholarly activity include the finding that faculty in several departments do significant work as grant/contract referees. This tends to be an indicator of preeminence in a field of study. In addition, 25 percent of the departments report development of inventions, patents, and other innovations.

The results gathered in the NCA survey for 2001–03 can be compared in modified form with data from 1994-97 collected for the PAR review

(See Figure 29). Focusing on aggregate figures for articles (refereed and non-refereed) and presentations (national/international, regional/local, and invited), the heart of scholarly publication in the sciences, the quantitative results are similar or displayed some decline over the course of the decade. Overall, departments that entered the decade with a strong scholarly base continued at a similar level as did departments with a smaller research foundation at the outset. Generally, science departments have not increased their productivity over the past decade.

Social Sciences

According to the data gathered in 2004, 73 percent of departments in the social sciences report that their faculty members average close to one book chapter or refereed journal article per year.

As with the Sciences, presence of some books indicates breadth of faculty activity and recognition of expertise. Articles in books can be a means of synthesizing the faculty member's own research as well

Figure 30. **2001-2003 Scholarly Productivity Summary: Social Sciences**

	Monographs		Chapters		Articles		Presentations	
	94-97	01-03	94-97	01-03	94-97	01-03	94-97	01-03
Administrative Leadership	0.19	0.19	0.41	1.05	2.52	2.57	3.37	6.91
Africology	0.19	0.06	0.16	0.33	0.44	0.44	0.77	2.22
Anthropology	0.78	0.19	0.48	0.31	1.70	0.61	3.00	3.39
Architecture	0.16	0.06	1.77	0.03	0.30	0.36	2.88	2.98
Communication Sciences and Disorders		0.00		0.07		0.27		1.73
Criminal Justice	0.60	0.67	0.68	0.60	1.60	1.00	2.20	1.47
Curriculum and Instruction	0.63	0.08	0.65	0.89	2.15	0.85	7.60	4.47
Economics	0.32	0.14	0.69	0.00	2.77	0.76	1.67	1.14
Educational Policy and Community Studies	0.70	0.15	0.00	0.44	5.00	0.96	3.20	4.59
Educational Psychology	0.00	0.09	0.22	0.39	3.00	2.18	4.10	4.08
Exceptional Education	0.60	0.31	0.42	0.46	0.83	2.00	8.50	3.20
Geography	0.40	0.07	0.40	0.52	1.60	2.55	1.90	5.17
History	0.39	0.14	1.08	0.47	1.49	0.44	0.00	1.69
Journalism and Mass Communication	0.12	0.15	0.00	0.24	0.76	1.12	0.00	1.76
Political Science	0.59	0.30	0.75	0.35	1.63	1.65	4.08	3.33
Psychology	0.11	0.02	0.17	0.30	1.04	1.32	3.72	4.42
School of Information Studies	0.90	0.14	0.50	0.33	1.42	1.36	2.14	1.42
School of Business	0.02	0.13	0.07	0.24	1.00	0.98	0.64	1.25
School of Continuing Education		0.14		0.43		2.86		3.95
Social Work	0.14	0.08	0.47	0.20	2.30	1.33	4.83	2.32
Sociology	0.12	0.04	0.30	0.19	0.70	0.35	2.00	1.81
Urban Planning	0.40	0.28	0.46	0.17	1.86	1.11	3.06	3.55

*na indicates where departmental restructuring does not allow for historical comparisons

as reviewing the research of others. In 77 percent of departments faculty have published scholarly or text books; this rises to 95 percent if edited books are included. Ninety-five percent of departments have had articles in books; 67 percent of departments have at least one per faculty/three years; two departments average close to one per faculty per year.

The minimum standard of one presentation per year per faculty member is met by 77 percent of the departments in the Social Sciences; 32 percent meet the stronger standard of two per year per faculty member; 95 percent of the departments report that their faculty members were invited to do presentations over the last three years; 18 percent averaged at least one per faculty member per year; 86 percent of departments report that their faculty organized conferences or sessions within the last three years.

Seventy-three percent of the departments have faculty who were journal editors during the last three years. All departments in the Social Sciences have representation on journal editorial boards; 27 percent report two or more per faculty per year; 55 percent of the departments had faculty who were guest editors of a special issue during the last three years.

A comparison of the 2001-03 data with the 1994-97 PAR data indicates that scholarly productivity did not notably increase over the period (See Figure 30). For example, while 40 percent of departments had some increase in the number of articles produced, 60 percent experienced a modest decline.

Humanities

Drawing conclusions from the quantitative data contained in the 1997, 1998, and 2004 surveys for the departments classified as humanities is very difficult for a number of reasons. This division is extremely heterogeneous, consisting of the five departments in the Peck School of the Arts, language and literature departments, art history, philosophy, and communications. The form that scholarship typically takes in these departments varies widely. In the arts departments it often takes the form of performances and exhibitions; in English and language and literature departments the main mode of scholarly production tends to be books rather than papers, while the reverse is true in philosophy. Moreover, what are considered respectable rates of productivity vary widely across disciplines. The Division has just one Ph.D. program, which may also affect productivity.

Despite these caveats, the data contained in the surveys indicate that the level of research output for the departments classified as humanities constitutes a sound basis on which to build UWM's future as a first-rate research university. According to the data gathered in 2004 all of the departments meet disciplinary standards. In the departments of language and literature, art history, philosophy, and communications the Self-Study team used the standard of one article

in a refereed journal or book per year per faculty member as an indicator of active scholarship. All departments met this standard, and half of them exceeded it by a factor of two or three. Moreover, these departments produced a total of 36 books in the two-year period covered by the survey. In the cases of Dance, Film, Music, Theater, Visual Arts the standard of one solo exhibition, museum exhibition, recording, and guest appearances or performances per faculty member per year was used. It seems clear that this standard was met and in most cases substantially exceeded. The Peck School of the Arts has a long-standing record of public performance of both original and re-created work; part of its productivity is its role as a catalyst for the arts in Wisconsin. The School offers 270 performances and gallery exhibits per year, making it the second most active arts organization in the state.

Figure 31. **2001-2003 Scholarly Productivity Summary: Humanities**

	Monographs		Chapters		Articles		Presentations		Creative Expression	
	94-97	01-03	94-97	01-03	94-97	01-03	94-97	01-03	94-97	01-03
Art History	0.16	0.09	0.05	0.90	1.09	0.62	1.43	3.62	0.00	0.00
Communication	0.14	0.13	0.95	0.71	1.65	1.22	3.61	3.09	0.00	0.00
Dance	6.40	0.00	na*	0.00	na	0.00	0.00	0.00	6.40	4.00
English	0.19	0.36	0.41	0.11	0.40	1.71	1.38	4.19	0.60	1.45
Film	0.70	0.16	na	0.03	0.00	0.26	5.10	10.38	0.70	2.40
Foreign Languages and Linguistics	na	0.33	na	0.39	na	0.83	na	1.19	na	0.00
French, Italian, and Comparative Literature	na	0.22	na	0.51	na	0.38	na	1.62	na	0.00
Music	0.30	0.40	0.06	0.03	0.08	0.47	0.30	6.32	0.30	5.57
Philosophy	0.13	0.11	0.57	1.02	0.81	0.36	1.57	2.00	0.35	0.51
Spanish and Portuguese	0.41	0.56	0.00	0.28	1.20	0.33	0.00	2.28	0.00	0.00
Theatre	3.50	0.13	na	0.21	na	0.29	2.10	13.01	3.50	2.25
Visual Arts		0.01		0.04		0.57		9.64	2.30	8.60

*na indicates where departmental restructuring does not allow for historical comparisons

Longitudinal comparisons with the PAR data for the humanities mirror the basically stable results for the sciences and the social sciences (See Figure 31). However, the number of activities categorized as 'creative expression' increased, with productivity in several departments more than doubling.

Extramural Funding

External support for research is both an indicator of the quality of scholarly work and an engine for further scholarly development. Increasing success in the competition for extramural funding reflects the high regard that sponsors have for the academic quality of faculty and staff and the value of the scholarly and creative work in which they

engage. In turn, this funding provides important resources to support the building blocks of scholarship—from facilities and equipment to support for graduate students and libraries.

UWM faculty and academic staff have made significant progress over the last ten years in gaining support from external sponsors to fund scholarly activities. Since 1995, proposals for extramural funding have increased 31.6 percent and extramural research awards have increased 95.6 percent from $12.7 to $24.8 million. Since 1998, the base year of UWM's current Investment Plan, extramural expenditures have increased 60.5 percent from $24.1 to $38.7 million and Facilities and Administrative (indirect) costs have increased 57 percent from $3.0 to $5.3 million. For the last full fiscal year, 2003-04, 233 faculty and academic staff members received one or more research or instructional awards. These awards, when added to other categories of awards, resulted in total extramural funding that exceeded $64.1 million. Sponsored research funding reached $24.8 million and instructional funding totaled $11.9 million (See Figure 32).

While these amounts represent demonstrable growth and development of the University's sponsored programs, all agree that UWM would benefit from a broadening of its base, involving more faculty and academic staff in extramural funding activities, and reducing its dependence on a relatively small group of focused research units. In fiscal year 1995-96, 152 faculty and academic staff members obtained extramural research funding and another 69 received instructional funding. In 2004-05, comparable participants numbered 162 for research and 71 for instructional awards. This does not demonstrate significant growth in extramural funding participation. While the amount of funding increased substantially during the past 10 years, the distribution of funding has become more concentrated. In 1995-96 the top ten research award recipients represented 33 percent of the campus total. Today, the first 10 in rank order constitute 43 percent of total research funding (See Figure 33). Similarly, a decade ago, the top 10 instructional grant recipients obtained 66 percent of that campus total; today the top10 group brought in 64 percent. About 30 percent of today's UWM faculty are involved in extramural funding, not a trivial proportion, but many in this group bring in relatively small amounts of funding. In short,

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Figure 32. **Extramural Funding History**

Proposals for extramural funding increased 31.6%

Extramural research awards increased 95.6%

| 1995 | $12.7 million |
| 2004 | $24.8 million |

Extramural expenditures increased 60.5%

| 1998* | $24.1 million |
| 2004 | $38.7 million |

Facilities and Administrative (indirect) costs increased 57.0%

| 1998* | $3.0 million |
| 2004 | $5.3 million |

For the last full fiscal year (2003-04) 233 faculty and academic staff members received one or more research or instructional awards resulting in extramural funding

Research or instructional awards plus other categories of awards	>$64.1 million
Sponsored research funding	$24.8 million
Instructional funding	$11.9 million

*Base year of UWM's current Investment Plan

UWM's extramural funding base relies on a relatively few individuals, mainly housed in research centers or focused on large multiyear projects funded by federal agencies. Examples of these large UWM research units include the WATER Institute, Center for Addiction and Behavioral Health Research, the NIEHS funded Marine and Freshwater Biomedical Research Center, the LIGO Physics project, and the NSF funded Milwaukee Mathematics partnership project. Nonfederal funding remains fairly constant over time and represents a relatively small portion of total funding.

One approach for the future is to broaden UWM's funding base by expanding upon the existing model of research clusters or foci. It is clear that funding agencies are requesting more collaboration on larger, often interdisciplinary research projects and programs. Over the past decade, research has become a more collaborative enterprise at UWM as well: In 1995-96, UWM generated $5.4 million in multipartner grants; the amount rose to $15 million by 2003-04 (See figure 34). Emerging research groups at UWM suggest a growing capacity to demonstrate interdisciplinary collaboration. The Graduate School's 2004 Research Investment Plan calls for partnerships with the schools and colleges in which discretionary resources are used to coordinate the development of large grant proposals and create additional new concentrations of research strength. In addition, developing research partnerships with non-governmental units should lead to increases in nonfederal extramural support over time.

Creation of Knowledge: Undergraduates

Research is self-driven learning that is focused on the discovery of new knowledge. Encouraging undergraduate students to conduct research beyond the level required in ordinary classes, especially independent projects in cooperation with individual faculty members, is an important part of valuing a life of learning and discovery. Engagement in and support of undergraduate research is extensive at UWM: Whether in the laboratories of scientists, in community nursing clinics, or in professional dance groups, students have taken advantage of the rich resources that UWM offers as a research university to move beyond the classroom into project-driven individual studies.

About 80 percent of departments reporting in the recent NCA survey listed opportunities for undergraduate research and creative expression, though the detail provided varied greatly.

Several of these are highlighted for illustrative purposes:

- Art History professor Derek Counts serves as the Associate Director of the Athienou Archaeological Project, an archaeological excavation and undergraduate field school on the island of Cyprus. In collaboration with a colleague at Davidson College, he is co-principal investigator for a three-year (2004–2006) National Science Foundation Research

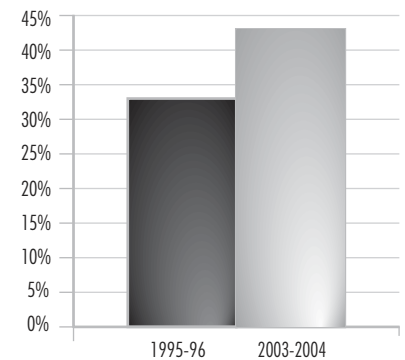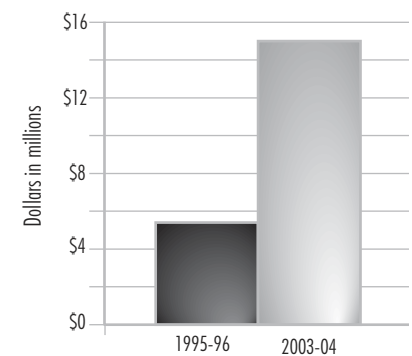Figure 33. **Research Funding from Top-Ten Award Recipients**

Figure 34. **Generated Dollars in Multi-Partner Grants**

Experiences for Undergraduates Grant. This grant provides funding (tuition, airfare, room and board, and stipend) for UWM undergraduates who participate in the field school. Students are actively engaged in both field and library research and are required to complete a research project.

- Psychology actively involves undergraduates in faculty research. Undergraduate students have coauthored more than 125 scholarly products during the past decade. UWM Psychology students have consistently been recognized for the quality and quantity of scholarly research they conduct with Psychology faculty. National awards students received in 2003 include: American Psychological Association Travel Award: Kristen Jastrowski; APAGS (American Psychological Association of Graduate Students): Nancy B. Forest; L. Michael Honaker Scholarship for Master's Research in Psychology: David Bauer; Centers for Disease Control and Prevention Doctoral Dissertation Grand for Violence-Related Injury Prevention Research in Minority Communities ($19,866): Michael McCart.

- Nursing undergraduate students participate in faculty and staff research activities through independent study. Several of these experiences have led to presentations at research conferences and awards for the research. Undergraduates are also involved in the research activities at the Community Nursing Centers. Many of these projects focus on health promotion activities. In October 2003 one of the participants received a $1,000 award for the best student paper from the UW Medical School Public Health and Health Policy Institute.

A small sampling of the accomplishments of undergraduates is listed below:

- Architecture students have won numerous awards in the annual Chicago Chapter of the American Institute of Architects design competition, more, in fact, than any other Midwest school.

- A number of Chemistry undergraduates participate in research, such as D. R. Killelea, who was recently first author on publications in *Chromatography* and *Chemosphere.*

- Civil Engineering and Mechanics students won the Martin Brueing Award for outstanding technical papers in 1999, 2000, 2001, 2002 (statewide competition).

- Nursing student Jacqueline Alomepe received a Minority International Research Scholarship that allowed her to study and work with a researcher in Thailand. Her project was entitled "Perception of Sexual Violence among Thai Adolescents."

- Psychology major Steven Bulinski (B.A., 2000) received funding for a Sigma Xi proposal, coauthored nine national conference presentations, and was later accepted at Yale for graduate study.

- Dance, Film, and Music students are also widely recognized for their creativity. For example, Dani Kuepper (1998) choreographed and performed a solo that was included in the Gala performance of the American College Dance Festival at the Kennedy Center.

- Bachelors of Fine Arts student Alexander Boguslavsky's (2003) senior film project, "Blue Lamp," won a Kodak prize at the Wisconsin Film Festival. The film was nominated for a Student Academy Award in the Midwest Region and was the only student film selected for screening at the 2003 Milwaukee Film Festival.

- Kevin Schlei was commissioned to compose a work for the Milwaukee Ballet that was performed in February 2004.

- Economics student Greg Whitten served as a State Department Intern with the U.S. Mission to the Organization for Economic Cooperation and Development in Paris in 1999.

At the University level, the Honors Program offers an Honors Research seminar that pairs honors students with faculty in conducting a research project. The Undergraduate Research Opportunity (UROP) also pairs students with leading academic researchers. Building on a strong tradition of undergraduate research at UWM, the UROP makes it possible for undergraduates to participate first-hand in the University's research mission. First- and second-year students are teamed with faculty members based on shared interests and then work side-by-side with their mentors on research projects. Students receive up to three credits each semester for their work and participate in a special one-credit UROP Seminar to discuss their research and learn about methodological approaches in other disciplines.

The UW System also sponsors an Undergraduate Research Symposium that UWM sends students to each year. In 2004–05, five UWM students participated by presenting their research at the statewide conference.

Another initiative that exposes undergraduates to research is the Ronald E. McNair Postbaccalaureate Achievement Program, which was initiated by the U.S. Department of Education in 1989. UWM was one of the first of 14 universities in the country to receive funding for this program. The purpose of the McNair Program is to increase the number of students from underrepresented backgrounds who enter graduate studies leading to the doctorate. The McNair Program at UWM provides tutoring, academic advising, and career counseling for juniors and seniors during the academic year. Eligible students

are provided workshops that emphasize library research, writing, and computer skills; selected juniors and seniors receive research internships and stipends, primarily during the summer. During the internship, each student is paired with a faculty mentor and receives individualized attention in completing a research project. Fifteen internships are offered each year. The program is open to students in any major discipline. To further expose students to academia, McNair provides travel to conferences, graduate schools, professional meetings, and forums, where mentors and students present research findings. In addition, the program assists students in finding avenues for publishing.

Although UWM undergraduates can participate in faculty research projects or carry out their own research projects, these opportunities vary significantly by department. On the 2004 NSSE, 24 percent of UWM seniors reported having worked on or planning to work on a research project with a faculty member; 41 percent of instructors taking the FSSE rated that as being a very important activity for seniors. Clearly, the University can close this gap between instructor expectations and student experience. Individual faculty and staff advocates from across campus encourage undergraduate research; however, there is strong opinion that undergraduate research should be better promoted across the entire campus, possibly through establishing an undergraduate research office.

Creation of Knowledge: Graduate Students

The UWM graduate education portfolio includes 20 doctoral and 48 master's degree programs. All doctoral and many master's programs are focused on research and creative work. In virtually all of them, students collaborate with faculty, publish joint papers, and present their studies at meetings, frequently at the national level (Appendix 14). Many are supported by external or internal funding and receive travel grants to present their work at conferences. Numerous graduate students have received regional and national recognition for their thesis work.

The following examples illustrate the high quality of UWM's graduate student scholars:

- Zoran Samardizjia, a doctoral student in Modern Studies (English), was invited to present a paper on Balkan film at the Yale University Film Conference in Jan. 2003. He was the only graduate student invited to speak at this event.

- Institute of Chamber Music (ICM) graduate students perform two major recitals each semester on campus. In addition, ICM students perform at several university and community functions each semester. They also compete yearly in major chamber music competitions such as the Fishoff and Coleman.

- Over the past five years, graduate students in the College of Health Sciences have co-authored eight publications with faculty members and made five joint presentations at national conferences with faculty members.

- The Dance Department has three graduate students studying on prestigious Jacob Javits fellowships.

- Steve Morales, a graduate student in the School of Architecture and Urban Planning, worked on a Community Design Solutions project that was a joint venture with the United Community Center (Milwaukee's central resource for the Latino community). His work on this project secured public and private funding in excess of $50,000.

- In 2000, Spanish and Portuguese graduate student Tamara DuPage's translation of an essay entitled "I Work, You Work, Does She Work?" by Guatemalan sociologist Ana Silvia Monzón was published in *Americas & Latinas 2000*, a publication of the Working Group on Women and Gender in the Americas of Stanford University.

- Ann Kern (Master of Arts in Foreign Language and Literature) was awarded a full fellowship from Yale for the doctorate in Comparative Literature.

- Tisha King Heiden of the NIEHS Marine and Freshwater Biomedical Sciences Center garnered the following awards: Midwest Regional Chapter Society of Toxicology Young Investigator Award ($150.00); Midwest Regional Chapter Society of Environmental Toxicology and Chemistry (SETAC) Student Travel Award; Best Student Poster Midwest Regional Chapter SETAC; $1000.00 to attend the national meeting; Society of Toxicology Student Travel Award; EPA graduate student fellowship for 2004-2005.

Coupled with the independent analysis of the faculty's research productivity above, it is clear that students in a wide range of programs have excellent opportunities to achieve at high levels in their graduate research focus.

Celebrating the Achievements of Faculty, Staff and Students

UWM honors excellence in scholarship in a variety of ways:

- The UWM and UW System Distinguished Professor programs honor researchers whose work is recognized as exceptionally innovative and important.

- Campus media profile research in the campus website's story of the day, in the *UWM Report* publication targeting faculty and staff, in the *UWM Today* alumni magazine, and in the Graduate School's *Research Profile* and *Salute to Scholars* publications. School and college publications also highlight innovative research.

- KnowledgeFest, a Milwaukee Idea initiative showcasing research and scholarship at UWM, offers the community a chance to learn about and interact with the full breadth of UWM research and the many ways the university is working to improve the quality of life. KnowledgeFest activities include:

- The Chancellor's Research Forum—this new annual symposium brings guests from the community together with UWM scholars for a look at noteworthy research and community-university partnership opportunities.

- WUWM "KnowledgeFest on the Air"—research achievements featured regularly on WUWM, the National Public Radio affiliate.

- The UWM Authors Collection is composed of monographs, written, edited, compiled, translated, or illustrated by present and former staff during their employment at UWM. This collection is housed in the University Libraries Special Collections. Since 1992, contributing authors are biennially recognized in an awards ceremony.

- The Graduate School's biennial Humanities Research Award was inaugurated in 2003.

Departments such as History, Visual Art, Psychology (R. Dale Nance award), and Electrical Engineering and Computer Science (alumni association award) make awards to worthy undergraduates for their achievements in course work and research. Similarly, programs including Art History (Lawrence Hoey Memorial Prize) and Chemistry annually honor their graduate students. An example of these initiatives is the spring awards day in Chemistry, during which undergraduates and graduates display research posters in the halls, outside judges evaluate them for the purpose of presenting a number of monetary awards in a ceremony to which parents and administrators are invited. At that time, outstanding undergraduates at every level are also cited for their excellence in course work.

UWM honors its outstanding junior and senior Letters and Science undergraduates with invitations to join Phi Beta Kappa. Other Schools and Colleges have their own professional honorary societies. In addition, honors are accorded students at the time of graduation based on their grade point average.

Fostering Breadth of Knowledge and the Skills of Intellectual Inquiry

UWM's vision for student learning is expressed in the preamble to *Investing in UWM's Future* (summarized in the bolded text).

> UWM is at its core a community of faculty, staff and students engaged in learning, discovery, and creative expression. For the sake of generations of students to come, for our immediate neighbors in metropolitan Milwaukee, for the state of Wisconsin, and for our world as it ventures into the twenty-first century, UWM aspires to become a premier doctoral research university. **Our capacity to serve our constituents is grounded in our identification as a research university, engaged in scholarship across the campus. This foundation provides UWM with the capability to meet students at the frontiers of knowledge and to** engage the surrounding communities (city, state, world) with a robust base of scholarly expertise.

The University has designed its academic and support programs with the goal of helping students to reach their intellectual potential. UWM's model for the education of its undergraduate students broadly includes two elements: general liberal arts education and focused education in a major field of study.

The first addresses the need by all educated adults to have a foundation of knowledge and understanding about the world in which they live. Our society has become more complex, in some sense more self-aware, and increasingly intertwined with other societies and the underlying biosphere. It is absolutely necessary that students establish an objective knowledge base that can help them comprehend their surroundings and provide a starting point for effective decision making.

For the same reasons, students need to commit a substantial portion of their undergraduate education to gaining a foothold of more developed knowledge and expertise in particular areas of study. Commonly, this concentration provides them with the tools to launch a career. More generally, it can provide an organizing center for lifelong learning about the world in which we live.

At the graduate level, the learning process continues as students proceed from undergraduate majors to advanced study in even more defined subjects. Society's intellectual leaders emerge from the intense discipline of graduate work.

CRITERION 4b

The organization demonstrates that acquisition of a breadth of knowledge and skills and the exercise of intellectual inquiry are integral to its educational programs.

Additional supporting material for 4b is at www.selfstudy.uwm.edu:

- Appendix 5. Co-Curricular Experiences
- Appendix 8. Graduate Student Accomplishments
- Appendix 9. Capstone Experiences
- Appendix 10. Preparation for Independent Learning
- Appendix 11. Alumni Accomplishments
- Appendix 12. External Reviewer Comments about Graduate Programs

General Education

Breadth of knowledge and the skills of intellectual inquiry are strongly emphasized in UWM's General Education requirements. The program requires students to acquire basic competencies in math, foreign language, and English composition and to take classes spread across a credit distribution pattern in the arts, humanities, social sciences and natural sciences. There is also a cultural diversity requirement.

The UWM faculty designed the distribution requirements to provide a high degree of flexibility for students. There are clear expectations of learning outcomes for both the competency and distribution components of the GER. As described in "Criterion 3," the assessment of student learning outcomes in these courses has been instituted in the program review and oversight processes within the divisions of the College of Letters and Science. Compared to courses in the competency areas, however, distribution-requirement courses have received less scrutiny at the campus level. The assessment of student learning for the many courses that satisfy the distribution requirement has been left to the departments offering the courses. The general thinking of the campus, as documented in the APCC discussions from September through December 2003, is that while many of these courses are of high quality and continue to be highly sought by students, other courses may have drifted away from their intended purpose. Newly designed and implemented assessment activities will provide data useful in determining if the course array meets the intended student learning outcomes. A notable exception to the historical lack of review of the distribution areas has been the consistent monitoring of the freshman seminars and the related faculty development focused on student success and retention in the first year.
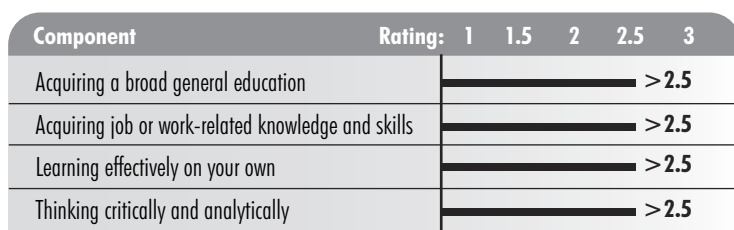
A unique component of UWM's General Education program is the Cultures and Communities certificate. This certificate affords students the option of focusing their distribution requirements through designated, interrelated Cultures and Communities courses. Learning goals for the Cultures and Communities certificate address students' ability to reflect critically on their own cultural identity in relation to the historical and social construction of categories such as "race" and "ethnicity" and their ability to collaborate with people from diverse backgrounds.

The lasting impact of UWM's general education program is evident in the 2003 survey of alumni: 73 percent of respondents with bachelor's degrees reported that UWM was very helpful in helping them acquire a broad general education. When alumni were asked to evaluate various components of their UWM experience, general education was one of the items that scored highest (See Figure 35).

Figure 35. **Alumni Ratings on Educational Impact of Their UWM Experience**

Component	Rating:	1	1.5	2	2.5	3
Acquiring a broad general education						>2.5
Acquiring job or work-related knowledge and skills						>2.5
Learning effectively on your own						>2.5
Thinking critically and analytically						>2.5

Based on a three-point scale.

The Major

The companion of general education is the student's work in a major field of knowledge. A special category of courses are those that provide students with research and creative experiences under the individualized direction of faculty mentors. In these diverse venues, faculty gain more detailed knowledge of a student's abilities to grasp, utilize, and apply knowledge in an open environment of inquiry. Undergraduates increasingly are required to carry out a significant research project as part of their major. Many programs in the College of Letters and Science assess student learning through senior-level capstone experiences that are predicated on a foundation of course work and involve the application of knowledge in the major to an independent project of research or creative activity. The College determined this as one method to ensure that all students experience the linkage between learning and discovery in settings that require them to become increasingly responsible for their own learning. Similar efforts that also focus on independent student inquiry are in place or underway in many of the professional schools.

UWM's annual survey of graduating seniors provides evidence of students' satisfaction with their experiences at UWM. The 2004 survey revealed that 88 percent of graduates rated the overall quality of instruction as excellent or good, compared with 71 percent of the 2003 graduates, 78 percent of the 2002 graduates, and 80 percent of the 2001 graduates. Similarly, 81 percent of 2004 graduates rated the overall quality of courses as excellent or good, compared with 68 percent of the 2003 graduates, 72 percent of the 2002 graduates, and 75 percent of the 2001 graduates (See Figure 36).

Figure 36. **Graduating Seniors Survey, Areas Receiving Excellent/Good Rating**

Legend: Quality of Instruction · Quality of Courses
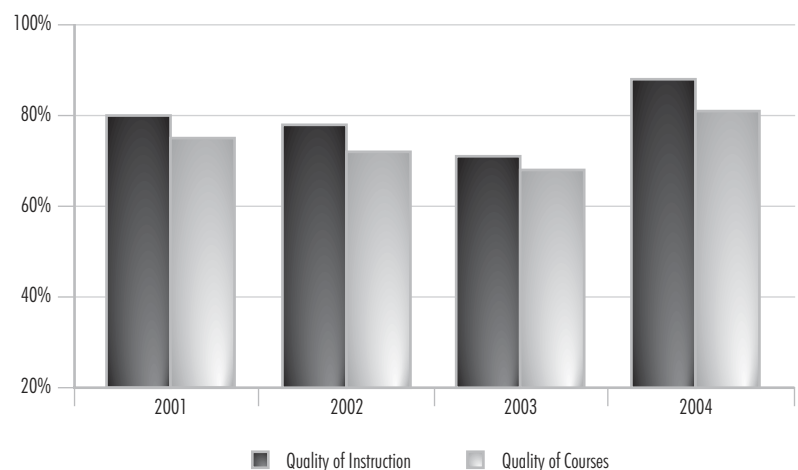
Recognizing that the validation of UWM's undergraduate programs also rests on the student's assessment of their learning years after graduation, UWM recently surveyed over 600 UWM graduates. Results revealed that as the time after graduation lengthened, alumni increasingly appreciated their UWM education. Information from departments indicates that graduates of programs throughout the campus are being accepted into graduate degree programs. Similarly, programs point to numerous alumni who are professionally employed based on their undergraduate majors, indicative of the strength of the educational foundations that are set in place at UWM.

UWM's alumni have established themselves in a wide array of professional careers, including the following examples:

- Anhai Doan, an MS graduate of the Electrical Engineering and Computer Science Department went on to obtain his Ph.D. in Computer Science from the University of Washington in 2003 and received the ACM outstanding doctoral dissertation award. He has also received the NSF Early Career Award. Currently, he is an assistant professor at the University of Illinois-Urbana/Champaign.

- Occupational Therapy alumna Joyce Engel Knowles is an associate professor of Occupational Therapy at the University of Washington-Seattle. She has obtained several NIH grants for her research in pain management in children with cancer as well as adults with cerebral palsy.

- Christopher Bratton (MFA '94, Film) was appointed President of the San Francisco Art Institute in January 2004. Prior to his SFAI appointment, Bratton served as Dean of Undergraduate Studies at the School of the Art Institute of Chicago.

- Juan-Carlos Campuzano, an undergraduate as well as a graduate student in the Physics Department is currently a Professor in the Physics Department of the University of Illinois at Chicago. He recently joined the select group of Fellows of the American Physical Society.

- Robert Stein, a graduate of the Political Science Dept., was appointed Dean of the School of Social Sciences at Rice University.

- Ann Prestamo, (MLIS 1995, School of Information Studies) is President of the Oklahoma Library Association (2003-04) and Oklahoma Librarian of the Year (1999).

- Alok Chaturvedi (Ph.D., MIS, 1989, School of Business) is currently Associate Professor and Director of the SEAS Laboratory at Purdue. He is also an Adjunct Research Staff Member at the Institute for Defense Analyses in Alexandria, Virginia, a leading think tank on national security matters.

Although the Self-Study process elicited many examples of positive alumni outcomes, the need for more comprehensive data is clear. Some departments keep full records of graduates, but many do not, in part because of other pressures on departmental administrative support resources. As part of its assessment of student learning outcomes, UWM has committed additional resources for alumni tracking.

Graduate Education

The bachelors, master's, and doctoral degree requirements represent a continuum in expectations for a student's depth of knowledge and understanding, intensity of work, and capacity to do advanced intellectual or creative work. Graduate programs provide students with advanced expertise in particular fields of knowledge and artistic work.

At the doctoral level, students go through a rigorous series of assessments, beginning with comprehensive tests of knowledge and understanding that must be passed before students achieve doctoral student status. Once in the doctoral program, both the primary mentor and a doctoral committee repeatedly assess progress toward the doctoral degree. The general requirement that the degree research must be publishable serves as the final, external indicator of success at this level. Similar, though less stringent and more variable assessments accompany progress toward the master's degree.

In a 2002 survey of 1,012 graduate students, 84 percent were satisfied or very satisfied with their experience. Students were particularly pleased with the availability of faculty members for independent study, with results that are highlighted in Appendix 14. These appendices focus on student publications in national journals, presentations at national meetings, shows and performances of fine arts students, and the accomplishments of alumni of the programs. They contain a variety of information indicating that the level of accomplishment of graduate students at UWM is good to excellent.

UWM carries out a full assessment of each graduate program every decade that features the reports of external reviewers. UWM's doctoral and master's programs are well to highly regarded by external experts. A common qualifier, however, is the observation that programs are limited by available resources.

Co-Curricular Experiences

Due to UWM's size, diversity of academic departments, and the wide ranging scholarly interests of faculty members, resources that support the academic mission extend far beyond the UWM classroom. Undergraduates' intellectual inquiry is enhanced with research opportunities offered by individual faculty, by the study abroad option, through participation in field-oriented clubs, and by the opportunity to interact with invited speakers and artists. Graduate students have an even greater prospect to learn from distinguished scholars who visit their departments. Centers as well as programs also make major contributions to the co-curricular assemblage.

Student Union-sponsored-activities further support the basic academic mission by providing a calendar filled with provocative films and film series featuring international as well as domestic film-makers, numerous speakers, and other activities such as the UWM orchestra and band performances.

Practice and social responsibility are also supported generously by co-curricular activities throughout UWM. Departments (both pre-professional and in the liberal arts) and centers make a wide variety of internship and service learning options available to undergraduate students. These experiences are invaluable, introducing students both to job-related applications and the possibilities for service in their majors. (See "Criterion 5" for more detail.) Membership in professional societies encourages students to become part of an ongoing community of learners and links their learning to real-world issues.

Currency and Relevance of UWM's Educational Programs

UWM's curricular connections to the larger world are grounded in the vision of UWM expressed in the preamble to *Investing in UWM's Future* and summarized in the bolded text.

> Great cities need great universities. In 1986 a community-based report, *UWM and the Future of Metropolitan Milwaukee,* stated, "The people of the Greater Milwaukee Region are determined to take charge of their future. They see a major doctoral research university as a powerful and necessary resource to help them achieve that future." Since that time, **UWM has taken large strides to advance its goal to achieve recognition as a major urban institution of higher learning and at the same time has established a myriad of linkages with the community. Considering that Milwaukee is the ethnic/international, cultural and artistic, manufacturing, financial, and population center of the state, it is imperative that UWM continue to grow in stature and to enhance and renew its symbiotic relationship with metropolitan Milwaukee.**

UWM mission statements make clear that together with its objective to become an outstanding research university, UWM is also called upon to take the leadership role within the UW System in addressing the intellectual needs of cities, beginning with the Milwaukee metropolitan area and extending out to embrace those needs on a global level.

UWM is located in a major city and metropolitan area that is home to diverse ethnic and immigrant populations; to companies that do

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business on scales that range from local to global; and to a thriving arts and cultural community that is international in outlook. In many respects, Milwaukee and its environs are experiencing changes that are occurring in other cities in the United States and throughout the world. In this context, the UWM faculty recognizes that students attending the University must be provided with the intellectual tools and perspective that can address the increasing complexity and magnitude of the world that they will face in their daily lives and professions. Among the curricular requirements and options placed before UWM undergraduate students in response to these challenges are the following:

- The general education component (GER) of every student's program balances the intense focus on a particular area of study with a broad exploration of the arts and humanities, social sciences, and sciences. The rich context of a general education is designed to help students develop an outward looking intellectual attitude in their lives.

- The GER also stresses the ethnic diversity with its requirement that students take at least one course that centers on the subject matter of ethnic diversity.

- The new Bachelor of Arts in Global Studies (BAGS), a series of jointly offered courses of study between the College of Letters and Science and various professional schools is designed specifically to link professional programs to the global context of these professions. For example, in the first BAGS degree in international management, one of the core courses is global environmental economics, designed to raise students' understanding of the environmental context and consequences of globalization. Both this and the study abroad program are administered by the Center for International Education.

- The general education Cultures and Communities certificate program promotes understanding of North American urban society. Its unique feature of immersing students in Milwaukee community settings has been called a "study abroad at home" experience.

UWM faculty members broadly recognize that student learning should foster the development of a foundation for lifelong learning. Whether one thinks of a student's professional future or personal and social futures, the pace and pressure for change demand that the citizens of the 21st century have the intellectual strength, breadth, and flexibility to function assertively in this type of environment. The adjectives "global, diverse, and technological" describe some of the ways that increasingly characterize our society and our stance toward the world around us. Each of these adjectives subsumes a huge range of intellectual subject matter. For example, although "diversity" commonly means ethnic or racial diversity and its

relationship to culture, a more robust definition for the 21st century would also include the diversity of genders, classes, religions, world views, and biological and physical environments. Similarly, "global" connotes more than international trade and economics; it relates to homogenization of environments, world views, languages, and ethnicity. Finally, "technology" represents more than computer-based information tools. In a broad sense it is the set of rapidly changing tools that societies use to gain control over their surroundings, be they physical, biological, or societal. In this enormously complex context, lifelong learning represents the only useful approach that can hope to provide UWM graduates the opportunity to remain relevant and capable of informed action throughout their lives.

Curricular Connections

Research universities are meeting places for professionals from all sectors of society. If there is one departmental activity that induces attention to currency of the undergraduate and graduate curriculum, it is the seminar series. Numerous scholars from across the United States and other countries are invited to campus by virtually all departments and programs. Their role is both to disseminate new knowledge to faculty and students and to provide the leaven that stimulates individuals and programs to refresh themselves. Particular programs also routinely utilize local professionals to teach in their courses. Many others effectively incorporate extra-academic perspectives into their curriculum by establishing substantial internship programs off-campus for their students.

Beyond this effective, informal mechanism to gain external perspective on the curriculum, many programs, particularly in the professional schools and colleges, routinely seek input from local employers in order to assess the level of preparation of students for their job careers. Many programs have formal advisory groups that draw upon the expertise of practicing professionals and area employers. (See "Criterion 5" for more detail.) Most professional units, and some Letters and Science departments such as Chemistry, must meet external curricular benchmarks in order to be certified. Finally, all programs undergo periodic review, utilizing external academic consultants to assess the quality of the programs, including their curricula.

Currency of courses and programs

This is first and foremost a function of the currency of the professoriat as scholars. Researchers who regularly publish in peer reviewed journals and continually participate in national meetings can only do so by maintaining a cutting-edge knowledge of their fields. These faculty members, who also staff the undergraduate and graduate teaching programs, serve as a direct conduit for the incorporation of current knowledge into graduate and undergraduate courses.

Second, many professional programs such as Engineering, Business, Social Work, Nursing, and Health Science are guided by national accrediting organizations, which are necessarily focused on the preparation of graduates for the future needs of the fields. Changing and refining curricula to meet the requirements of external certification maintains their currency. In addition, a number of programs are linked to national professional societies that include the definition of cutting edge undergraduate curricula within their purview. Therefore, connections between individual UWM faculty and academic programs and the larger scholarly and professional communities mandate that curricula maintain their currency.

At the program level, departments generally have standing undergraduate and graduate committees that address the issue of currency. Finally, UWM's comprehensive ten-year program review process for all undergraduate and graduate programs includes curricular currency as an indicator of programmatic quality.

Responsible Scholarship

In cooperation with the UWM graduate faculty, the Graduate School supports the creation, dissemination, and enforcement of policies and procedures that protect research integrity and ensure compliance with federal, state, UW System, and UWM guidelines and requirements. The University's new conflict of interest policy was approved in the spring of 2005, and both the Faculty and Academic Staff Senates have created policies on research misconduct. For faculty members, cases of research misconduct are investigated by the Faculty Rights and Responsibilities Committee; the Academic Staff Research Misconduct Review Committee investigates cases involving academic staff. Researchers are informed and advised of their responsibilities through formal and informal mentoring programs within academic units; consultation with the Office of Research Services and Administration (RSA) at the pre-award stage (regarding PI responsibilities and certifications and assurances) and post-award stage (regarding fiscal management, procurement and hiring, and financial reporting); and consultation with the Office of Technology Transfer on matters of intellectual property and technology transfer. The RSA website provides detailed information for researchers concerning their responsibilities.

CRITERION 4d

The organization provides support to ensure that faculty, students, and staff acquire, discover, and apply knowledge responsibly.

Human Subjects in Research

UWM's Institutional Review Board for the Protection of Human Subjects in Research (IRB) reviews funded and non-funded human subject research conducted by faculty, staff, and students. Research is defined as a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. The IRB's charge is to protect,

from inappropriate risk, human subjects involved in research at the University, and ensure that human subjects consent to their research participation.

The IRB operates under the authority of four documents:

❶ The Belmont Report. This report is the final report of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Science Research, established under the National Research Act of 1974. The principle of respect for persons underlies the requirement to obtain informed consent; the principle of beneficence justifies the need to engage in a risk/benefit analysis and to minimize risk to participants; the principle of justice requires that research subjects be selected fairly.

❷ Title 45 Part 46, Code of Federal Regulations, the Department of Health and Human Services' policy for the protection of human research subjects.

❸ UWM Multiple Project Assurance (MPA). UWM's MPA describes the means by which the institution will protect the welfare of research subjects under the requirements of 45 CFR 46. Filing for federal wide assurance (FWA) indicates that the University is engaged in a number of health-related, social and behavioral science, and educational research projects at any given time. Under the provisions of UWM's FWA, all research involving human subjects, as those terms are defined under 45 CFR 46.102, whether funded or non-funded, whether exempt or non-exempt, is subject to review and final approval by UWM's Institutional Review Board.

❹ FDA 21 CFR 56 Protecting Human Subjects/ FDA 21 CFR 56 IRBs, which regulates the use of drugs and medical devices in experiments.

A review of recent human subjects training and protocol review data shows that UWM has policies and procedures in place to ensure the effective oversight that is required for the conduct of responsible scholarship (See Figures 37 and 38).

Figure 37. **Human Subjects Research Training Certificates Issued**

Year	Number of Certificates
2000	54
2001	164
2002	111
2003	207
2004	158

The IRB Coordinator holds monthly workshops on IRB issues for researchers and makes presentations in graduate research methodology courses across the University. The Graduate School also provides financial support for IRB members and staff to attend national professional development conferences.

Figure 38. **Protocol Reviews**

Year	Exempt	Expedited	Full Board	Total
2000	48	19	38	105
2001	176	87	175	438
2002	164	126	223	513
2003	156	63	138	357

Intellectual Property

UWM encourages the publication and display of original works and the uninhibited dissemination of new knowledge. As an institution where faculty members are expanding the frontiers of knowledge, UWM accepts its obligation to serve the public interest by ensuring that these works are made available for use; at the same time, it is recognized that UWM must assist its faculty in properly disclosing their scholarly work, and in ensuring compliance with applicable laws and agreements.

Historically, universities of the UW System have not claimed proprietary rights in any invention generated by the faculty, staff, or students. In the absence of contractual provisions obligating transfer of all or some proprietary rights in an invention, the inventor traditionally is free to dispose of those rights in the manner of his or her own choosing. An important statute that governs the ownership of intellectual property is PL 96-517, commonly referred to as the Bayh-Dole Act, which provides nonprofit grant recipients the opportunity to take ownership of the intellectual property created with federal extramural research support.

The Board of Regents is the legal recipient of all grants and contracts and, as such, has the legal responsibility for complying with all contractual obligations contained within these agreements. The acceptance of the sponsorship obligates the principal investigator and the University to comply with the terms of an agreement.

To assure proper reporting to extramural funding agencies, all principal investigators who participate in sponsored research must complete and agree with the "Intellectual Property Agreement" (IPA), which is contained within the Extramural Support Transmittal Form. As part of the IPA, principal investigators are also required to obtain

an "Intellectual Property and Research Compliance Agreement" from all project participants. These forms are kept on file by the principal investigator.

The IPA requires the researcher to report his or her invention to the Graduate School's Office of Technology Transfer. The Office of Technology Transfer determines the sources of funding used in the inventive activity and whether UWM or any other party has an equity interest in the invention.

The University has put systems in place that support sound research practice. The RSA office and the Graduate Faculty monitor institutional policies and practices; institute pre-award and post-award "best practices" in administering grants and contracts; and implement mechanisms for investigating and resolving questions of research integrity.

Discussion

Overall, UWM has done very well during the past decade to keep its research momentum going, considering the steady decline in the proportion of funding it receives from the state. Based on our analysis, several actions would further enhance UWM's research profile.

First, the establishment of rigorous research productivity goals or extramural funding targets by the administration (in consultation with each department) and focusing resources on supporting research productivity would help to expand the number of active researchers. The campus is relying on a narrow base of grant recipients, and the norm of active participation in research and creative activity should be a stronger element within UWM's institutional culture. Second, teaching workload policies should be reevaluated to enhance research productivity and in so doing, maximize individual contributions to the collective goals of effective teaching and research. Third, recognizing that national standing and impact are largely based on departmental scholarly output as well as the quality of the body of work, emphasis should be given to expanding faculty lines in undersized departments so that they are able to contribute more effectively to UWM's development. Fourth, to mature as a research university, UWM must expand its doctoral array. Doctoral programs are central to the knowledge creation mission of the research university. They attract high-achieving faculty and graduate students who in turn enhance research productivity.

Accompanying these actions, there is broad recognition that there needs to be a rethinking of the relative rigidity that characterizes UWM's school/college structure. Individuals and groups of faculty who want to move into an interdisciplinary arena that crosses

unit lines currently face substantial impediments. For UWM to flourish in contemporary research settings that increasingly stress multidisciplinary work, every effort will need to be made to facilitate such efforts from administrative and programmatic standpoints. Such measures as offering incentives for writing multi-investigator grants and making it easier for faculty members to connect with potential research partners in other departments and at other institutions could reduce barriers to collaborative research across departments and with other educational and community partners. It is expected that the new Vice Chancellor for Research will facilitate the formation of such interdisciplinary teams.

In addition, more creative efforts need to be made to attract excellent faculty to UWM and to retain them. The continual shortfall in one-time start-up funds for hires in scientific and technological areas needs to be addressed with new ideas, such as investment borrowing and capital fund raising. Restoration of RA matching support on grant proposals, additional Graduate School funding for research proposals from newer faculty, and new funds in support of travel by nonscience faculty are also important considerations.

In general, the comprehensive research support mechanisms and services offered by the Graduate School and other academic units must continue to grow and develop in support of UWM's goal of becoming a premier research university. Concern remains about the magnitude of research resources and their allocation in such areas as faculty hiring, grant-writing support, space, travel, graduate student support, and equipment. The 10-year program reviews are the most intensive examinations that UWM's graduate programs receive. The presence of independent external reviewers on the panels provides credibility for the summary recommendations. For these reviews to serve UWM to their fullest extent, it is crucial that the review recommendations concerning program capacity and resources be seriously addressed by the campus.

Graduate student assistant compensation is one of UWM's most pressing fiscal concerns. Additional reallocations or other sources of funding will continue to be needed to resolve this problem. In many disciplines, graduate students play an important role in faculty members' research—and attracting productive graduate students is generally a function of offering competitive stipends. In addition, the role of the graduate teaching assistant in undergraduate education cannot be overemphasized. Teaching assistants staff most of the laboratory and discussion sections that are part of introductory and some advanced courses across the curriculum. Their quality and dedication are critical to the success of student learning. As UWM continues to increase its emphasis on research and creative work in the undergraduate experience, graduate assistants (TAs and RAs) will play central roles as partners with undergraduates in research settings. With an adequate pay structure in place, UWM will be able to attract the quality and size of graduate student body that are necessary

to achieve premier research university status. The use of internal Chancellors Fellowships to offset the noncompetitive state stipends has been partially successful in boosting overall graduate student support, but more needs to be done to make the University competitive for new and continuing students.

As noted at the outset of this chapter, in order for UWM to catalyze economic, cultural, and social development, the UW System and the state need to tangibly recognize the value of UWM's research mission. In addition, endowment and capital support from the private sector and extramural funding from federal and foundation sources are paramount fiscal resources. In 'making UWM's case,' whether it's in the context of the capital campaign, a federal earmark, or a state budget request, it will be important to focus on the development of UWM as a research institution. The fundraising, governmental relations, and marketing operations of the University must identify their missions as being fundamentally linked to the development of UWM as a research institution.

The areas of strategic planning and budgeting will be critical in building on UWM's momentum as a research institution, pulling together all of the goals and needs identified above. Setting specific goals relative to research and creative activity and developing a strategy for acquiring and allocating resources are joint responsibilities of the Chancellor; governance groups such as the Faculty Senate, the Academic Planning and Budgeting Committee, the University Committee, and the Academic Staff Committee; the Academic Deans Council in concert with the Provost; and the new Vice Chancellor for Research. In order to be successful, planning needs to involve fully both the administration and the faculty; given the scope of UWM's aspirations, it needs to galvanize the faculty and staff toward a common vision of UWM as a premier research institution.

The Student Experience

Students come to UWM to learn and discover new knowledge. They have access to excellent scholar-teachers in the classroom and in one-on-one research activities. Cutting-edge academic and research programs draw them into the life of the mind and inculcate a stance toward learning that lasts a lifetime.

Although there are abundant examples of undergraduate research at UWM, the establishment of an undergraduate research office would provide further support for units in developing undergraduate research opportunities. Collaborations across the UW System such as the Women in Science initiative, the Undergraduate Research Symposium, and the WisAmp program, which is designed to increase the number of minority students in the science, technology, engineering, and mathematics fields, will also provide additional resources to UWM for these efforts.

The University also needs to ensure that students derive the maximum benefit from exposure to the resources of a research university. The current review of student support services will help in this regard. However, UWM also needs to do more to attract a talented student body interested in working with the increasingly strong faculty through such means as increasing scholarships for high-achieving students and emphasizing the academic quality of UWM in student recruitment materials. UWM's recent discussions on enrollment management have moved the campus toward the goal of increasing the number of high-achieving students, with the intent of seeding the student body with academic leaders who can stimulate students as a whole to achieve at high levels.

At the graduate level, sustained attention to the quality of the graduate student body is a fundamental requirement for elevating the research stature of UWM. The new administrative focus upon adequate graduate student stipends must be a sustained as a first priority in the future.

Data Needs

In the course of collecting and analyzing information pertinent to the Self-Study, a number of institutional data issues arose. A comprehensive web-based data collection system would provide users with interactive and flexible access to essential information concerning the scholarly output of faculty and academic staff, as well as student achievement. The first steps toward this goal are underway with the development of a standardized format and web form for collecting annual faculty activity reports. The School of Education is taking the lead in investigating the use of electronic portfolios for demonstrating and assessing student achievement in ways beyond grades. Acquisitions of Customer Relationship Management (CRM) and Contributor Relations (CR) software system are being considered to provide the tools for understanding our alumni's progress after graduation.

Looking Forward

As this Self-Study is going to press, the campus-wide Strategic Research Development Program, with $1 million in seed funding from the UW System, is moving toward implementation. Proposals have been solicited from the schools and colleges, and a selection committee consisting of distinguished professors and governance leadership will be involved in evaluating proposals for funding. The purpose of the program is to develop world-class research teams that build programs across UWM's schools and colleges, regional academic institutions and industrial partners.

UWM has also just launched the Biomedical Technology Alliance (BTA). This alliance, which includes the Medical College of Wisconsin, Marquette University, UW-Parkside, the Milwaukee School of Engineering and UWM, has been endorsed by the leadership of the city and the business community. The purpose of the BTA is to expand biomedical research in southeastern Wisconsin and promote economic development.

Preparations are underway for the University's capital campaign. The campaign's themes, Capital Improvements and Equipment ($50 million), Building the Faculty Base for the 21st Century ($25 million) and Providing Access and Opportunity for Students ($25 million) will support the campus research agenda by creating more endowed faculty positions, strengthening facilities for research, and providing additional postdoctoral support. The "Providing Access and Opportunity for Students" part of the campaign addresses the University's need to attract high-achieving students. An infusion of scholarship funds will enable UWM to be competitive with other universities, as demonstrated by a recent scholarship award that attracted a high-achieving student (4.0 GPA and 1500 SAT) with a four-year tuition scholarship.

These actions are part of a concerted movement to advance UWM's scholarly productivity. Chancellor Santiago's September Plenary address presents a vision for the future that emphasizes UWM's distinctive mission as a research university.

Expanding UWM's research portfolio will provide a number of positive benefits to the campus and to the Milwaukee community:

- Better support for graduate students and an increase in the percentage of graduate students on our campus—a change that we are now working toward;

- Greater research opportunities for our undergraduates;

- Larger indirect cost return stream that can be used to support the campus's infrastructure and further build on our success;

- A bigger research portfolio that expands our research enterprise to the point where we can move from research to discovery to commercialization—the sciences and engineering will need to contribute significantly to this effort, and our business school will need to train the managers and business personnel to support this;

Expanding the portfolio allows us to demonstrate to the wider community, both in Milwaukee and in southeastern Wisconsin, that UWM can and must be a catalyst for local and statewide economic development. Ultimately, growing our research portfolio will result in an enhanced academic profile and a higher quality educational experience for our students.