— The Task Force Report —

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Graduate Research, Education and Scholarship at the University of Maine:

Challenges and Opportunities for the 21st Century

A report charged by the Provost of the University of Maine as part of the University's 2006-2011 Strategic Plan

University of Maine Strategic Planning Task Force 2005-2006
Graduate Research, Education and Scholarship

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Graduate Research, Education and Scholarship at the University of Maine: Challenges and Opportunities for the 21st Century

Executive Summary

Between the spring of 2005 and spring of 2006, a Task Force on Graduate Research and Education, appointed by the Provost, undertook a study of the graduate environment at the University of Maine. This undertaking was initiated as part of the Strategic Planning process of the University, but also in response to growing evidence of strong support for graduate programs among the faculty and the sense within the senior academic and administrative leadership that the University was at a pivotal point in planning the future of graduate research and education. The report *Graduate Research, Education and Scholarship at the University of Maine: Challenges and Opportunities for the 21st Century* is the result of this one-year effort, but it is more. The report reflects an unprecedented faculty-led research effort aimed at understanding the core value and contributions of graduate research and education in the context of the University of Maine, and in the context of American research universities in general. What we have concluded is that the graduate mission is, and must be, at the core of everything we do if we are to (a) compete successfully with our national peers for research funds and high-quality human capital, and (b) fulfill our Land- and Sea-Grant role in the State of Maine, combining high quality student education and the production of research that translates into economic, social and cultural progress.

The three central imperatives of the University of Maine are: (a) providing rich educational opportunities for undergraduate and graduate students, (b) performing both basic and applied research that advances knowledge and fuels innovation, and (c) engaging with the state to support the economic and personal well being of its residents. As we search for ways to improve the University of Maine, and our performance in these three imperatives, graduate research and education must be at the center of the discussion. Undergraduate education, basic and applied research, and state engagement are all inextricably intertwined with our graduate mission. Graduate students enrich and improve the undergraduate experience, providing an intermediate level of mentorship not found in undergraduate institutions. Our graduate teaching assistants help fulfill the University's educational mission and they commonly receive excellent undergraduate student evaluations. Graduate students, working closely with faculty advisors, perform much of the basic and applied research at the University of Maine. They generate new knowledge, and produce data that lead to publications, grant proposals, patents and spin-off companies. This is particularly true for Doctoral students because they are required to produce original work for their dissertations. Graduate professional programs at the University produce the business leaders who will help guide Maine's economic development, K-12 teachers who will educate Maine's children, and health-related workers who will care for Maine's citizens. The Task Force believes that the University of Maine is the State's most valuable public asset, and we believe that investing in the University's graduate mission should be a high priority.

Based on its study, the Task Force has developed recommendations in relation to each of the issues identified in the Provost's charge. Responsibility for implementation of these recommendations reaches to every level of the University, from individual faculty to department chairs and directors of administrative offices, from academic deans to the provost, vice presidents and the president. The main document provides extensive discussion and analysis of the charge issues, and here we provide a brief summary of all the recommendations. We note that the UM Association of Graduate Students and the UM Graduate Board voted unanimously on March 2, 2006, to endorse and support this report. The University Research Council expressed unanimous support on April 27, 2006.

Charge Issue 1
The University of Maine has primary responsibility for graduate research, education and scholarship in the State of Maine.

The 2004 University of Maine System Strategic Plan clearly indicates that the University of Maine has primary responsibility for the graduate-level research, education and scholarship within the System. The University of Maine is not only the flagship research university of the State providing graduate education over a broad range of academic and professional programs, but is one of only 140 select public research universities in the country classified by the Carnegie Foundation for the Advancement of Teaching as having High or Very-High research activity. Additionally, leadership and primary responsibility in graduate research is entirely consistent with the University of Maine's Land- and Sea-Grant status.

Recommendations

- The Graduate School should facilitate and monitor existing Doctoral programs, new program initiation, graduate faculty status and basic criteria for excellence in Doctoral programs at the University of Maine.
- The University of Maine should engage in delivering quality distance education at the graduate level, where appropriate, to the community.
- Cross-system collaboration should be formalized for the purpose of offering selected Master's degrees statewide, where the need is clear, with University of Maine contributing expertise to advance quality and credibility.
- The University of Maine should initiate collaboration with other Doctoral-level scholars and researchers in the University of Maine System to award Doctoral degrees in appropriate and selective fields of learning.

Charge Issue 2
Enhancement and Selective Growth of Our Graduate Programs

This report contains criteria that should be used when considering which graduate programs should be started, enhanced or grown. Below we prove a general recommendation followed by recommendations grouped by report subheading.

Recommendations

- Pursue a graduate enrollment target of 3,000 by the year 2010.

- 25% of the total graduate enrollment should be Doctoral students.
- To meet these goals, we need to increase both Master's and Doctoral enrollment by approximately 350 each by 2010.

Build on existing strengths and where we have competitive advantage

- Increase to capacity the number of Ph.D. students in those programs identified as "strong" by the Peterson's Academic Services review team, and any other programs that can demonstrate strength as defined by the review team.
- Increase the number of full-time Doctoral students in those departments that grant Doctoral degrees by providing institutionally funded bridging awards for 2 years.
- Create dissertation-year awards on a competition basis for Doctoral students to facilitate completion of doctoral dissertations while the work is still on the cutting edge.
- Develop, to the level of competitiveness, promising programs/research initiatives in areas not currently identified as strong but with measurable potential for growth.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

Support graduate research and education in the arts, humanities and social sciences

- The Dean of the College of Liberal Arts and Sciences should establish a committee to consider the development of a limited number of new graduate and research programs in the social sciences, arts and humanities, including but not necessarily limited to, interdisciplinary niche areas, potential niche areas where research funding is available, and new approaches and partnerships to establish a funding base to support growth of graduate research and education.
- Ensure that competitive start-up packages meet national benchmarks for the discipline thereby allowing faculty to compete for research funding on a national level.
- Create incentives for social sciences, arts and humanities programs that do not have strong track records of attracting external funds, explore the impediments to success in this arena and develop a plan to help these programs overcome them.
- Promote research excellence in the social sciences, arts and humanities through appropriate funding of faculty research (e.g., the MAPI program) including materials, travel, colloquia and visiting scholars to kick-start promising faculty groups.
- Provide support (e.g., money, release time) for development of graduate education and research programs in the social sciences, arts and humanities with the expectation of competitive benchmarking and grant seeking for funded initiatives.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

Provide incentives to increase the number of graduate students and research funding in science and engineering

- Indirect costs (F&A) charged to research grants/contracts and paid for by external funding agencies should be distributed by rigidly proscribed formula in such a

manner as to provide faculty and research programs with strong direct incentives to increase their numbers of graduate students and amounts of research funding.

- Hire, retain, and promote administrators who are demonstrably committed to implementing best practices for promoting research success, particularly by providing clear incentives to reward faculty success in attracting quality and numbers in graduate students, as well as funding to support graduate education.
- Hire, retain, and promote science and engineering faculty who are demonstrably committed to research excellence and to increasing the number and quality of graduate students in their programs.
- Create incentives for science and engineering programs that do not have strong track records of attracting external funds, explore the impediments to success in this arena and develop a plan to help these programs overcome them.
- Work with the Maine State Legislature to ensure that financial support of university-based research becomes comparable to states with which we are competing to develop an innovation-driven economy.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

Enhance the University's ability to service the State's professional needs in business, education, natural resources, health care, social work and engineering

- Invest strategically in faculty lines that will allow for expansion of graduate-level professional training opportunities in key areas.
- Consider establishing a policy studies unit with graduate programs at the M.A. and Ph.D. level.
- Form three separate committees to consider the advantages and disadvantages of establishing a Pharmacy School, Medical School and/or Hotel/Restaurant School.
- Give deference to professional graduate programs in areas where faculty are willing to offer many of their courses through asynchronous distance education technologies and thereby reach and serve a greater proportion of the State's working population.
- Address the impediments to differential tuition in order to create funds to support professional programs at the graduate level.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

Promote those programs that have obvious economic, geographical, social and cultural relevance to Maine

- When considering investment in graduate programs, there should be a deliberate consideration of the degree to which the program plan fits with Maine's economic, geographical, social and cultural circumstances.
- Evaluate all investment in new and emerging programs relative to benchmark institutions using a two-stage process that focuses on international status and local relevance.

- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

Charge Issue 3
Development and Maintenance of Interdisciplinary Programs

Establishment of innovative interdisciplinary and multidisciplinary graduate programs could significantly increase the visibility and uniqueness of the University's graduate offerings. The Graduate School can provide the infrastructure where no formal program exists, coordinate and formalize rigorous core curricula, develop and disseminate these unique programs through publicity and recruiting efforts.

Recommendations

- A committee, consisting of a wide range of faculty leaders and administrators, should be established with the specific charge of articulating an institutional plan regarding interdisciplinary research and education.
- The proposed committee should be led by those faculty members who are at the cutting edge of interdisciplinary research, education and scholarship.
- The proposed committee should work closely with the University Research Council, Graduate Board, and Faculty Senate.
- The proposed committee should develop specific recommendations to foster interdisciplinary program development.
- The proposed committee should systematically review institutional policies, procedures and practices in order to propose/oversee changes to allow for institutional progress in this area.

Charge Issue 4
Balancing Quality and Quantity in Our Graduate Programs

Balancing quality and quantity in graduate programs is a matter of institutional priority and strategic vision. Appropriate resources must be directed towards areas of research, higher scholarship and professional program development if the institution envisions itself competing in these arenas. If resources are made available, then the graduate student numbers can be in line with national peers and quality control appropriate for a Carnegie Research/High university can be implemented.

Recommendations

- New sources of money must be found, and existing university resource allocation models evaluated, in order to provide a revenue stream that is in line with the role played by graduate students at research universities.
- Establish and maintain a competitive financial package for recruiting and retaining high quality graduate students in today's market, including minimum 9-month stipends for both Master's and Doctoral students benchmarked to the mean of New England Land Grant universities, and fully subsidized health services.

- The current policy in Maine's Department of Health and Human Services of not allowing subsidized childcare for graduate students at the University of Maine is discriminatory and should be reversed.
- Increase the total number of institutionally funded graduate teaching and research assistants across the campus, at the very least recovering the 47 centrally-funded TA positions that were lost to budget cuts over the past 15 years.
- Establish a sustainable administrative policy for supporting graduate programs at a level consistent with our Carnegie status.
- The University of Maine should periodically evaluate the quality of its graduate programs, and in particular its Doctoral programs, through external review, to determine areas of improvement or potential termination of failing programs.
- External reviews from accrediting bodies should be used to evaluate all graduate programs and assist in planning.
- Continue with plans for providing a dedicated building or buildings for graduate student housing at the University of Maine to create a focus for graduate student life.
- Continue with the plan to raise needed funds for Fogler Library from State Bonds and the President's Comprehensive Campaign, regain access to the leading journals in digital form, and promote publication in and support of high quality refereed open-access journals.

Charge Issue 5
Funding Our Graduate Mission

The University of Maine's Graduate School has virtually no flexibility to implement and reward best practices in graduate research and education. Extensive research has shown that, given appropriate budgets and oversight of the graduate mission, graduate deans can lead the way in improving the performance, quality and culture of the graduate mission.

Recommendations

- Return a portion of indirect costs (F&A) to the Graduate School to support increased numbers of Doctoral students, graduate stipends, fellowships and other forms of support.
- Direct a fundraising campaign to University of Maine Graduate School alumni with funds ear-marked for improved graduate education to establish both an endowment and a rich culture of annual giving to the Graduate School.
- Streamline institutional management utilizing an open and transparent process.
- Increase number of grant-supported graduate assistants in programs able to attract external funding.
- The Graduate Dean should establish a committee to thoroughly examine the current, historically-based distribution of centrally-funded teaching assistantships, and develop a rational approach for redistribution of these assistantships based on national peer benchmarking that seeks to maximize every department's ability to fund their graduate programs from external sources without compromising the undergraduate teaching mission.

Charge Issue 6
Marketing Our Graduate Mission

The University of Maine is an active, visible, and collaborative member of Maine society, serving Maine's citizens and government agencies while helping individuals achieve a better quality of life through education. The people and legislatures of Maine have a growing appreciation of University-based research but do not fully understand the role of the University of Maine and its graduate programs. Overcoming the lack of understanding about the University of Maine and its role in graduate education is the key to marketing our graduate mission.

Recommendations

- Initiate a highly prestigious Maine Legislative Fellowship Program to fund outstanding graduate students across the various colleges to communicate with the Maine Legislature about the value to the State of graduate research and education.
- Continue to publicize the accomplishments and contributions of graduate students using the various web environments, marketing tools and publishing media available at the University of Maine.
- Appoint a professional-level marketing/development officer for the Graduate School.

Charge Issue 7
Attracting Increasingly Better Graduate Students

Although everyone expects a public flagship university to provide excellent teaching, fine student programs and activities, and the other attributes of an effective student experience, research quality and productivity are what identify a campus as belonging among higher education's premier institutions. Research and advanced graduate education are two sides of the same coin - it is not possible to a have thriving, cutting-edge research culture without high-quality graduate students. Advanced graduate students participate in a significant part of the actual research and therefore represent a key element in defining the competitive quality of the university. In order to attract high quality graduate students, a university must provide excellent facilities, faculty, resources, curricula, culture, and recruiting packages.

Recommendations

- The University's Strategic Plan must clearly state that the University of Maine is ambitious and competitive in a manner consistent with its Carnegie Research/High status, and emphasize the crucial role of graduate research and education in all that it does.
- Departmental promotion and tenure guidelines should place an appropriate emphasis on graduate research, scholarship and education, including participation in interdisciplinary graduate study, consistent with our Carnegie Research/High status.
- Faculty recruiting and retention packages should commit to nationally competitive salaries and startup packages.
- The University should implement policies that recognize and reward strong faculty performance and participation in graduate research, scholarship and education.

- Establish and maintain a competitive financial package for recruiting and retaining high quality graduate students in today's market.
- Focus on quality, not quantity, of programs, which should be periodically reviewed for effectiveness or redundancy.
- Establish a targeted Maine Doctoral Fellowship Program for Maine residents who want to pursue full-time enrollment in doctoral degree-granting programs at the University of Maine.
- The Graduate School should be given a functional budget so that it can implement some of the "best practices" identified in the 2005 report of the Woodrow Wilson Foundation entitled *The Responsive PhD.*

Charge Issue 8
The Appropriate Size and Function of Our Graduate School

The 2005 Woodrow Wilson Foundation Report on the Responsive Ph.D. provides a compelling case for giving graduate schools the budgetary means to implement best practices in relation to graduate research and education, and to provide academic leadership and guidance for their universities. These practices can make the difference between a great graduate institution and a mediocre one.

Recommendations

- The Graduate School should have a budget large enough to allow it to implement and reward best practices in graduate research and education at the University of Maine.
- The Graduate School should have the required financial resources to increase scholarships, awards and centrally-funded assistantships in order to meet the increased enrollment goals set out in this report.
- The Graduate School should be moved to an accessible building that better reflects its vital function in the mission of the University of Maine.
- The University should upgrade its marketing efforts to include the graduate programs as equally important to undergraduate programs in all that it does. Marketing should include alumni graduate students, highlighting those who stay in the State and make important contributions to the enterprises and citizens of Maine.

Graduate Research, Education and Scholarship at the University of Maine: Challenges and Opportunities for the 21st Century

"Generating innovative, sponsored research is a critical factor in Maine's economic development. Top quality graduate programs and research programs will attract resources and businesses to the State, helping to fuel the economy and contribute to growth."
University of Maine System Strategic Plan, 2004

"Graduate education prepares the scientists and engineers needed by industry, government, and universities to conduct the nation's research and development; educates the scholars in the humanities, g sciences, and the arts who preserve and enlarge our understanding of human thought and the human condition; and develops the scholars in all disciplines who become the faculties of the nation's colleges and universities."
Report of the Graduate Education Committee, Association of American Universities, 1998

Introduction

The University's graduate programs offer real and important benefits to the people and State of Maine by supporting an innovative and creative economy, educating Maine's highly skilled labor force, and developing new ways to understand and use Maine's natural resources and human capital. Some of these programs are already world class, but in order to increase quality and effectiveness across the board, and meet the challenges laid out in the Provost's charge and the System Plan, the perception and financing of graduate research and education at the University must undergo crucial changes. These changes will not be easy, and they will cost money, but the University of Maine is arguably the State's most valuable public asset and these changes will position the University to play a fundamental role in shaping Maine's future.

Between the spring of 2005 and spring of 2006, a Task Force on Graduate Research and Education, appointed by the Provost, undertook a study of the graduate environment at the University of Maine. This undertaking was initiated as part of the Strategic Planning process of the University, but also in response to a growing evidence of strong support for graduate programs among the faculty and the sense within the senior academic and administrative leadership that the University was at a pivotal point in planning the future of graduate research and education. The report *Graduate Research and Education at the University of Maine: Challenges and Opportunities for the 21st Century* is the result of this one-year effort.

The scope of this report is broad, its intention being to provide an overview of the current status of graduate research and education in the nation and at the University of Maine, and to make strategic recommendations in relation to the University's graduate programs, mission, and recognized strengths (such as the Interdisciplinary Graduate Education, Research and Training (IGERT) awards from the National Science Foundation). The Task Force did not attempt to review individual academic programs at the University of Maine. However, this report does identify some strategies for doing so. The charge from the Provost was to provide discussion, recommendations and strategies for the following.

(1) What it means for the University of Maine to have primary responsibility for graduate research and education in Maine.
(2) Selectively enhancing and growing our graduate programs.
(3) Developing and maintaining interdisciplinary programs.
(4) Balancing quality and quantity in our graduate programs.
(5) Funding our graduate mission.
(6) Marketing our graduate mission.
(7) Attracting increasingly better graduate students.
(8) Determining the appropriate size and function of our Graduate School.

Informing the Report

In order to be both accurate and representative, information for this report were collected from five primary sources, as follows.

1) Informal Faculty Survey

In order to inform the 2005 Report of the Coalition on the Graduate Environment, the following question was sent to approximately 70 faculty members representing all graduate programs at the University of Maine:

In order to improve the graduate environment, graduate education, and graduate research/scholarly activities on campus what are your 2 best ideas that could be implemented with new resources and your 2 best ideas without new resources?

Responses were broadly grouped into themes, and a series of meetings were held to discuss the responses and deliver a set of recommendations. These recommendations form the core of the 2005 Report of the Coalition on the Graduate Environment, and are also relevant to the efforts of the Task Force. The faculty responses contained in the Coalition report are included here as **Appendix A**.

2) Meetings with University of Maine Deans and Associate Deans

Owing to their unique institutional-level knowledge, leadership and perspective on graduate research and education, the Task Force conducted a series of interviews with Deans and Associate Deans from the College of Natural Sciences, Forestry and Agriculture, the College of Liberal Arts and Sciences, the College of Business, Public Policy and Health, the College of Education and Human Development, the College of Engineering, and the Division of Lifelong Learning**.** Graduate programs by college were critiqued through data-driven seminars over a 7-month period punctuated by a number of formal discussion series with the Graduate Dean to capture current state and vision for the future.

3) Documents Produced/Sanctioned by the State Government

To evaluate the State-level support for graduate research and education at the University of Maine, we have examined a number of documents produced or sanctioned by the State Government over the past 5 years that address the issues of graduate research and education and the vital role it plays in shaping the future of Maine. These include: (a) the annual reports of the Maine Economic Growth Council, which is administered by the Maine Development Foundation; (b) the 2004 and 2005 Maine Innovation Index Reports of the Maine Department of Economic and Community Development; (c) the 2001 Maine Science and Technology Action Plan of the Maine Sciences and Technology Foundation; and (d) the 2003 and 2005 Maine Science and Technology Action Plans of the Maine Department of Economic and Community Development.

4) Archival Sources From Advisory Bodies, Foundations and Peer Institutions

Task Force members have also examined hundreds of reports and surveys generated by groups such as the National Academies, the Association of American Universities, the National Research Council, the Carnegie Foundation for the Advancement of Teaching, the Woodrow Wilson Foundation, other research universities, the Federal Government, and non-government organizations.

5) Documents Produced by the University of Maine and University of Maine System

To evaluate the University-level rhetoric on graduate research and education at the University of Maine, we have examined the following six documents: (a) versions of the evolving University of Maine System Strategic Plan; (b) the 2000-2005 University of Maine Strategic Plan; (c) a Review of the Graduate Programs at the University of Maine, provided by The Peterson's Academic Services Group, 2004; (d) the 1988 University of Maine Report of the Presidential Commission on Graduate Education; (e) the 2002 University of Maine Report of the Provost's Commission on Graduate Education; and (f) the 2005 Report of the Coalition on the Graduate Environment.

The New Classification Schemes of the Carnegie Foundation

In 2005, the Carnegie Foundation for the Advancement of Teaching released two new classification schemes for American colleges and universities. These classifications are time-specific snapshots of institutional attributes and behavior based on data typically gathered over two calendar years. **Figure 1** gives a snapshot for the University of Maine, showing the two separate classifications. The first classification indicates that the University of Maine is a medium sized, public university with comprehensive Doctoral-level graduate programming and a high graduate coexistence (graduate degrees occur in at least half of the fields corresponding to undergraduate majors). This broad classification scheme is useful for identifying similar institutions, but is not useful for comparing research performance.

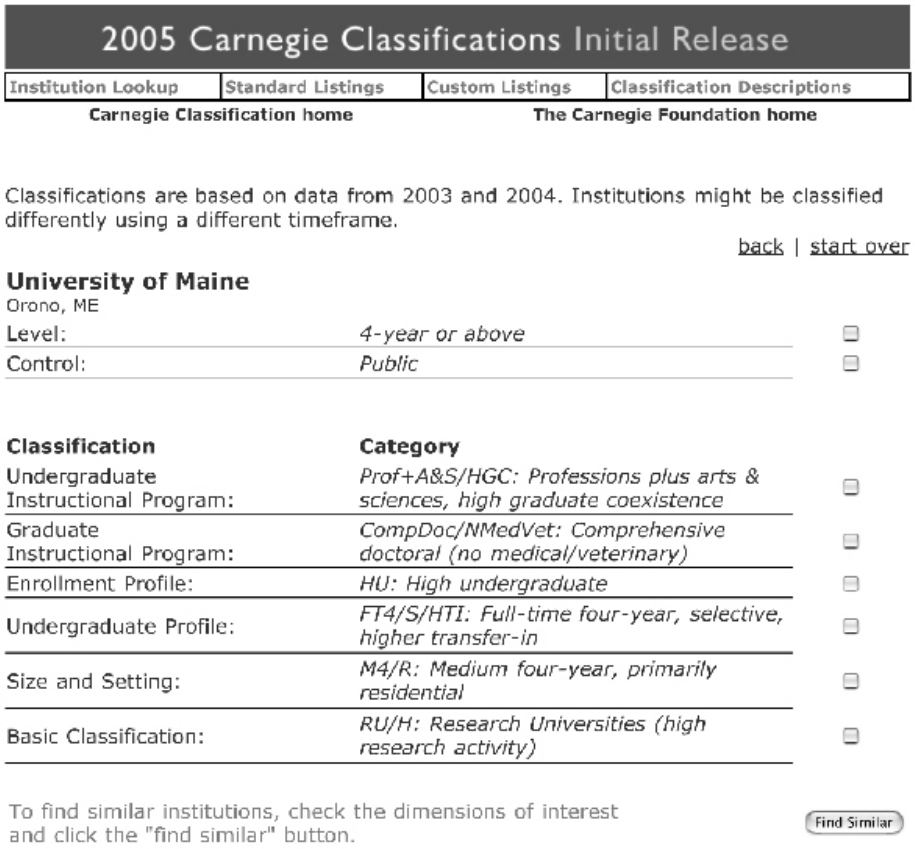


Figure 1. The 2005 Carnegie Foundation classification schemes. The Basic Classification applies only to research universities.

The second classification, called the Basic Classification, provides a measure of research activity among 259 American research universities. The classification is based on both aggregate and per-capita indices, which are determined using principal components analysis of several correlates of research activity: science and engineering (S&E) R&D expenditures; non-S&E R&D expenditures; S&E research staff (postdoctoral appointees and nonfaculty research staff with doctorates); doctoral conferrals by broad disciplinary area (humanities, social sciences, STEM fields, and other fields); and the first three items divided by the number of full-time faculty for the per-capita analysis. The Basic Classification scheme divides 259 research universities into three categories based on the level of research activity: (a) Research University Very High, (b) Research University High, and (c) Research University.

Figure 2 shows the University of Maine's position among these 259 research universities. The University of Maine falls in the High research activity grouping in the middle of the plot. However, it is clear that the University of Maine is a strong performer on a per-capita basis, and that it is near the boundary with Very High activity institutions. The total number of ***public*** institutions in the High classification is 76, and there are 63 in the Very High classification. ***Therefore, we conclude that, using the Basic Classification of the Carnegie Foundation, the University of Maine lies near the lower***

middle of the top 140 public research universities in the United States, with a strong per-capita performance in relation to other Research/High universities.

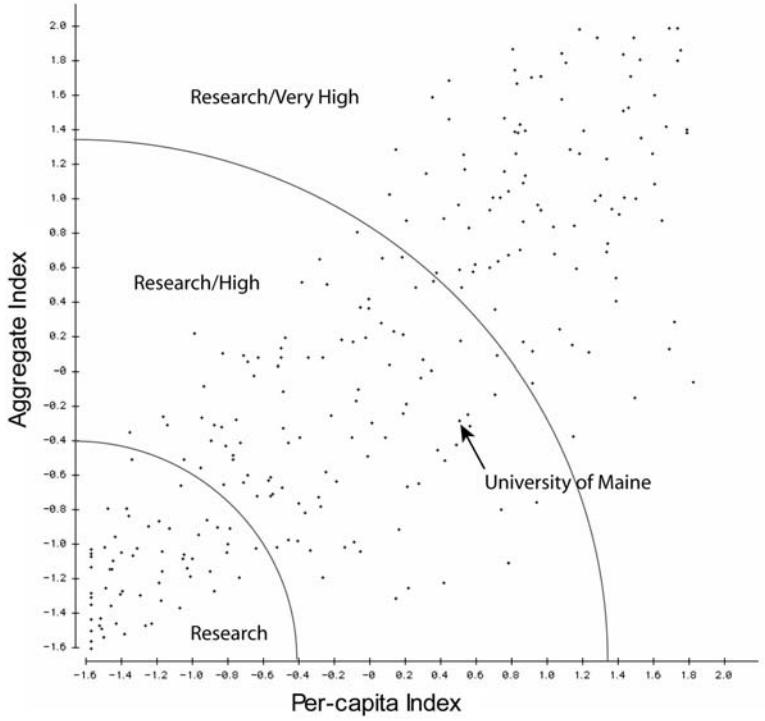


Figure 2. Rank-ordered plot of the 259 universities classified by the Carnegie Foundation as research universities. The University of Maine is classified as Research/High, shows excellent per-capita performance in this category, and plots near the boundary between Research/High and Research/Very High.

Research Universities and Graduate Research, Education and Scholarship

To both coordinate our efforts with other planning and meet the Provost's charge, the Task Force also focused on meeting the challenges inherent in the 2000 University of Maine Strategic Plan, 2004 University of Maine System Strategic Plan, and the 2005 Maine Science and Technology Action Plan. There is also a larger context in which the university must be evaluated, and it is the most important in terms of the University's overarching academic mission and goals. This larger context is the national landscape of American research universities. Members of the Task Force have, in various committees and roles over several years, studied the workings of successful research universities and the roles played by graduate students in their success. This report begins then by providing this larger context in relation to graduate research and education.

The University of Maine is classified by the Carnegie Foundation for the Advancement of Teaching as a Research/High university, which indicates high research activity. As discussed above, the University of Maine lies near the lower middle of the top 140 public research universities in the country. Research universities are engines of economic progress, fueling creativity and innovation, and providing the human capital that

underlies intellectual and material prosperity. Research universities are important to industry, commerce and government, because those groups are dependent on the ideas, solutions and highly skilled labor force that the universities produce. They are also essential contributors to the citizenry by fostering community well being, training the most advanced scientists, engineers, health-care workers, K-12 teachers, policy makers, business leaders and the entrepreneurs that build the creative economy. In addition to providing the skilled professionals in business, education and allied health, research universities attract significant investments from the federal government and industry for discovery-based research and innovation. These investments make possible sustained growth in the university itself, its surrounding communities and the state's economy that are critical to small states like Maine.

The University has demonstrated competitiveness in its quest to expand graduate education and research. For example, two multimillion-dollar IGERT awards have been funded by the National Science Foundation in functional genomics/biomedical sciences, and spatial engineering technology. Institutions with two IGERT interdisciplinary awards are rare: only 35 research universities in the country have achieved this status.

A key indicator of the quality and strength of a research university is the degree to which it emphasizes graduate research, scholarship and education. Graduate students in many programs play vital roles in both the research and teaching missions of research universities. They assist faculty with cutting-edge research and scholarship, produce data that lead to publications and millions of dollars in successful grant proposals, generate new knowledge and creative discoveries, and contribute significantly to mentoring and teaching undergraduate students across the campus. From a strategic viewpoint, these graduate students provide a relatively inexpensive and efficient way for the University to maximize its competitiveness with other research universities. But more than that, graduate students are an essential component of the intellectual resources that make a research university successful.

Research universities are highly competitive with one another for reasons that have been articulated by the research of the Lombardi Program on Measuring University Performance, which is part of The Center for Studies in the Humanities and Social Sciences at the University of Florida (http://thecenter.ufl.edu/index.html). The Task Force has thoroughly studied The Center's publications, along with other higher education-based strategic plans, task force reports, committee deliberations, ranking and quality analyses and rhetoric related to research universities in order to form a conceptual context within which the current report was developed. From this exploration, we distilled the following basic information and guidelines for success.

- Research universities are in competition with one another for the highest quality human capital that they can afford – faculty, staff, administrators, undergraduate students and graduate students in order to compete for excellence in scholarship and investment from government and industry in research and discovery.
- Research universities that successfully attract high quality human capital increase in all success indicators – quality of product, amount of product and relevance of

product to the institution's core missions. This holds for all indicators of academic excellence be they artistic, humanistic, scientific, technological or pedagogical in nature.

- Because high quality human capital is expensive, ***competitive*** research universities are constantly seeking to increase their revenue so that they can continually increase the quality of their professoriate and graduate students.
- If a research university wants to know whether or not it is improving, then it must benchmark itself against other research universities that are competing for the same human capital (i.e. students, faculty, staff, administrators). There is no other credible and objective way to measure institutional-level improvement.
- Research universities use ***compensation*** to attract and retain high quality human capital. The faculty are the most important human capital employed by the university and if faculty compensation is below that of its competitors, then there is little reason to expect that the university might improve relative to these competitors.
- Enhancement of excellence in the university flows directly from competition for quality in the professoriate and students: knowledge generation and creative discovery, national and international reputation, quality of teaching and student learning, ability to leverage money to bring in more money, personal pride and sense of satisfaction on the part of all who work at, attend, and contribute to the university, and increased contribution to a state's economic and cultural prosperity.
- Because research universities are primary movers in the generation and application of new knowledge, ***competitive*** states, through their legislatures, invest in their flagship research universities. The data suggest that failure of legislative investment in public research universities may directly limit and compromise the future prosperity of a state's citizens.

"Recent studies show that at most UMS institutions, faculty salaries are equal to or less than 85% of the national benchmark and that professional salaries are also well below the national average. In addition to inflationary increases, a priority investment is to increase salaries by $10.8 million by FY09, resulting in UMS faculty and professional salaries at 90% of the national average."
University of Maine System Strategic Plan, 2004

This statistic is a system-wide snapshot; at the professor-level in most disciplines at the University of Maine the average salary is near the 10^{th} percentile for public research universities. The impact of low salaries is especially evident at the University in the loss of competitive-edge faculty recruitment and retention. This salary compression reflects a lack of recognition of the unique research mission of the University of Maine and the need to grow faculty strength through a competitive salary structure.

Following from these university-level observations are some that are more specific for the graduate mission of research universities.

- Graduate programs are critical indicators of, and determining factors in, the ***overall quality*** of the university. They are fundamental in our efforts to compete with peer institutions.
- Universities that seek to advance their graduate programs must compare favorably using benchmark methods to other research universities in the quality of their

graduate research and education. For example, how does the mix of programs compare? How does the ratio of Master's to Doctoral students compare? What do the various student quality indicators tell us? How do we compare in developing a healthy climate and culture for our graduate students? How do our times to completion of graduate degrees stand up nationally?

- As with the professoriate, research universities must also compare favorably in the ***compensation*** offered to graduate students. If compensation is below the competition, or unstable during the course of study, then there is little reason to expect that the university can recruit or retain the best students and thereby improve the quality of its graduate programs relative to its competitors.

The available data show that, nationwide, faculty members and graduate students who can perform ***competitively*** in top research universities are relatively rare. Tenure-track faculty positions in Carnegie Research/High and Research/Very High universities define one of the most competitive job markets in the world, and competition for excellent faculty is fierce. The University of Maine must be prepared to pay for quality human capital in order to succeed.

National Trends in Graduate Research, Education and Scholarship for the 21st Century

A search of materials published by and about research universities (e.g., strategic plans, government documents, statements from granting agencies) revealed a consistent theme: graduate students play a critical role in competitive research universities and thoughtful growth of graduate programs is essential for these institutions if they are to remain vital. **Appendix B** contains seminal quotations from some research university strategic documents that illustrate the critical role and function of graduate research and education.

An examination of the national landscape in graduate research and education reveals a number of common trends. The United States continues to move away from manufacturing and industry towards information, technology and creativity. As a result, the importance of graduate research and education in relation to our economic prosperity is increasing markedly, and public research universities are focusing on the graduate mission as a primary emphasis in strategic planning. The reasons are simple, as follows. (1) Graduate students, particularly at the Doctoral level, are critical to the research and knowledge discovery under the guidance of the faculty. Faculty leaders facilitate, collaborate, promote, evaluate, fund and synthesize the work of their graduate students, but graduate students participate in a significant part of the actual research: they participate in experiments, assist in searching the libraries, collect and analyze data under supervision, etc. (2) Graduate students in professional programs develop advanced and integrative skill sets that are essential expertise for the nation's schools, businesses, technology, government and health-related fields. (3) Graduate-level education is, in many disciplines, becoming essential as the base level of preparation required for the highly skilled labor force needed in the 21st Century.

The role played by graduate students in delivering quality undergraduate education and mentoring in many university programs is well established in the American research university. This intermediate level of human expertise and knowledge between the undergraduate students and professoriate is unique to research universities. Graduate assistants mentor undergraduate students, and are in turn mentored by postdoctoral researchers and faculty. ***The most highly regarded and productive research universities are those which understand this "vertical integration" of intellectual resources and use it in such a way as to maximize quality of the research and teaching efforts***.

Some Individual and Societal Benefits of Graduate Research, Education and Scholarship

"If we are to remain preeminent in transforming knowledge into economic value, America's system of higher education must remain the world's leader in generating scientific and technological breakthroughs and in meeting the challenge to educate workers."
--Federal Reserve Board Chairman Alan Greenspan, February 16, 1999

"In 2002, the nation's colleges and universities performed 13.3 percent of the nation's total R&D—some $36.8 billion of the $276 billion total. University-administered Federally Funded Research and Development Centers (FFRDCs) performed an additional 2.6 percent, or $7.1 billion, of the nation's total R&D in 2002."
University Research - Facts and Figures - Association of American Universities, 2004

The economic benefits of graduate education are profound. Using data collected in 2003, a college graduate with a bachelor's degree can expect to earn $900,000 more in a lifetime than a high school graduate (**Figure 3**). At every level, the gap widens. The same person with a Master's degree will earn 1.3 million more, with a Doctorate the difference is 2.2 million, and with a professional degree 3.2 million. Given the trend in the USA for a highly skilled labor force, more personal responsibility for retirement, and the uncertainty surrounding social security, these differences in lifetime earning may play a pivotal role in the quality of life upon retirement.

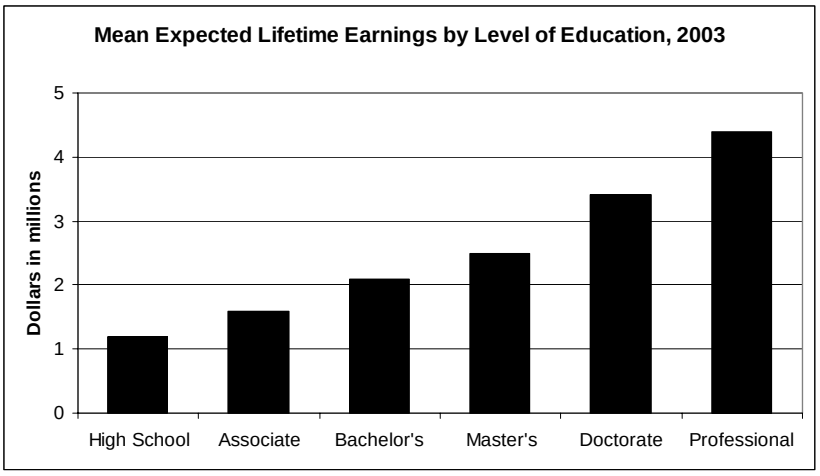
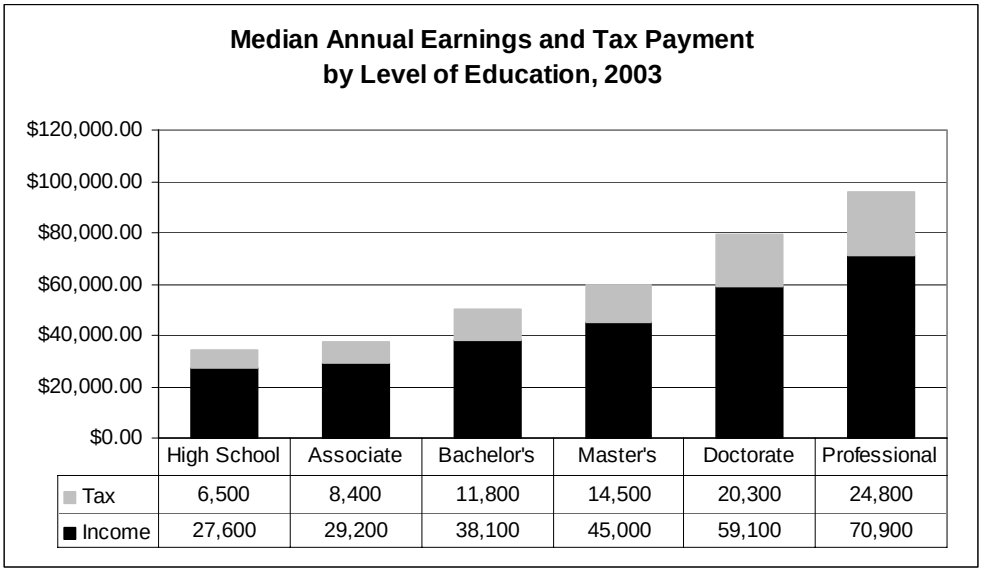


Figure 3. Mean expected lifetime earning by level of education. Based on sum of annual 2003 earnings for full-time year-round workers age 25 to 64 years, U.S. Census Bureau, Current Population Survey. Future earnings are discounted using a 5% rate to account for the reality of falling dollar value with time.

When we look at the median annual earnings of the typical full-time year-round worker in the United States in 2003 (**Figure 4**), a person with a four-year college degree earned 62% more than the income earned by the typical full-time year-round worker with only a high school diploma. Those with Master's degrees earned almost twice as much, and those with professional degrees earned over three times as much per year as high school graduates. In addition to the higher income, the typical college graduate paid nearly twice as much in taxes as the typical high school graduate. Those with professional degrees paid over $18,000 per year more in taxes than high school graduates. The higher earnings of more highly educated people are therefore shared with society through the payment of taxes.



	High School	Associate	Bachelor's	Master's	Doctorate	Professional
Tax	6,500	8,400	11,800	14,500	20,300	24,800
Income	27,600	29,200	38,100	45,000	59,100	70,900

Figure 4. Median annual earnings and tax payments by level of education. The bars in this graph show median earnings at each level of education. The gray segments at the ends of the bars represent the average federal, state and local taxes paid at these income levels. The black segments show after-tax income. U.S. Census Bureau, 2004a, PINC-03; Internal Revenue Service, 2004. Calculations by the authors of *Education Pays 2004*, prepared by The College Board (http://www.collegeboard.com/about/index.html).

In addition to increased earnings and increased tax payments, there is also a strong correlation between level of education and unemployment (**Figure 5**).

"Higher education is a common good that provides significant benefits to individuals and society as a whole. While the personal gains from higher education are widely acknowledged, the societal benefits are even more significant and lasting, thus warranting continued public investment. These include tangible returns through economic productivity and increased tax revenues, but even more fundamentally, through the promotion of an enlightened citizenry and greater social cohesion."
American Association of State Colleges and Universities' 2005 Public Policy Agenda

The above data provide empirical support for the economic value of advanced-degree educational attainment, but there are many other ways in which advanced education benefits both economy and society including lower crime rate, better employment benefits, higher voter participation, better health-related behavior patterns, higher college enrollment rates where the parents themselves have college educations, and higher levels

of civic participation such as volunteer work and blood donation. Data and charts related to these and other indicators can be found in the 2004 and 2005 editions of the publication *Education Pays*, prepared by The College Board (http://www.collegeboard.com/about/index.html).

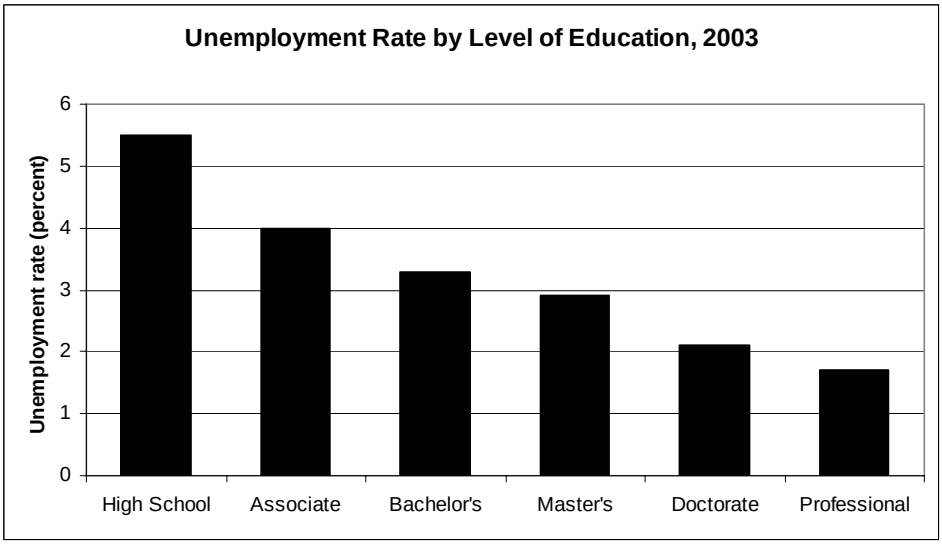


Figure 5. Unemployment rate by level of education. Unemployment Rate by Level of Education, 2003 Unemployment rate for full-time wage and salary workers age 25 and over, by educational attainment Source: Unemployment rate, 2003 annual average: Bureau of Labor Statistics; earnings, March 2003: Bureau of the Census.

Some Background on the University of Maine

"Research also drives and defines the quality of the University's graduate programs. UMaine must ensure that its graduate opportunities are cutting edge, highly competitive, and inspiring. The enthusiasm of graduate students permeates the campus with an air of excitement unique to research universities and sparks the imagination and motivation of undergraduates, many of whom immediately benefit from the presentation or application of new findings in the classroom."
University of Maine Strategic Plan, 2000-2005

The University of Maine opened its doors as the State's Land Grant University in 1868, and became the State's Sea Grant University in 1980. It has a long tradition of being the State's flagship research and graduate institution, and is one of only 140 public universities in the country that hold the highest Basic Classification of the Carnegie Foundation as Research/High or Research/Very High. The University offers graduate degrees in 65 formal Master's programs (including the professional programs) and 25 formal Doctoral programs; the numbers are higher when individual concentrations in these programs are counted (**Table 1).**

Graduate School Enrollments for the 2005/2006 Fiscal Year															
		MAST			DOC			CAS			OTHER			TOT	
MAJOR	MALE		FEM	MALE		FEM	MALE		FEM	MALE		FEM	MALE		FEM
ACC-Accounting	9		8										9		8
ANS-Animal Sciences	3		4										3		4
BCH-Biochemistry	8		8										8		8
BLE-Biological Engineering	3		1										3		1
BMO-Biochemistry & Molecular Biology				13		14							13		14
BSC-Biological Sciences				8		4							8		4
BTP-Botany and Plant Pathology	1		3	1									2		3
BUA-Master of Business Administration	43		30										43		30
CEC-Counselor Education	16		69	3		11			10				19		90
CEN-Computer Engineering	5												5		0
CHE-Chemical Engineering	6		4	10		1							16		5
CHY-Chemistry	3			22		6							25		6
CIE-Civil Engineering	19		8	7		2							26		10
COM-Communication	7		17										7		17
COS-Computer Science	9		1	4		4							13		5
CSD-Communication Sci. and Disorders	1		41										1		41
ECO-Economics	3		1										3		1
EDC-Elem Ed-Curr, Assmt and Instr.			5										0		5
EDE-Elementary Education			18						1				0		19
EDL-Educational Leadership	31		29	3		10	17		19				51		58
EDS-Secondary Education	5		13										5		13
EDT-Instructional Technology	7		10										7		10
EDX-Individualized Program	14		84	1		4	7		11				22		99
EES-Ecology & Environmental Sciences	9		21	7		10							16		31
ELE-Electrical Engineering	14		3	8		2							22		5
ENG-English	11		20										11		20
ENT-Entomology			1										0		1
EPS-Engineering Physics	2												2		0
ERS-Earth Sciences	9		6	7		5							16		11
ESC-Science Education	4		11				1		1				5		12
ESS-Social Studies Education	1		2										1		2
FIE-Financial Economics	3		2										3		2
FNS-Food and Nutrition Sciences				3		9							3		9
FOR-Forest Resources				14		7							14		7
FRE-French	1		7										1		7
FSN-Food Science & Human Nutrition	1		17										1		17
FTY-Forestry	14		9										14		9
GCT-Graduate Certificate Program	1			1		1				3		1	5		2
GRT-Graduate Student-Transient										2		4	2		4
HCL-Horticulture	1		2										1		2
HED-Higher Education	7		23				1						8		23
HEL-Higher Educational Leadership				4		10							4		10
HTY-History	13		20	13		19							26		39
HUD-Human Development	2		10										2		10
IND-Individualized (PHD)				1		2							1		2
INT-Interdisciplinary				7		16							7		16
ISY-Information Systems	6		5										6		5
KPE-Kinesiology & Physical Education	19		12										19		12
LED-Literacy Education	1		47			4			6				1		57
MAB-Marine Biology	7		14	5		5							12		19
MAP-Marine Policy	3		11										3		11
MAT-Mathematics	7		2										7		2
MBR-Marine Bio-Resources	4												4		0
MCB-Microbiology			4	1		3							1		7
MEE-Mechanical Engineering	10		2	5		1							15		3
MLS-Liberal Studies	8		20										8		20
MUC-Master of Music in Music Conducting			2										0		2
MUI-Master of Music in Music Education	3												3		0
MUP-Master of Music in Music Performar	1		3										1		3

Table 1. See next page for continuation and totals.

Graduate School (Continued)															
		MAST			DOC			CAS			OTHER			TOT	
MAJOR	MALE		FEM	MALE		FEM	MALE		FEM	MALE		FEM	MALE		FEM
NDG-Nondegree										34		62	34		62
NGE-Nondegree (Education)										55		272	55		272
NUR-Nursing	1		17										1		17
OCE-Oceanography	4		8	4		9							8		17
PAA-Public Administration	14		21										14		21
PHY-Physics	6			19		4							25		4
PLS-Plant Science				2		2							2		2
PSE-Plant, Soil, & Environ. Sci.	4		5										4		5
PSY-Psychology	1		1	4		2							5		3
PYC-Clinical Psychology				2		21							2		21
QCS-Quaternary & Climate Studies	6		3										6		3
QUS-Quaternary Studies			1										0		1
REP-Resource Economics & Policy	7		7										7		7
SED-Special Education	6		74				1		5				7		79
SIS-Spatial Information Sci. & Eng.	2		5	13		4							15		9
SMT-Master of Science in Teaching	14		13										14		13
SWK-Master of Social Work	19		108										19		108
THE-Theatre			2										0		2
WLE-Wildlife Ecology	2		2	5		4							7		6
ZOL-Zoology	6		5	3									9		5
Graduate School Total	447		902	200		196	27		53	94		339	768		1,490
		1,349			396			80			433			2,258	

Table 1. Graduate enrollment by program, gender and level, FY2005. MAST=Master's, DOC=Doctoral, CAS=Certificate of Advanced Study. This is only a 1-year snapshot, and relative numbers may vary from year to year.

The first Master's degree was conferred by the University of Maine in 1881, and the first Doctoral degree in 1960. The University currently has approximately 2,300 graduate students, 396 of whom are Doctoral students. In the last thorough assessment of the University's graduate programs (Presidential Commission on Graduate Education, 1988), there were a total of 1311 graduate students. The University's graduate students are supported by a variety of means, including self-funding, teaching assistantships, research assistantships and fellowships. **Table 2** indicates the type of funding for graduate assistants. This is not a complete list of funded students, but it does include all positions that are centrally funded by the Graduate School, and many positions funded by other sources.

The University of Maine's graduate mission clearly differentiates it from the other campuses in the System, and is a key factor in its national reputation. ***We attract 92% of all federal research dollars for academic research in the State ($57 million in FY04),*** we have a number of graduate programs and faculty that are internationally recognized as world class, and ***we have produced every Doctoral graduate in the University of Maine System***. The University of Maine is the only institution in the State that has the faculty and program recognition required to attract the very best graduate students across a broad range of disciplines.

Authorized Graduate Assistantships and Other Funding
Academic year 2005-2006 (as of January 5, 2006)

Business, Public Policy and Health	PhD	MS	MA	Other	GRADUATE ASSISTANTSHIPS GS TAs	Other Funding
Accounting		X				
Business Administration				MBA	3	16
Nursing		X		CAS		2
Public Administration				MPA	1	1
Social Work				MSW		9

Liberal Arts and Sciences	PhD	MS	MA	Other	GRADUATE ASSISTANTSHIPS GS TAs	Other Funding
Chemistry	X	X			15	10
Communication			X		17*	2
Communication (Sci & Disorders)			X			3
Computer Sciences	X	X			9	6
Economics			X		3*	2
Economics (Financial)			X			
English			X		21	1
French			X	MAT	2	
History	X		X		9	11
Mathematics & Statistics			X		6	
Music (Conducting)				MMUS	2*	1
Music (Education)				MMUS		
Music (Performance)				MMUS		
New Media					4	
Physics	X	X		MST	15*	18*
Physics (Engineering)				ME		
Psychology	X		X		17*	8
Psychology (Clinical)	X					
Theatre			X		1	

Education & Human Development	PhD	MS	MA	Other	GRADUATE ASSISTANTSHIPS GS TAs	Other Funding
Includes all the positions throughout the college					*21*	*43*
Counselor Education		X	X	CAS,EDD,MED		
Educational Leadership				CAS,EDD,MED		
Elementary Education		X		CAS,MED,MAT		
Higher Education		X	X	CAS,MED		
Higher Education Leadership				EDD		
Human Development		X				
Individualized Prog. in Education		X	X	CAS,EDD,MED		
Instructional Technology				MED		
Kinesiology & Physical Education		X		MED		
Literacy Education		X	X	CAS,EDD,MED		
Science Education		X		CAS,MED		
Secondary Education		X		CAS,MED,MAT		
Social Studies Education		X		CAS,MED		
Special Education		X		MED		

Table 2. See next page for continuation and totals.

Authorized Graduate Assistantships and Other Funding (continued)
Academic year 2005-2006 (as of January 5, 2006)

Engineering	PhD	MS	MA	Other	GRADUATE ASSISTANTSHIPS GS TAs	Other Funding
Dean's Office					1	
Biological Engineering		X		ME		20
Chemical Engineering	X	X				
Civil Engineering	X	X			3	23
Computer Engineering		X				
Electrical Engineering	X	X			2	19
Mechanical Engineering	X	X			2	7
Spatial Inform. Sci & Engineering	X	X				24

Natural Sciences, Forestry & Agriculture	PhD	MS	MA	Other	GRADUATE ASSISTANTSHIPS GS TAs	Other Funding
Animal & Veterinary Sciences		X		MPS	1	3
Biochemistry, Micro & Molecular Bio.	X	X		MPS	9*	8
Biological Sciences	X	X			19*	11
Earth Sciences	X	X			6	15
Ecology & Env. Sciences	X	X				2
Food & Nutrition Sciences	X	X			3*	10
Forestry	X	X		MFOR	7*	40
Horticulture		X				1
Marine Biology	X	X			3*	13
Marine Bio-resources	X	X				3
Marine Policy		X				9
Oceanography	X	X				12
Plant Science	X					8
Plant,Soil & Env. Sciences		X				20
Quaternary & Climate Studies		X			2	11
Resource Eco, & Policy		X			3	10
Wildlife Ecology	X	X		MWC	3	10
TOTALS					**210**	**412**

Graduate School	PhD	MS	MA	Other	GRADUATE ASSISTANTSHIPS GS TAs	Other Funding
Information Systems		X				
Interdisciplinary PhD	X					2
Liberal Studies			X			

Graduate School TAs provide: tuition, 50% health insurance, and stipend.
The Graduate School awards tuition scholarships to approximately 42 graduate students through: Atlantic Provinces Scholarships, Trustee Tuition Scholarships, Thurgood-Marshall Scholarships and International Tuition Waivers.
* Includes all students within department regardless of their academic program
MAFES positions are partially funded by the Graduate School (tuition, 50% health ins., and partial stipend)

Table 2. All centrally funded graduate teaching assistantship positions at the University of Maine for fiscal year 2006, as well as known positions funded by other sources (e.g., grants and contracts). In addition, the Graduate School provides tuition wavers, partial funding for MAFES positions, etc.

One of the defining features of Research/High and Research/Very High universities is strong support for graduate programs, and particularly Doctoral programs. Graduate students typically comprise greater than 25% of the total student population at strong public research universities, whereas they comprise approximately 20% at the University of Maine. Similarly, Doctoral student enrollment at the University of Maine is

approximately 20% of the total graduate student enrollment, whereas they comprise greater than 25% at many of our peer and neighboring institutions. ***Over the past 15 years, the University of Maine has lost approximately 18% of its centrally funded teaching assistantships through college- and department-level budget cuts***, or through "combining" positions to make fewer, more competitive positions. In 1990 there were 257 teaching assistantships, whereas in 2005 there are 210 (**Table 2**). This 18% decrease was not the result of an organized redistribution of university resources. Instead, horizontal budget cuts across the University forced a number of Departments/Colleges to make choices among their various human resources (TAs, faculty, staff), and many TA positions were sacrificed. In 2003, the Graduate School successfully argued for centralized control of all remaining teaching assistantships, putting an end to budget-related loss of these positions. ***The Task Force wants to emphasize that the loss of these 47 TA positions has had a dramatic negative impact on several programs and recovering these 47 positions is a very high priority.***

As the Task Force explored the past 15 years of graduate research and education at the University of Maine, it became clear to us that the graduate mission was relegated to a secondary role to our undergraduate mission for most of this time. As a critical example of this institutional deprioritization, during the 1990s, the Graduate School lost its Dean and was not represented in the University's senior-level leadership nor was graduate research and education thoughtfully considered in the University's enrollment and budget planning.

In contrast to the dismal historical picture painted above, significant gains have been made over the past 5 years under the current senior leadership. University enrollment data over the past few years indicate that the number of Doctoral students in the pipeline is increasing again, with Doctoral student enrollment up 28% from 2000 (396 enrolled in 2005 versus 309 in 2002). We attribute this increase to both increased levels of external research funding to faculty, and specific measures taken over the past few years by the University's new team of senior administrative leaders. Specific administrative actions include the reinstatement of the Graduate Deanship, improvements in graduate student compensation and health benefits, $150,000 allocated by the Provost to the annual Provost's Fellowship program, and $160,000 allocated by the Vice President for Research to the annual Summer Research Awards program. Along with an increase in Doctoral enrollments, a significant cohort of faculty are more eager than ever to enhance existing, and develop new, graduate programs that will enjoy world-wide recognition for excellence, and solidify the position of the University of Maine as the State's only comprehensive research university. The combination of all these gains, the President's Comprehensive Campaign, an increase in faculty support of graduate students from grants and contracts, and an apparently increased awareness in Augusta of the importance of graduate research and education in building economic prosperity for Maine's citizens, give the Task Force reason to feel optimistic about the future. Although an optimistic outlook is important for faculty and student morale, progress requires a commitment of new resources to the graduate mission.

Maine Demographics and the Strategic Contribution of Graduate Programs

Planning for higher education in the State of Maine must be at least partly driven by demographic changes that will occur in the state during the next decade. The decline in Maine high school graduates is estimated to be 11% from 1990 to 2009 and 17% during the next decade (**Figure 6a**). At the same time the economy of the state needs significant support from higher education and research to provide jobs and reshape the economy. **Figure 6b** gives model projections of UMS enrollments from Maine high school graduates. Three different scenarios are given, and the bottom line is that unless there is an increase in the number of high school graduates who attend the University of Maine or a marked increase in out of state enrollments, the size of the undergraduate population will decline.

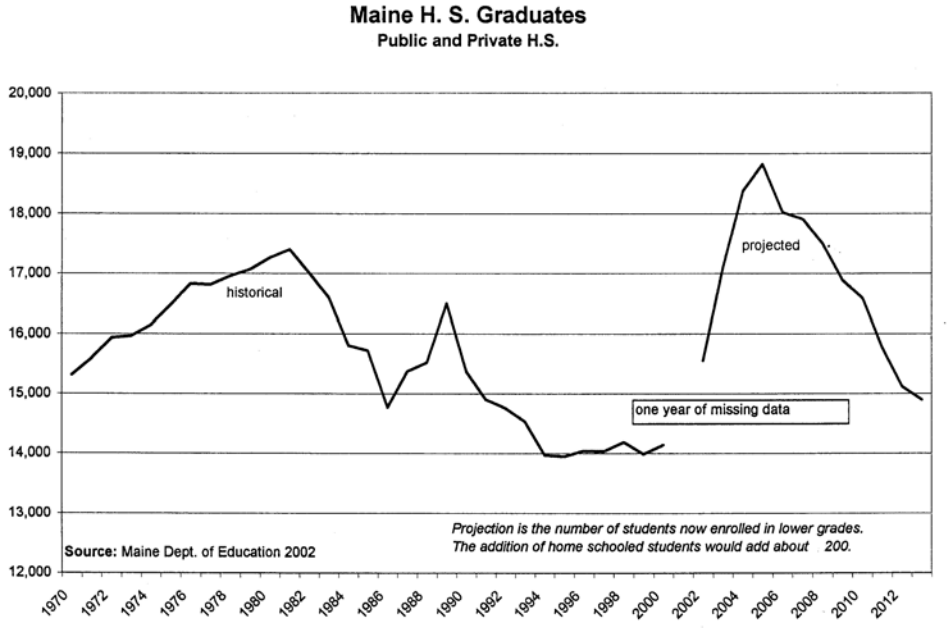


Figure 6a. Total High School graduates in Maine.

An important strategy for increasing both in-state and out-of-state enrollments is to offer unique, high-value educational experiences for students. The University's graduate programs can contribute significantly to this goal. Of the graduate students enrolled in degree programs at the University of Maine, approximately 25% have come here from other states or countries, and approximately 55% of the international students on campus are graduate students. These students not only add significantly to the ethnic diversity of the campus, but illustrate that graduate programs are particularly effective at attracting students from other states and countries. Therefore, increasing our proportion of graduate students in relation to total student enrollments is a strategic way to dampen any potential crisis related to falling enrollment by Maine high school graduates. This effort would simultaneously increase the rate of production of highly skilled workers available to the state. To achieve this strategy, the University of Maine must develop/enhance a moderate number of well focused, world-class programs which can attract research funding, undergraduate students and graduate students from both inside and outside of Maine. Several of these programs already exist; they must be enhanced

and other programs that fit the needs of Maine and strategic opportunities at the federal level must be developed.

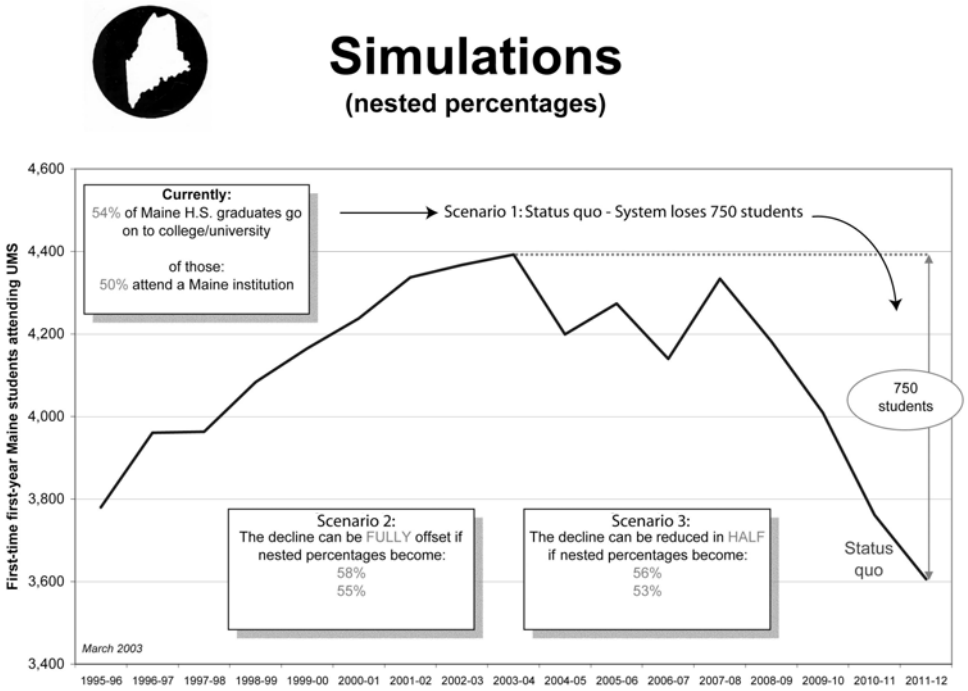


Figure 6b. Full-time, first-year enrollments of Maine High School graduates in campuses of the University of Maine System. The System stands to lose 750 enrollments if status quo recruiting continues (scenario 1). Relatively small changes in the number of Maine High School graduates going on to UMS campuses can eliminate the problem (scenario 2). From the University of Maine's standpoint, increased graduate enrollments can help to stabilize any enrollment issues stemming from Maine demographics.

THE CHARGE ISSUES AND RECOMMENDATIONS

Below we present the eight charges delivered by the Provost, along with associated recommendations. There is no rank ordering implied by the numerical ordering below.

Charge Issue 1

The University of Maine has primary responsibility for graduate research, education and scholarship in the State of Maine.

"Support a land-grant/sea-grant research university with State-wide and national responsibilities, including primary responsibility as Maine's graduate-level, research, and public service outreach institution."
"Its [UM's] leadership within the UMS in natural resources and engineering, State-wide service and outreach, graduate education, continuing education, and research that supports both basic discovery and economic development, is significant."
"It [UM] will also employ the best Distance Education technologies to make UMaine's upper-level and graduate courses available nationwide, with special emphasis on accessibility within Maine."

All from the University of Maine System Strategic Plan, 2004

Preface

The quotations above from the 2004 University of Maine System Strategic Plan clearly indicate that the University of Maine has primary responsibility for graduate-level research, education and scholarship within the System. The Task Force wishes to emphasize that we do not interpret primary responsibility with the notion of policing or controlling graduate education at other UMS campuses. Instead, we believe that the University's status as the State's flagship research university naturally positions it to provide constructive leadership in graduate-level research and education across a broad range of the University's academic and professional programs. The University of Maine is one of only 140 public universities in the country classified by the Carnegie Foundation for the Advancement of Teaching as Research/High or Research/Very High research universities. Graduate programs in these universities typically have a relatively large critical mass of accomplished research and teaching faculty and are positioned to both attract excellent graduate students across a broad range of disciplines, and maintain high levels of quality control on their graduate programs. Furthermore, leadership and primary responsibility in graduate research and education is entirely consistent with the University of Maine's Land Grant and Sea Grant status. Finally, building world-class programs, and attracting the faculty and resources to make them competitive, are costly, and it makes little sense in a state like Maine to try to duplicate the programs and strengths in graduate research and education of its research university at other campuses. These points are important in the context of building a highly skilled labor force in Maine that will educate Maine children, care for the sick, manage engineering projects, develop new scientific and biomedical breakthroughs, start and grow new companies, and contribute to the creative economy and cultural richness in the State. We break the "primary responsibility" for graduate research and education into 2 categories, as follows.

1) Doctoral Degrees

"Ph.D. education differs from master's and professional education, as well as from undergraduate education. The Ph.D. is a research degree, signifying that the recipient has acquired the capacity to make independent contributions to knowledge through original research and scholarship."

Report of the Graduate Education Committee, Association of American Universities, 1998

The University of Maine offers Doctoral degrees in 25 official programs **(Table 1)**. The Ph.D. and Ed.D. degrees offered at the University of Maine are research degrees, requiring demonstrated ability to make independent contributions to knowledge through original research and scholarship. The human and material resources required to establish a nationally competitive Doctoral program are significant, and the quality control required to build and maintain cutting-edge programs can only come with a critical mass of highly accomplished faculty members and a graduate school that has enough strength and resources to provide guidance and incentives. The University of Maine is the only campus in the System that has this capacity to offer Doctoral-level research degrees across a wide range of programs. In addition to Doctoral-level research degrees offered by the University of Maine, professional degrees can include M.D. (medical), J.D. (law), D.D.S. (dentistry), D.V.M. (veterinary medicine), and others. The University of Maine

does not currently offer doctoral-level professional degrees, although the J.D. degree is offered through the University of Maine Law School in Portland, Maine (the Law School is part of the University of Maine System; it is an administrative, as opposed to an academic, unit of the University of Southern Maine).

Recommendations

- The University of Maine should invite collaboration with other Doctoral-level scholars and researchers in the University of Maine System to explore the awarding of Doctoral degrees in appropriate selective fields of learning. In such instances, the campus with the most established and respected scholars and researchers in the discipline should award the degrees.
- Specific procedures administered through the Graduate School should facilitate and monitor, through review, existing Doctoral programs, new program initiation, graduate faculty status and basic criteria for excellence in Doctoral programs at the University of Maine.
- Our ability to deliver quality distance education at the Doctoral level should be explored for selected areas. Distance education is a rapidly growing practice in the United States, and this style of education is particularly suited to part-time students aspiring to Doctoral-level training in order to improve their economic and educational status. The University of Maine should engage, where appropriate and where the demand is empirically demonstrated, in delivering this service to the community.

2) Master's and Professional Degrees

The University of Maine offers research and professional Master's degrees in 65 programs **(Table 1).** Research Master's degrees may be a final degree or a step toward a doctorate. In the latter case, the Master's contributes to the Doctoral mission and such bridging should be encouraged and supported as part of our overall recruiting strategy. These degrees involve less time and money than the Doctorate while leading to a career with greater responsibility and better pay than would be expected with a baccalaureate degree alone.

Professional Master's degrees provide a specific set of skills needed to be licensed and to practice a particular profession. These degrees include the MBA (Master of Business Administration), MSW (Master of Social Work), MSN (Master' of Science in Nursing), MST (Master of Science in Teaching), the Master of Art in Communication Sciences and Disorders (speech language pathologist), MPA (Master of Public Administration), MSN (Master of Science in Nursing; nurse practitioner) and others. A Master's-level professional degree is generally a final degree, and commonly involves some type of internship or fieldwork before the degree is conferred. Some of these students also are prepared in "clinical" research.

The University of Maine System Strategic Plan calls for the smaller campuses to initiate selected professionally-oriented Master's programs in areas in which the University of Maine has significant experience and expertise. As a result, the University of Maine is well-positioned to collaborate with other UMS campuses in providing advanced training

to working, place-bound professionals. Both the State of Maine and the University of Maine System have a vested interest in the quality and credibility of graduate and professional programs offered throughout the System. As the flagship campus of the System, the University of Maine can provide leadership and guidance in developing and maintaining quality and credibility. This is important for graduate programs already offered at the University of Maine where students might seek to apply graduate credit taken from other System campuses.

Recommendations

- Cross-system collaboration should be formalized for the purpose of offering selected Master's degrees statewide, where the need is clear. When it is involved in such collaboration, the University of Maine should contribute available expertise to the graduate programs to advance quality and credibility. Student/faculty ratios must be managed appropriately for each program for capacity and marketability, and in some instances for accreditation. It is critical that these programs are competitive and that the graduate faculty have appropriate qualifications to teach advanced courses. .
- Our ability to deliver quality distance education at the Master's level should be strengthened. Distance education is a rapidly growing practice in the United States, and this style of education is particularly suited to part-time students attempting to improve their economic and educational status. The University of Maine should engage, where appropriate and where the demand is empirically demonstrated, in delivering this service to the community. The Division for Lifelong Learning at the University of Maine has made exceptional progress in establishing both the market and the high quality-control standards expected by the University of Maine faculty. The Task Force applauds their efforts and successes.

Charge Issue 2
Enhancement and Selective Growth of our Graduate Programs

Preface

The best way to gauge the target size of graduate programs at the University of Maine is to benchmark with competitive peer institutions. ***The University of Maine is one of few research universities we know of that has not chosen an institutional set of peers for benchmarking.*** Therefore, we have put together our own for this analysis. As a comparator group – we used the New England Land Grant universities, and most of the universities used by the University Research Council and the Peterson's Academic Services Group report. **Figures 7 and 8** show an average graduate enrollment for these peers at 23% of total enrollment, and an average Doctoral enrollment at 29% of total graduate enrollment.

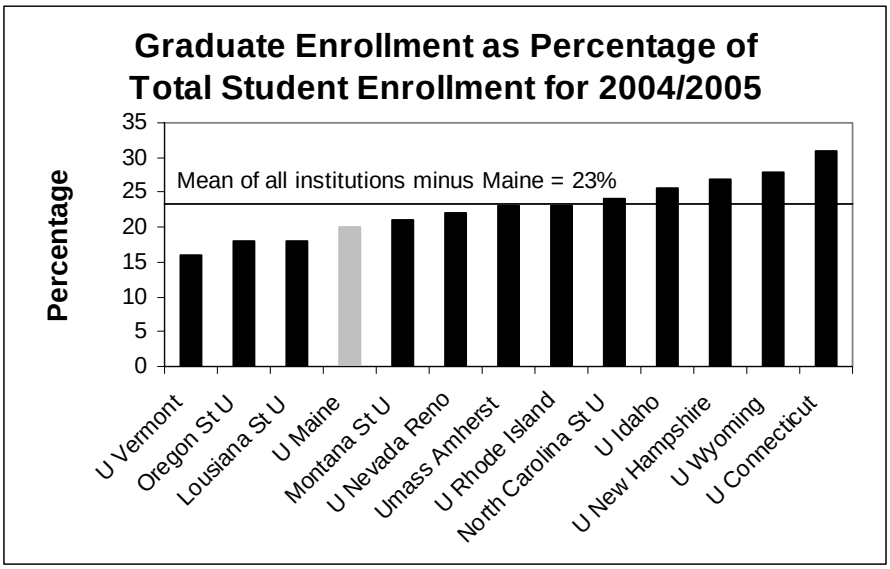


Figure 7. Total graduate enrollments as a percentage of total student enrollments for Fiscal Year 2005. Peer group was selected to include the New England Land Grant universities plus most of the universities used by the University Research Council and the 2004 Peterson's Academic Services Group report.

Therefore, ***as a general recommendation***, the Task Force recommends that the University of Maine pursue a graduate enrollment target of 3,000 for the year 2010. This would constitute 25% of the projected total student enrollment of 12,000. The Task Force also recommends that 25% of the total graduate enrollment should be Doctoral students. Our total graduate enrollment is currently 2300, 296 of which are Doctoral students. ***To meet the above goals, we need to increase both Master's and Doctoral enrollment by approximately 350 each by 2010.***

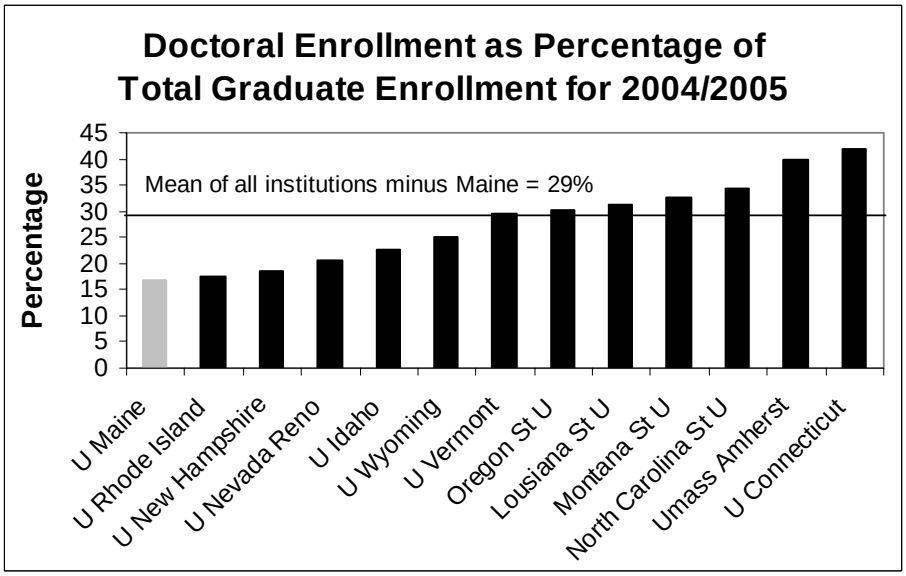


Figure 8. Total Doctoral enrollments as a percentage of total graduate enrollments for Fiscal Year 2005. Peer group was selected to include the New England Land Grant universities plus most of the universities used by the University Research Council and the 2004 Peterson's Academic Services Group report.

The next question that arises is how best to grow our graduate mission at all levels. The Task Force has developed a set of criteria that we recommend be used to make these decisions. These criteria are at once general and specific. They seek to balance the need for the University to contribute to the prosperity of Maine while simultaneously increasing its national status. In determining whether or not departments meet these criteria, or how departments are prioritized, convincing and empirically supported arguments should be made for: (1) empirically supported demand, and (2) current and future quality. These two points might be further broken down, for example, as: a) national and state need (will graduates be likely to find jobs in a related discipline?), b) programmatic quality (is there a critical mass of highly qualified faculty and do they have the necessary resources?), c) opportunity for national and international prominence (is there a good chance that the University of Maine could be a recognized leader in the field), d) future sustainability (is the track record there, and are there enough resources and market force to sustain the program?), e) are the additional faculty required a good investment (e.g., is it a high demand program or does it have niche potential?).

Before going into the criteria, the Task Force wishes to make one point very strongly and clearly. ***There is a solid core of faculty and graduate programs at the University of Maine that would be competitive in research universities that are superior to the University of Maine. These people and programs should be rapidly pushed to capacity before spending money on new adventures. Proceeding in this way will allow growth to occur in units where quality and capacity are demonstrated by reputation and productivity.*** It will also discourage the loss of some our best faculty, who may consider moving on because the graduate program they are working in is not growing or developing.

The five broad areas for investment identified in this section provide a range of options for Maine citizens and out-of-state students, and will support productive linkages between higher education and corporate and public interests. Critical support for these academic thrusts, as well as for imaginative and creative new endeavors, must be provided by enhancements to academic and administrative services, especially computer resources, libraries, laboratories, and updated classroom and research facilities.

1) Build on existing strengths and where we have competitive advantage

"We recommend increasing to capacity the number of graduate students – particularly doctoral students – in these (selected) programs and programs in the basic sciences that support them."

Review of the Graduate Programs at the University of Maine, Peterson's Academic Services Group, 2004

During 2003, the Peterson's Academic Services Group undertook an evaluation of the Doctoral programs at the University of Maine. The review team's impression was that there is an unevenness in quality among our graduate programs. They noted that strong programs think strategically about graduate research and education, have a vision for the program, and have developed areas of focus upon which to build. It is important to note here that, benchmarked to national peer institutions, even UM's strong programs need improvement. Weaker programs appeared to the external review team to lack a sense of

ownership or urgency and exhibited little sense that programs needed aggressive development. ***The external review team from Peterson's Academic Services made the following recommendations***:

- Increase to capacity the number of graduate students, particularly Ph.D. students, in the programs that they identified as strong (Wildlife Ecology, Ecology and Environmental Science, Psychology, Spatial Information Science and Engineering, Marine Sciences, Earth Sciences, Functional Genomics, and Chemical Engineering).
- Increase faculty in these strong programs as appropriate to maximize their impact on growth of strong programs to enhance graduate research and education at the University.
- Shore up basic research in Biology, Chemistry and Computer Science to provide the basic strength in science required to support chosen areas of excellence in applied science.
- Develop a designated funding base to improve stipends and provide health insurance.
- Develop, to the level of competitiveness, promising programs/research initiatives in areas not currently identified as strong but with measurable potential for growth.
- Recruit additional Doctoral students as stronger programs come online. In this context, "strength" was defined as a department's ability to raise external funding it needs to support doctoral students.

The Task Force agrees, in principle, with the review team's assessment and recommendations. In particular, we agree that rapid enhancement of the University's graduate mission can be most readily accomplished by stimulating those programs identified as "strong". ***It must be noted that "strong" programs were defined by the external review team as programs that think strategically about graduate education, have a vision for the program, have developed areas of focus upon which to build, and have the capacity to support a significant percentage of their graduate students through external funding.*** On this basis, the Task Force believes that additional programs at the University of Maine may well be considered "strong", and these will emerge naturally in any advanced discussion about resource allocation.

"As indicated beforehand by the Graduate Dean, most departments at the University of Maine do not think strategically about their graduate programs and tend to "think small" in terms of external funding. We think this is related to their lack of knowledge about peer institutions. …we think this lack of knowledge about peers is more pronounced at the University of Maine than any other institution with which we're familiar."
Review of the Graduate Programs at the University of Maine, Peterson's Academic Services Group, 2004

Recommendations

- Increase to capacity the number of Ph.D. students in those programs identified as "strong" by the Peterson's Academic Services review team, and any other programs that can demonstrate (through benchmarking, strategic planning, etc.) strength as defined above by the review team. The Task Force is well aware that much growth and renewal has occurred in Ph.D. programs in the three years since the Peterson's

team conducted their review, partly owing to the hiring of dynamic, competitive new faculty to replace retired positions.

- Increase the number of full-time Doctoral students in those departments that grant Doctoral degrees by providing institutionally funded bridging awards for 2 years. The number of bridging awards to any single department will be based on the number of full-time Doctoral students in that department who are funded for an entire year by external sources, and will be updated annually. These bridging awards should be offered for 2 years at a competitive level, and should bring the total award for Doctoral students to at least 4 years.
- Create dissertation-year awards for Doctoral students. These awards should be available on a competition basis in instances where dissertation completion is demonstrably imminent. Such awards will facilitate the completion of doctoral dissertations while the work is still on the cutting edge.
- Develop, to the level of competitiveness, promising programs/research initiatives in areas not currently identified as strong but with measurable potential for growth.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

2) Support graduate research and education in the arts, humanities and social sciences

Graduate programs in the arts, humanities and social sciences are essential to the graduate mission of the university because of the richness, diversity, unique perspectives and expertise they bring to the academic community and the community at large. They are also essential to the teaching and knowledge production missions of the University through the transmission of the intellectual skills of critical thinking and analysis. However, faculty in these areas have had only spotty support in developing competitive graduate programs. By increasing the number of graduate programs and teaching assistantships in the arts, humanities and social sciences, a cascade of institutional benefits will ensue, including an elevation of opportunity for the careers of affected faculty and students who would be enlivened by participation in the graduate mission. In addition, their contribution to Maine's creative economy may be profound. A recent (2004) report by the Association of American Universities provides an extensive discussion with recommendations on reinvigorating the arts and humanities in research universities. This report provides recommendations on a wide range of issues facing these disciplines, and gives extensive examples of best practices at universities throughout the US. The Task Force suggests that this report is essential reading for anyone concerned about reinvigorating the arts and humanities at the University of Maine, and growing strength in graduate programs in these areas.

"As the University begins to develop additional areas for the Ph.D., we think it would be helpful to strike a balance by introducing programming in the Arts, Humanities, and Social Sciences. The two existing Ph.D. programs in these areas—Psychology and History—seem productive and capable of growth."
Review of the Graduate Programs at the University of Maine, Peterson's Academic Services Group, 2004

The above quote from the Peterson's report makes it clear that we should be striving for a more balanced distribution of graduate programs at the University of Maine – in other words more graduate programs in the arts, social sciences and humanities. Maine residents are typically unaware of the high-level accomplishments of the faculty in these programs because the direct impact of the physical sciences, health sciences and engineering are most often emphasized in the Maine state legislature initiatives. The University of Maine needs to begin the process of explaining the goal of a research university, not only in terms of basic and applied research, but also in disciplines that investigate the cultural and social challenges that affect the overall quality of life and personal appreciation for culture, art, literature, history and music. The potential for growth in the social sciences, arts and humanities is strategic and largely untapped at UM. An inclusive approach of endorsing graduate programs around groups of faculty within and across disciplines would serve the Peterson's recommendations to a) evangelize graduate education amongst the faculty, b) develop incentives for graduate faculty, and c) advocate for a more inclusive graduate community. We discuss these three points below.

"Faculty-based evangelization" of graduate education is at least moderately well established in some University of Maine programs. However, some departments, in particular the smaller ones in social sciences, arts and humanities, have had great difficulty finding administrative support to start or grow graduate programs. The reasons are obvious for a financially challenged public university. In most cases, such growth would be achieved only by additional faculty lines, financial support for graduate assistantships and competitive start-up packages to enhance competitiveness for funding and research endeavors. The Peterson's charge for balance in our graduate programs could be addressed by promoting targeted growth using a competitive process of faculty-driven initiatives and consortia with demonstrated promise to improve institutional excellence. The MAPI program (Maine Academic Prominence Initiative) has been an exceptional step in this direction.

Incentivization for graduate faculty has been discussed in earlier sections as nearly absent and in great need of redress. This is particularly true for graduate faculty in the arts, humanities and social sciences who typically have relatively heavy teaching loads and have limited access to federal or other sources of summer salary to augment comparatively lower salaries.

An inclusive graduate community is an important goal of any flagship public research university. If a balanced approach is taken by the administration, then opportunity for faculty and student participation in graduate education in other areas would greatly improve. With more inclusive opportunity, the evangelization process will drive itself. Further, the greater graduate community does not have strong interdisciplinary ties, despite considerable progress in the last few years by the graduate dean, associate dean and multidisciplinary representation in faculty and graduate student leadership. This trend is quite positive but dependent on the goal of achieving more balance in graduate opportunities. The English Department has a Master's program and funding through the MAPI program for its excellence in poetry. This should serve as model at UM for an effort to reach for balance. The commitment of the faculty to evangelize graduate education will lead to enhancement of career opportunities that naturally result from this

development. The Task Force believes that incorporation of graduate activities into faculty workload analyses is required to achieve strong faculty buy-in for the graduate mission or development of an inclusive graduate community.

Solutions to funding for graduate programs lacking critical mass is a perpetual problem at public universities, owing largely to the all-too-obvious financial pressures. Graduate programs are expensive, particularly when programs are not self-sustaining through external funding. How can arts and humanities graduate programs compete in this climate? Similarly, when faculty with particular niche expertise in any area labor within departments or units without critical mass to offer a graduate specialty, there is little chance to garner local (institutional) or national attention. One solution is to broaden the interdisciplinary breadth and develop alliances across established boundaries. However, such efforts are made difficult and even perilous owing to existing departmental- and college-level hierarchies that define the traditional university structure. Interdisciplinarity is a central, pluralistic intellectual trend of the 21st century, and the University of Maine should take concrete steps to support it (see further discussion in Charge 3 below).

Recommendations

- The Dean of the College of Liberal Arts and Sciences should establish a committee to consider the development of a limited number of new graduate programs and research programs in the social sciences, arts and humanities. We recommend that this new committee do the following:

    a) Focus on programs that can take advantage of interdisciplinary niche areas that will capitalize on cross-disciplinary strengths.
    b) Identify potential niche areas that will address exciting new intellectual challenges, where research funding is available and where a demand for graduates exists. Such areas should meet needs in Maine, the nation and the world.
    c) Consider ways to nurture new approaches and partnerships that can help establish a funding base for supporting growth of graduate research and education in the arts, humanities and social sciences.

- Ensure that competitive start-up packages allow faculty to compete for research funding on a national level. These packages should meet national benchmarks for the discipline and follow an open and fair process.
- Create incentives for social sciences, arts and humanities programs that do not have strong track records of attracting external funds, explore the impediments to success in this arena and develop a plan to help these programs overcome them. Performance should be benchmarked to peer institutions and top performers should be rewarded while barriers in other units should be investigated.
- Promote research excellence through appropriate funding of faculty research (e.g. MAPI) including materials, travel, colloquia and visiting scholars to kick-start promising faculty groups.

- Provide support (e.g., money, release time) for development of graduate education and research programs in the social sciences, arts and humanities with the expectation of competitive benchmarking and grant seeking for funded initiatives.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

3) Provide incentives to increase the number of graduate students and research funding in science and engineering

At the University of Maine there are 24 doctoral training programs in science and engineering. Here, as elsewhere in this document, we include the social sciences (in this case Psychology) when we refer to programs in "science." There are an additional 43 programs in science and engineering that offer Master's-level training. Examined in isolation, these numbers might suggest that our university has a healthy production of science and engineering graduates. However, when examined in the context of the national landscape a very different impression is formed.

The most recent National Science Foundation report on Science and Engineering Indicators (2004) shows that Maine ranks poorly in several characteristics related to graduate research and education (**Table 3**). Of the characteristics in Table 3, Maine performs particularly poorly in S&E doctorates awarded (51 of 52 – only Alaska ranks lower), S&E graduate students in doctoral-granting institutions (50 of 52 – only Alaska and Vermont rank lower), and academic research and development expenditure (50 of 52 – only South Dakota and Wyoming rank lower).

"Efforts to increase university-led R&D require a concomitant expansion in science and e graduate programs. Two statistics illustrate this striking interdependence. Maine ranks last among the 50 states in producing science and engineering Ph.D.s and last among the states in conducting university research and development. The state's status in both of these measures is not coincidental. To move forward, expanded graduate programs must match investments in R&D." Maine 2001 Science and Technology Action Plan

Science and Engineering Profile: Maine

Characteristic	State	U.S.	Rank
Doctoral scientists, 2001	2,120	542,940	42
Doctoral engineers, 2001	280	112,760	45
S&E doctorates awarded, 2002	30	24,558	51
S&E postdoctorates in doctorate-granting institutions, 2002	38	45,171	46
S&E graduate students in doctorate-granting institutions, 2002	690	482,211	50
Academic R&D, 2002 (millions of dollars)	69	36,314	50
Public higher education current-fund expenditures, 2001 (millions of dollars)	550	170,024	44
Federal obligations for Academic research and development, 2002 (millions of dollars)	255	83,764	41

NOTES: Rankings and totals are based on data for the 50 states, District of Columbia, and Puerto Rico. Reliability of the estimates of industry R&D and of doctoral scientists and engineers varies by state, because the sample allocation was not based on geography. The rankings do not take into account the margin of error of estimates from sample surveys. Data on graduate students, doctoral scientists, doctoral engineers, and postdoctorates include all graduate degree (except M.D.) candidates and recipients in S&E fields, including health fields. Data on S&E doctorates awarded do not include health fields. Federal R&D obligations are as reported by funding agencies. Ranks and totals are based on data for the 50 states, District of Columbia, and Puerto Rico.

SOURCES: Prepared by the National Science Foundation/Division of Science Resources Statistics.

Table 3. Science, engineering and research profile for Maine. All rankings show poor performance in relation to investing in an innovation-driven economy. Those characteristics shown in bold are the most closely related to graduate research and education, and are also the worst of the rankings.

While Maine ranks fifth per capita in the nation in terms of producing undergraduate bachelor's degrees in science and engineering, Maine ranks 50 out of 52 per capita in education of science and engineering graduate students (**Table 3**). This has been true each and every year since at least 1992 (See p.4-15, US Dept of Commerce, State Science and Technology Indicators, Fourth Edition, 2004). These poor rankings reflect a long term lack of sustained support for graduate education in science and engineering at all levels – from faculty to university administrators and on to legislators. Why is this ranking significant? The number of science and engineering students in graduate programs, as well as the percentage of the workforce with science and engineering graduate degrees, are used as ***key indicators*** in national comparative assessments and particularly by businesses in determining whether a state has the knowledge base necessary for starting and maintaining innovative wealth generation in an information economy. Hence, although we rank relatively high (5^{th} per capita in the nation) in producing undergraduate bachelor's degrees in science and engineering, Maine's strategic deficit in graduate education in these fields discourages investment by businesses and industry in the State of Maine. It is critical to note that our poor ranking in science and engineering graduate education matches Maine's low ranking in legislative support of funds for research and development at our only major research university, the University of Maine.

Faculty Incentives to Motivate Grant Seeking for Research and Graduate Education
Faculty members generate indirect costs (now referred to by the Federal Government as F&A – Facilities and Administration) when they win competitive grants. The amount of F&A is most substantial (ie., the maximum allowed at UM, currently 48.5%) when the award is through a major governmental agency such as National Institutes of Health, National Science Foundation or the Department of Defense. Many research universities return a portion of the F&A associated with a grant to the units, departments and investigators that obtained the grant. However, at the University of Maine none of the F&A funds are made directly available to the faculty, units or departments generating the research activity. Not only is there a lack of incentive to generate indirect cost dollars, but there are substantial disincentives for faculty to increase such funds for the university. For example, if a faculty member triples indirect revenue to the university, their research workload increases with no increase in administrative support.

Of concern to the Task Force, the lack of direct incentives to seek research grants with associated indirect dollars has a negative impact on potential growth of graduate assistantships. This hurts everyone and has contributed to at least two decades of the State of Maine being ranked very poorly in terms of educating highly skilled graduate students in science and engineering and generating research funding for their tuition and support. ***Incentive structures similar to those used at many other research universities must be instituted.*** While the current and past administrations have made heroic attempts at changing the situation at UM, the campus has witnessed at least twenty years of failed strategic plans in bringing about change. Distributions of F&A have been continually sacrificed by successive administrations to meet the needs of crises or short-term needs with the result that the longer term goal of providing a foundation for research and graduate growth has failed to materialize. The dire situation of several decades of being

ranked at or near the bottom of the nation in terms of research funding (on a per-capita basis) and conferred graduate degrees demands an explicit plan to aid both the well being of the University and the State of Maine. We need to allow and enable university faculty to help bring more funds to the State. The Task Force emphasizes that, for F&A-return incentives to work, it is critical that a substantial proportion be delivered directly to the investigator and the administrative unit of the investigator. We also suggest that a portion of F&A should be returned directly to the Graduate School, owing to the strong ties between research and the graduate mission.

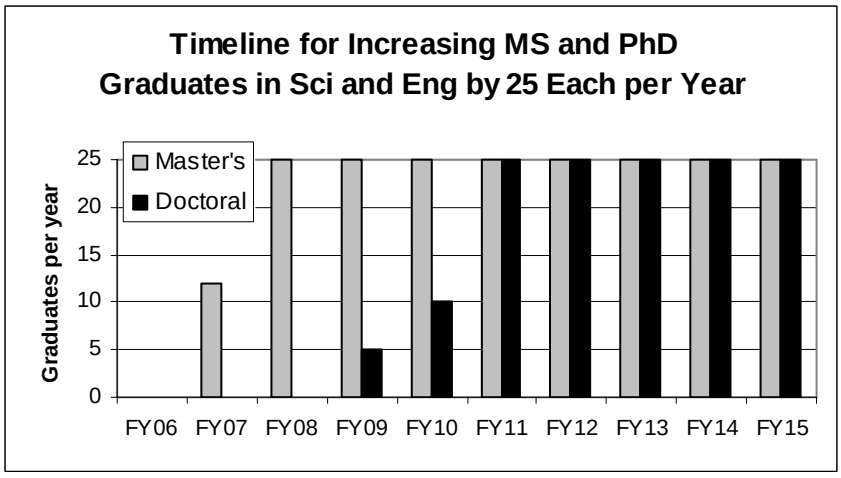
Meeting the State's Requirements in Science and Engineering Graduate Degrees

The 2005 Maine Science and Technology Action Plan's goal that Maine universities award 250 graduate degrees in science and engineering by 2007 is achievable only if the University of Maine commits itself to this goal. Given that the University of Maine is the State's research university, and has the quality faculty and resources required to attract competitive science and engineering graduate students from the national and international talent pool, this is a direct challenge to us. The most sensible and economically efficient way to achieve the 250 goal is to invest in expanding existing and emerging science and engineering programs at the University of Maine. Because the State of Maine has long been near the bottom in the nation in terms of per capita production of research funding and granting of graduate degrees in science and engineering, new approaches are required to reverse the incentive system both on the UMaine campus as well as system-wide.

"Relatively speaking, when it comes to Ph.D.s in the workforce, Maine has a significantly smaller pool to draw upon than other states nationwide, particularly in fields such as computers, information sciences and engineering. This shortage of Ph.D. scientists and engineers imposes a potential restraint on Maine's knowledge-based economic growth."
Maine 2004 Innovation Index

"2007 Benchmarks:
• In 2007 Maine universities award 250 graduate degrees in science and engineering, while universities and research institutions support 2000 principal investigators, and attract over $150,000,000 in research funding."
2005 Maine Science and Technology Action Plan

Currently, approximately 200 students graduate annually from Maine institutions with Master's or Doctoral degrees in science and engineering. Therefore, to meet the goal of the Science and Technology Action Plan, 50 more graduates are required each year. The Task Force has calculated what this increase would cost (**Figure 9**). Using compensation levels comparable to fellowships from the Department of Education Graduate Assistantships in Areas of National Need, and targeting equal increases in Master's and Doctoral graduates (25 each), we can reach this goal at a cost leveling off to approximately 4 million dollars per year at 2011 and then increasing by 4% each year thereafter for inflation.



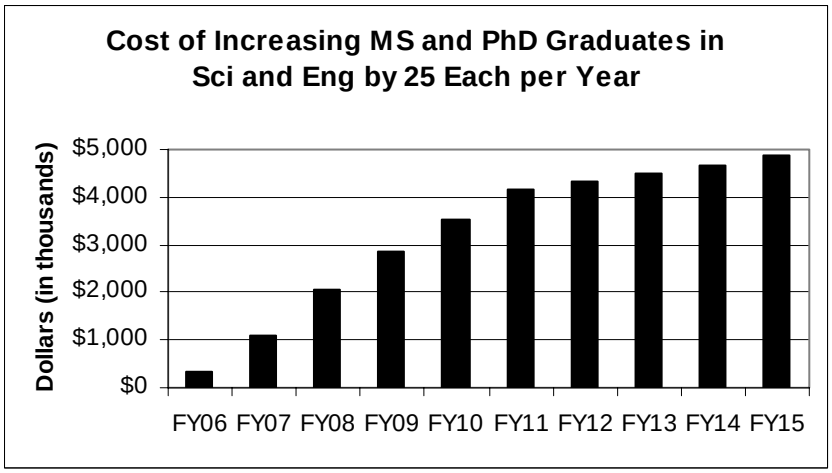


Figure 9. The 2005 Maine Science and Technology Action plan calls for increasing the number of Master's and Doctoral graduates in science and engineering from 200 to 250. The graphs above show a timeline and cost for increasing Master's and Ph.D. students evenly. The assumptions are that Master's students will graduate after 2 years, and Ph.D. students after 4. Salaries are those reported by the US Department of Education ($16,500 for Master's and $21,000 for Ph.D.). Costs increase by 4% each year for inflation. The bottom line: by 2011 we can reach the target goal of graduating 25 Master's and 25 Ph.D. students per year in science and engineering for a cost of 4 million dollars per year at 2011 plus annual inflation growth.

Recommendations

- Indirect costs (F&A) charged to research grants/contracts and paid for by external funding agencies should be distributed by rigidly proscribed formula in such a manner as to provide faculty and research programs with strong direct incentives to increase their numbers of graduate students and amounts of research funding. The Task Force is concerned about three things in relation to any distribution formula. First, the formula must be followed, even in economic hard times. Second, for incentives to work it is critical that a substantial proportion of F&A be returned directly to the investigator and the administrative unit of the investigator. Third, the Graduate School should be among the recipients of distributed F&A.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of

the University Research Council.

- Hire, retain, and promote administrators, whether chancellor, president, provost, dean, or department chair, who are demonstrably committed to implementing best practices for promoting research success. In particular, we endorse providing clear incentives to reward faculty success in attracting increased quality and numbers of science and engineering graduate students and the funding to grow research and thereby support graduate education.
- Hire, retain, and promote science and engineering faculty who are demonstrably committed to research excellence and committed to increasing the number and quality of graduate students in their programs.
- Invest to meet the goal of the 2005 Maine Science and Technology Action Plan of increasing science and engineering Master's and Ph.D. graduates by 25 each per year.
- Make competitive start-up packages available so that new faculty can reasonably compete for research funding on a national level. These packages should meet national benchmarks for the discipline and follow an open and fair process.
- Create incentives for science and engineering programs that do not have strong track records of attracting external funds, explore the impediments to success in this arena and develop a plan to help these programs overcome them. Performance should be benchmarked to peer institutions and top performers should be rewarded while barriers in other units should be investigated.
- Work with the Maine State Legislature to ensure that financial support of university-based research becomes comparable to states with which we are competing to develop an innovation-driven economy. Benchmark state and institutional investment on a national scale and prioritize research to support state research goals.

4) Enhance the University's ability to service the State's professional needs in business, education, natural resources, health care, social work and engineering

The provision of excellent professional education, research, and service in a wide array of professional programs is central to the University's mission. Graduates from the University's professional programs fill important positions in government, corporate, industrial, health care and educational settings. As a Land Grant and Sea Grant state flagship university, we have a responsibility to provide undergraduate and professional graduate training, in-service training, research, and service to practitioners and clients of the professions throughout Maine. Programs in agriculture, forestry, public administration, social work, education, business, communications, psychology, nursing, management, engineering, and planning and public policy educate many Maine citizens for social service and for public and private sector employment throughout the state.

The breadth of professional studies at the University of Maine may require us to make hard choices about which graduate programs to prioritize in the coming years. Since many of these programs fulfill specific needs of practicing professionals in the state, our concerns for need, access, and diversity must play important roles in our decision making. However, excellence in professional studies, as measured by ability to conduct important research and offer high quality instruction, should remain essential criteria in faculty hiring decisions.

There is strong potential for the University's professional programs to expand in the graduate arena. Several of these units may need new faculty lines to do so, but the demand is clearly there. Of concern to the Task Force, the Deans of the respective colleges (Business, Public Policy and Health, Education and Human Development, and Engineering) have all expressed frustration with a lack of willingness on the part of the University of Maine System to allow for differential tuition and other flexibility that would facilitate the development of more creative and attractive programming at both the graduate and undergraduate levels. Most students in these programs cover their own tuition or their tuition is covered by companies or agencies for which they work. The cost of additional faculty may, in fact, be offset by the tuition revenues these programs generate, particularly if they are allowed to implement reasonable differential tuition plans.

"Maine's business schools will assist the science and engineering departments, research institutions, and research-intensive business community to develop business and marketing plans for technologies developed at the research institutions by the fall of 2007."
2005 Maine Science and Technology Action Plan

One of the most important roles of the University of Maine has been to train students for professional jobs, but Maine has need of professionally trained people in several areas that the University of Maine is currently not offering. We therefore suggest the University Administration evaluate the pros and cons of four possible new graduate programs in the following areas.

Policy Studies

A large number of faculty and professional staff are engaged in policy research of one kind or another. It may be possible at relatively low cost to establish a unit and graduate program in policy studies that takes advantage of the skills of these individuals. This is not to suggest that the program will be cost free or that no realignments of faculty positions will be necessary. We believe that there is funding available for policy studies and that graduates of this program would be in demand. Such a program would also use the skills of faculty who are currently in widely scattered programs, some of which have no graduate programs.

Pharmacy School

There is currently high demand for pharmacists, and establishing a school of pharmacy might be well received in Maine where the need for health care is growing rapidly. A pharmacy school would build on the existing strengths in Biology, Chemistry, Physics, Micro-biology and Biochemistry. One possibility is to combine some of the University's units into a school or college of Allied Health Professions, within which a Pharmacy School would fit well. An undergraduate program should probably be considered before graduate programs are established.

Medical School

Maine has a shortage of physicians and the need for additional physicians will grow in future years. Maine is one of the few states with no allopathic medical school. We believe

that efforts to establish a medical school would find support among members of the State Legislature, the Alumni and Maine residents. On the other hand, the enormous cost of a medical school would require significant and sustained new state funds to get off the ground. The University of Maine could consider establishing a two year medical school and then possibly expand into a four year medical program at a later date. Students would take their basic medical sciences at the University of Maine and then transfer to other schools for their clinical training. Brown and Dartmouth began their medical schools by establishing two year programs and these may provide useful models for further investigation. The University of Maine has many of the faculty needed to teach the basic medical sciences now given the resources in the Biology, Chemistry, Physics, Microbiology and Bio-Chemistry. Given our current resources, it might be as easy, if not easier, to establish a two year medical school rather than a pharmacy school.

Tourism Industry

One of the largest industries in the state by any measure is tourism, and the University of Maine should consider training graduate students for jobs related to this industry. One possibility would be to establish a School of Hotel and Restaurant Management, building on the recently established Center for Tourism Research and Outreach (CenTRO). CenTRO is a collaborative effort involving the University of Maine and the University of Southern Maine to provide a single point of service to academics, policy makers, and the industry for tourism-related research and outreach. Such a school could form strong links with existing UM programs, for example in the Business School and the Department of Food and Nutrition.

"The most common pitfall for state policy makers is to attempt to create new clusters where there are no preexisting advantages to be built upon."
— A Governor's guide to Building State Science and Technology Capacity, 2002 - National Governor's Association

Recommendations

- Invest strategically in faculty lines that will allow for expansion of graduate-level professional training opportunities in key areas. There should be evidence that graduate (and undergraduate) enrollment will increase appropriately as a result.
- Consider establishing a policy studies unit with graduate programs at the MA and Ph.D. levels.
- Form three separate committees to consider the pros and cons of establishing a Pharmacy School, Medical School and/or Hotel/Restaurant School.
- Give deference to professional graduate programs in key areas whose faculty are willing to offer many of their courses through asynchronous distance education technologies and thereby reach and serve a greater proportion of the State's working population.
- Address the impediments to differential tuition in order to create funds to support professional programs at the graduate level. The Maine School of Law already has such a tuition differential.

- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

5) Promote those programs that have obvious economic, geographical, social and cultural relevance to Maine

An important element of any university strategic planning process is to assess the environment in which the university exists. Maine is isolated in a natural setting, the quality and diversity of which rivals any in the nation. With its long coastline, abundant inland lakes and waterways, expansive forests, unique geological and glacial history, and rich biodiversity, Maine clearly has certain obvious strength related to its geographic position. Culturally unique programs which are well tailored to the people of Maine must also be supported by the university. In addition, basic and applied research that is tied to the economic well being of the state should always play an important role in the research portfolio of the University of Maine.

The most successful institutions have clearly identified their competitive advantages that are associated with the skills or unique capabilities of their faculty or region. External reviews of the University of Maine as well as reviews of other small institutions have stressed the need to have clearly focused programs which can impact a broad population both inside and outside of the campus community. The relative strength and weakness of programs has been discussed as have the existence of pockets of excellence. The criteria for expanding support of programs should include existence of a critical mass of researchers in an area, the existence of unique ties to the economy or culture of the area or the need to support areas of traditional strength which create the character of the institution. Programs should not duplicate other strong programs in the state in public or private institutions and need not necessarily be tied to large undergraduate educational programs.

In addition, humanities are a growing part of the creative economy that the State of Maine cannot afford to lose. The Harvard Business Review reports that the power behind the U.S. economy is its "creative class" of scientists, artists, engineers, photographers, technologists and designers to name a few. The creative sector accounts for at least half of American wage income, and the United States is losing its competitive edge. In response, “Businesses have come to realize that the only way to differentiate their offerings is to make them beautiful and emotionally compelling -- which explains why an arts degree is now a hot credential in management” (Harvard Review). The perspectives that emerge from a humanist background are sought after in the US economy, which the University of Maine has the expertise to offer to its citizens and the larger economic community. Graduate students in these areas provide Maine with a competitive edge in the business market, and can mentor undergraduates across disciplines to enter into the economy.

In relation to health issues, there are pressing needs of the citizenry that must be addressed. Maine has a relatively old population and one that will demand increased

health care in the foreseeable future. Traditionally, the University has done little to train students for health-related professions. The Ph.D. track in clinical psychology is well established, as are Master's programs in nursing and social work. Recently the university has added the Graduate School of Biomedical Sciences. The Task Force has had some discussion regarding the possibility of establishing a medical school at the University of Maine. Such a decision could not be taken lightly owing to the enormous long-term costs associated with such an effort. A medical school could not be established without a guaranteed, long-term commitment of specific new funds from the state. Nearly two decades of continuous, horizontal budget cuts have left the university on the edge of non-competitiveness.

Recommendations

- When considering which graduate programs to invest in, there should be a deliberate consideration of whether their plan fits particularly well with Maine's economic, geographical, social and cultural circumstances.
- Evaluate all investment in new and emerging programs relative to benchmark institutions. A two stage process should be used to evaluate the international status and then local relevance of these programs. All significant internal and state investment in individual programs should be evaluated by external reviewers who are specialists in the field of inquiry and who can evaluate the relevance of the investment to criteria based on the unique position of Maine in the culture and economy of the United States.
- Support graduate stipends and research in those New and Emerging Focus Areas identified by the Vice President for Research and the Focus Areas Subcommittee of the University Research Council.

Charge Issue 3

Development and maintenance of interdisciplinary programs

"Beyond looking around at each other, there is the question of working together. Interdisciplinarity is universally praised for sponsoring adventurous learning and just as universally underfunded. Its many forms are also woefully underassessed. Cherry-pie virtue turns to cherry-bomb warfare as the departments and interdepartmental programs battle over rights and faculty. How a university administers the interdisciplinary in relation to the disciplines remains one of the most fraught problems, economic and academic at once."
Woodrow Wilson Foundation Report on the Responsive PhD – 2005

"The interdisciplinary, then, is a special concern of New Paradigms. Most graduate students (six in ten) desire collaboration across disciplinary lines, while only 27 percent believe their programs prepare them for the possibility (Golde & Dore, 2001). And among 6,000 graduates interviewed ten years after earning the doctorate, "The number-one-ranked recommendation was to maintain an interdisciplinary focus, to go for breadth" (Nerad, 2000)."
Woodrow Wilson Foundation Report on the Responsive PhD – 2005

"*Interdisciplinary research can be one of the most productive and inspiring of human pursuits—one that provides a format for conversations and connections that lead to new knowledge. As a mode of discovery and education, it has delivered much already and promises more—a sustainable environment, healthier*

and more prosperous lives, new discoveries and technologies to inspire young minds, and a deeper understanding of our place in space and time."
Facilitating Interdisciplinary Research – The National Academies Press, 2004

Preface

In an era when interdisciplinarity is the key to progress in many fields, establishing innovative interdisciplinary and multidisciplinary graduate programs could significantly increase the visibility and uniqueness of the University's graduate offerings. Where no formal program exists, but the University has strength across several departments and colleges, the Graduate School can provide the infrastructure to coordinate and formalize rigorous core curricula where necessary, and then develop and disseminate these unique programs through national and international publicity and recruiting efforts. Interdisciplinary centers and programs, in collaboration with an improved graduate culture of cross-disciplinary study, can help to position our graduate students for a future in which problems and the skills needed to solve them often fall outside, or across, disciplinary boundaries.

Early in our investigation of interdisciplinary issues, it became clear that these issues extend beyond the boundaries of graduate studies to also encompass undergraduate education and research. Therefore, any set of recommendations on this topic must be general and positively affect all areas of the University, or they will not be endorsed as a strategic direction. Our deliberations were much informed by two recent (2004 and 2005) publications by The National Academy of Sciences and the Association of American Universities on Facilitating Interdisciplinary Research.

Facilitating Interdisciplinary Research Committee on Facilitating Interdisciplinary Research, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, 2004

Report of the Interdisciplinarity Task Force, Association of American Universities, 2005

The National Academy of Sciences document includes the following definition:

> *Interdisciplinary research (IDR) is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice.*

The need to facilitate the development of interdisciplinary programs at the University of Maine is clear. We have listed some of the more compelling reasons below:

- There is considerable faculty interest in developing, and working within, interdisciplinary structures and programs.
- The spaces between existing disciplines are where new knowledge is evolving. The University of Maine must possess the flexibility to respond to changes in society that call for the establishment of these new disciplines to pursue this knowledge.

- Many research funding agencies such as the NIH and NSF are now calling for interdisciplinary teams to work together on complex problems (e.g., the NSF IGERT program).
- Many important societal problems, like global warming and world hunger, can only begin to be addressed by scholars from a variety of disciplines working together.
- Students are particularly voicing strong interest in interdisciplinary studies, particularly as they see the relevance of these areas to society and potential jobs. As a recruiting tool, niche interdisciplinary groups can compete for the excellent graduate students.
- Students and faculty with interdisciplinary training and expertise are at an advantage when competing in the job market and for federal funding.

Climate for Interdisciplinary program development at the University of Maine

- A very positive development is the creation of the new program by the Vice President for Research to seed the development of interdisciplinary groups (new and emerging focus areas). We view this as a powerful mechanism to stimulate the formation of interdisciplinary groups, particularly in areas where external funding is available.
- Most of our administrative processes favor program development, teaching, and research activities that stay within department boundaries. Importantly, budgeting, space allocation, and tenure and promotion are all administered through individual departments. Although many faculty want to participate in interdisciplinary programs, there are no incentives for departments to encourage this. In fact, it is more difficult for departments and therefore faculty to get appropriate "credit" for activities (research, teaching, etc.) that occur between department lines.
- A fundamental barrier to interdisciplinary growth is the problem of administrative and technical infrastructure. Also, there are disincentives for deans to seek out intercollegiate alliances in terms of "lost" faculty time, competition with existing intercollegiate programs, and independence from collegiate autonomous control. Mechanisms must be developed that reward these activities if the university is to pursue this agenda, particularly at the dean and department level where the problems are similar. Secondly, there are faculty disincentives in terms of workload, which is typically additive with extracurricular involvement in interdisciplinary ventures. In addition, there are considerable personal costs to the individual in terms of political capital unless new sources of support come with the interdisciplinary effort.

New UMaine interdisciplinary initiatives

Many successful interdisciplinary groups exist at the University of Maine, interspersed across the various colleges and disciplines, reflecting national trends for investment in interdisciplinary research and scholarship. However, the Task Force believes that there are many as-yet untapped opportunities for increasing our interdisciplinarity in the context of graduate research and education. These un-tapped opportunities exist across the entire campus, and here we briefly discuss opportunities in the arts, humanities and social sciences because we believe that the development of interdisciplinary groups in these areas is probably the most effective way to increase their capacity to obtain external resources and in so doing contribute significantly to the University's graduate mission. The humanities, arts and social sciences at UM contain many broad interdisciplinary foci

with implications for several areas of strength already on campus. To capitalize on faculty expertise in these areas, there must be a thorough inventory conducted, and careful exploration of cross-discipline links and strengths in areas of relevance to Maine, the nation or the international community. This exploration can strategically position the University graduate mission by increasing funding and graduate education in the arts, humanities and social science, which have been poorly supported to date and are areas of strong growth across US research universities (see interdisciplinary reports by the National Academies and Association of American Universities cited above). With the proper effort, research and scholarship achievement and interest amongst these faculties and their students can lead to new and emergent interdisciplinary thrusts. Evaluation of our currents strengths and talents, as well as stimulation of ideas for faculty coalescence, should be explored more fully. Our administrative leadership in concert with our existing arts, humanities and social sciences departments, related disciplines and our policy centers (Chase-Smith and Cohen), will play an increasingly important role in the support and development of interdisciplinary faculty groups at UM.

Recommendations

The complexities surrounding interdisciplinary programming and planning are considerable, and have been the source of rather serious debate both nationally and on our campus. ***The Task Force's primary recommendation is that a committee be established with the specific charge of articulating an institutional plan regarding interdisciplinary research and education***, and that this committee include a wide range of faculty leaders and administrators (e.g., the Dean of the Graduate School) who are appointed to serve multi-year terms. ***The Task Force recommends that University of Maine faculty members who are at the cutting edge of interdisciplinary research, education and scholarship across a range of disciplines be asked to provide leadership in this committee.*** We also recommend that this committee be required to work in close consultation with the University Research Council, Graduate Board and Faculty Senate. ***This issue requires very careful thought and planning***. The core committee should be required to examine, in some depth, the lessons of other institutions that have successfully developed intelligent and sustainable plans for fostering interdisciplinarity. There should also be a clearly demonstrated knowledge of the examples and recommendation given in recent publication by the National Academies and Association of American Universities, among others. Finally, there should be a clear recognition that many departments are in fact multidisciplinary and interdisciplinary in their research and teaching, and therefore may already be contributing to this aim.

The committee should be charged with:

a) Developing specific recommendations to foster interdisciplinary program development. This may include recommendations about reallocation of existing funds, proposals to fund new initiatives and the creation/allocation of physical spaces where faculty from different disciplines/departments can interact. Examples of what has worked at the University of Maine and other institutions on the national landscape must be provided to insure best practices in interdisciplinarity, and a cogent model for accountability and sustainability presented before new programs are developed. As

demonstrated both at UM and other universities, transparency and adherence to an established process will improve our success.

b) Systematically reviewing institutional policies, procedures and practices in order to propose/oversee changes to allow for institutional progress in this area. Specifically the group should review the following: (a) tenure, promotion and budgeting policies; (b) faculty affiliation to the programs; (c) graduate assistantships allocations to the programs; (d) how "credit" is distributed between the program and the home department in which the faculty member holds, or is striving for, tenure; (e) current departmental and college structure; and (f) the history and structure of those inderdisciplinary programs at the University of Maine that have become very successful.

Charge Issue 4 – Balancing Quality and Quantity in Our Graduate Programs

"Universities should seek to build diverse student bodies in their graduate programs. Bringing together talented students from diverse backgrounds serves the interests of students by building a community of scholars judged for the quality of their ideas and preparing them to work in a global environment…"
Report of the Graduate Education Committee, Association of American Universities, 1998

Preface

Balancing quality and quantity in graduate programs is a matter of institutional priority and strategic vision. If the institution envisions itself competing in the areas or research, higher scholarship and professional program development, then appropriate resources must be directed towards these ends. If the resources are made available, then the total number of graduate students as a percent of total student enrollment can be in line with national peers, and quality control appropriate for a Carnegie Research/High university can be implemented.

Quantity

"In 2003, about 13.4 percent of New Englanders had graduate or professional degrees, while that percent in Maine was only about 8.5."
Eleventh report of the Maine Economic Growth Council, 2005

The University of Maine should set a graduate enrollment target of 3000 for the year 2010, which would be 25% of the projected total enrollment of 12,000. As discussed previously, the Task Force has conducted research to determine the percentage of graduate enrollment relative to total enrollment in the New England Land Grant institutions, and in several other research universities that have been used as a peer cohort by the University of Maine Research Council and Peterson's Academic Services Group (**Figures 7 and 8**). In order to achieve the average enrollments in this group, the University of Maine needs to increase both its Master's and Doctoral students by 350 each.

Current number of teaching assistantships
The University of Maine suffers from both a shortage and uneven (legacy-based) distribution of teaching assistants in relation to the size and function of its graduate and undergraduate programs. **Table 2** shows the distribution for the 05/06 academic year. Some extremely productive and nationally recognized research units have few or no institutionally funded teaching assistants. On the other hand, some departments that do relatively little nationally recognized research have a large number of institutionally funded teaching assistants to service introductory-level undergraduate courses. Owing to a major push to increase the number of undergraduate credit hours served over the past few years to increase revenue generated by tuition dollars, the existing assistantships are almost all consumed in entry-level courses. This typically leaves assistants with no upper-level teaching experience, and provides no assistants for professors in their core curriculum courses. This situation is extremely unfair for Doctoral students who need the upper-level teaching experience to be competitive in the academic job market, and it hinders research and scholarly productivity of professors who are left with increasingly limited time for these activities.

Current number of research assistantships
The University of Maine Graduate School oversees 2 programs for institutionally funded research assistantships: the Provost's Fellowship and the University Graduate Research Award. Both of these are small programs that provide one year of funding on a competitive basis for a total of approximately 10 students each per year. Whereas the Provost's Fellowship is more competitive at $15,000 per award, the University Graduate Research Award pays a non-competitive stipend of $11,000 per award. Institutionally funded (but better paying) fellowships and assistantships are essential for maintaining momentum in graduate programs, recruiting high quality graduate students, and maximizing completion rates for doctoral dissertations. However, at a maximum of 20 awards per year they do not even come close to meeting the needs on campus.

Quality

Quality of graduate students and programs is inextricably tied to: (a) quality of the faculty involved in graduate research and education, (b) competitiveness of the recruiting package offered to prospective graduate students, and (c) quality of the campus environment and resources available for the overall graduate effort.

Faculty
Faculty are the most valuable human capital in the university, and the success of the university in its primary imperatives – teaching and research – will be most directly related to the quality of these individuals. Improvement of faculty quality should be a constant goal of any competitive research university, and we have already discussed the importance of competitive salaries and startup packages in achieving this goal. Although the University of Maine is geographically isolated, offers well-below-average compensation relative to competitive peer institutions, and has no meaningful merit- or performance-related promotion opportunities, the University has some of the most productive and accomplished faculty in the US. This claim is supported by a variety of indicators tracked by The Center at the University of Florida, the National Science

Foundation, the Carnegie Foundation, the National Research Council and others. We are not sure why highly competitive faculty would stay at the University of Maine, and there are many examples of such faculty members moving on without serious institutional attempts at retention. We reiterate that our context demands that we monitor our competitive performance in relation to a set of carefully selected peer institutions, and that we also benchmark faculty compensation if we are to become more competitive.

Recruiting package

"Institutionally funded recruiting packages offered by the University of Maine are not competitive with our national peer institutions, and therefore do not allow us to compete for the best available graduate students."
The 2005 Report of the University of Maine Coalition on the Graduate Environment

"The universities and research institutions will ensure graduate stipends are competitive nationally to attract more graduate students beginning in fall 2008."
2005 Maine Science and Technology Action Plan

Research universities seek to employ high quality graduate students as teaching assistants and research assistants to: (1) educate the highly skilled workforce of tomorrow, (2) stay at the cutting edge of research, (3) remain competitive with other institutions, and (4) maximize the quality and efficiency of undergraduate education. Graduate assistants are employees and collaborators, not customers. By assisting faculty and conducting research for their own dissertations and theses, graduate assistants help attract millions of dollars in extramural funding to the University each year. They also play an important role in the generation of new knowledge and creative discoveries in fields where external funding is typically difficult to obtain. Under the supervision of experienced professors, they contribute significantly to the teaching mission of the university, and commonly receive some of the highest evaluations from undergraduates whom they teach. From a strategic viewpoint, high quality graduate assistants provide a relatively inexpensive and efficient way for the State to maximize the effectiveness of its efforts to education Maine residents and build strength in its economy.

However, the recruiting packages we offer are simply not competitive, and that strongly affects our ability to attract first-tier graduate students. There are important differences between first-tier and second-tier graduate students, and these differences manifest themselves in overall academic performance. At the same time, we lose the very best Maine residents to other states, partly because they receive better offers elsewhere. This brain drain at the advanced degree level is troubling.

"Key Goal #3
Strengthen graduate education as a vital component of the University's land-grant mission, fundamental to research and invigorating undergraduate education… Improve the University's ability to compete for the best graduate students nationally and internationally by providing competitive stipends, benefits and nationally recognized programs and researchers."
University of Maine Strategic Plan, 2000-2005

Current support package

Our current support package for institutionally funded graduate assistants includes a 9-month stipend of $11,000 and a 50% subsidy on student health insurance. While we applaud the recent increase from $9,010, this level of support is still low by both national and New England standards. **Figure 10** shows how our minimum stipend level of $11,000 compares to those in other New England Land Grant universities. These are only minimum stipends for incoming Master's students; some of these institutions have higher minima for Doctoral students. It is extremely difficult for us to compete with other New England universities for high quality graduate students. In addition to the low stipend, additional impediments to successful recruiting include: 1) we offer only partial (50%) rather than full funding of health insurance for graduate assistants; 2) the State does not extend subsidized child care to graduate students (although it does for undergraduate

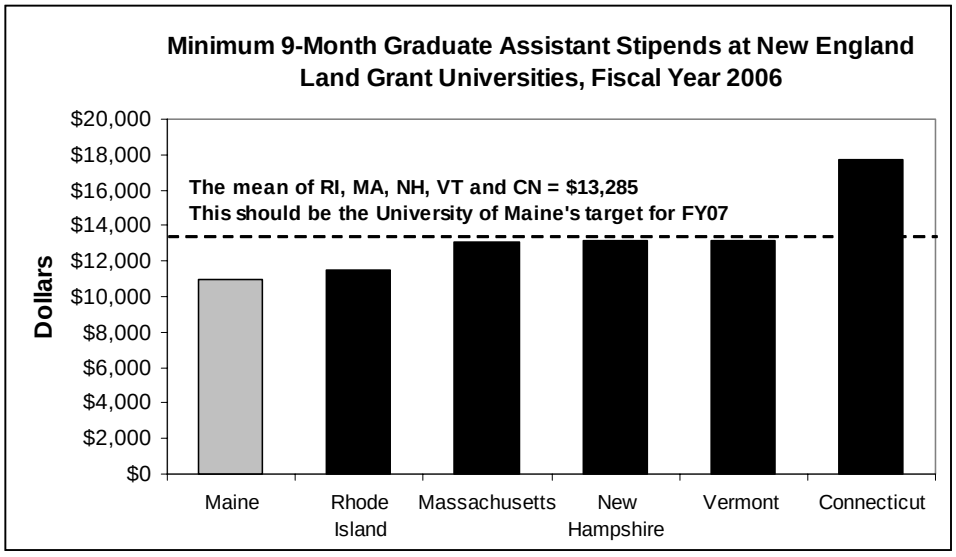


Figure 10. Minimum 9-month graduate assistant stipends at New England Land-Grant Universities, Fiscal Year 2006.

students); 3) our graduate student housing is unattractive; and 4) the cost of rental living in Orono is not significantly different than the cost of living in other New England Land Grant university towns. **Figure 11** shows cost of rental living ratios in New England Land Grant towns. According to these data, Orono is more expensive to live in than Burlington Vermont, and varies from the costs in the other states by less than 6%.

"To get the best students, we have to spend money. Good students want many things from their universities. They want good faculty, high quality facilities, engaging student activities and recreation, winning intercollegiate sports programs, high quality living space, extensive service oriented libraries and computer support, and most of all; they want to be with other good students. None of this comes cheap." Competing For Quality: The Public Flagship University. A Discussion Paper Presented by J.V. Lombardi to the Reilly Center for Media and Public Affairs, Louisiana State University, 2003.

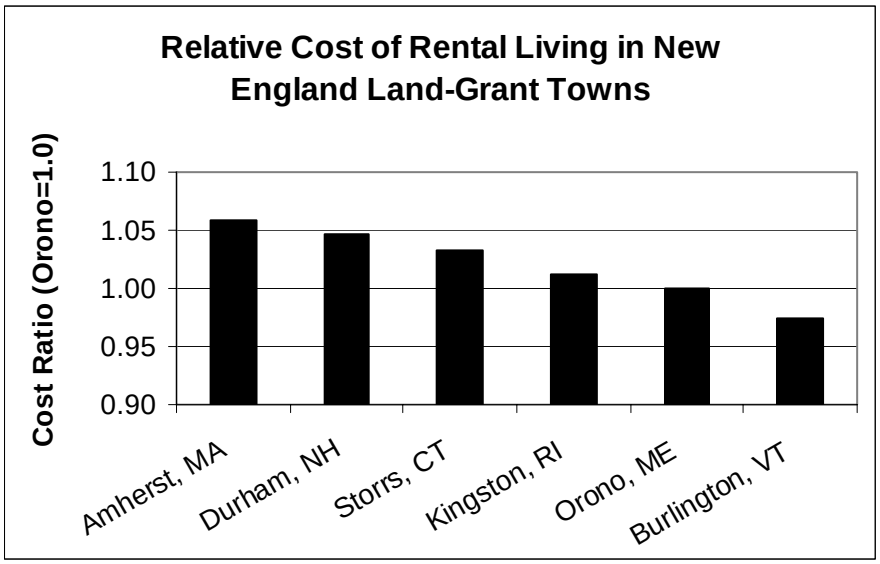


Figure 11. Relative cost of rental living in New England Land-Grant towns. Cost in Orono varies from others by less than 6%. Source: Salary Calculator:
http://www.homefair.com/homefair/readart.html?art=bc_research
The cost of living data is provided as part of the Center for Mobility Resources® service. The formulas are based for the most part on those adopted by the Bureau of Labor Statistics. The five major categories for U.S. data are housing costs (33%), utilities (8%), consumables (16%), transportation (10%), and other services (33%).

Campus resources

In an intensely competitive market for high quality graduate students, the University's facilities and infrastructure must be world class. We cannot be competitive if our facilities and infrastructure lag behind what is available in the larger marketplace. Providing rapid and complete access to the world's primary knowledge sources, and delivering enhanced capabilities in information technology to better prepare our graduate students and help in their progress toward the degree, should be a high priority. The Task Force understands that the President will dedicate approximately 20 million dollars of fundraising through state bonds and his comprehensive campaign to support Fogler Library. We applaud this effort.

Human diversity

Graduate students contribute very significantly to the human diversity at the University of Maine through bringing a range of life experiences and ideas to campus. For example, ***even though they account for only 20% of the total student population, graduate students enrolled in degree programs account for 55% of the total international student population.*** The University of Maine could significantly enhance its ethnic diversity by recruiting more international graduate students; providing better accommodation for these students may play an important role in successful recruiting efforts. Many of our graduate students are adults and some come from different cultures. They may want different living arrangements than most undergraduate students, including full kitchen facilities, an activity center and 12-month accommodation contracts. Currently, graduate student housing is so unattractive that only 29 graduate students live on campus (not considering married student housing). This is only 1.2% of the total graduate student

population as compared, for example, to 6% at the University of Connecticut and 7% at the University of New Hampshire. This dearth of acceptable university housing presents a fundamental impediment to creating an intellectual community for those graduate students who come to the University. The Task Force understands that plans are in progress to convert Stodder Hall to a combined Graduate School/Graduate Housing facility. We applaud this move.

As shown in **Table 1**, while graduate programs in the sciences are gender-balanced, engineering is 70% male. In contrast, total graduate enrollment in health, education, social sciences and the arts & humanities is between 60-80% female. Although educational strategies in K-12 combined with a broad cultural shift have done much to dispel the view that women are not appropriate for science pursuits, leading to the growth of women in these fields, similar change has not occurred in engineering despite the well-established parity in quantitative scores for women and men. Graduate education in engineering could benefit significantly by advocating for the training of female engineering students through incentivization to address this loss of available talent in the pool. There is evidence from the Netherlands and other European nations that targeting female students with strong quantitative scores in high school and financing their inclusion in engineering training has worked to increase the talent pool for graduate students in this area. The University of Maine could do much more in engineering graduate education generally and with regard to gender and through key hires, active recruitment of female graduate students, and incentivization of faculty and administration for reaching average national benchmarks that we fall below. Our efforts to address climate could be modeled after the Spatial Sciences and Engineering program which has had many successes in recent years in graduate education of female engineers and scientists. Similarly, targeting of talented minorities for graduate education in science and engineering has been prioritized by the Northeast Alliance for Graduate Education and the Professoriate (NEAGEP) program of the National Science Foundation. Our university participates in this program and is uniquely positioned to recruit Native American students in particular due to our geographic location.

In addition, childcare is an essential component of increasing gender diversity at the University of Maine by providing the opportunity to participate fully in university life for families with children. Statistics reveal that women are still the predominant caregivers in the United States and that the chief obstacle to improving the educational status of women is access to childcare in the workplace. This is not only an issue of fairness and equality of services offered to graduate and undergraduate students at the University, but a need for a commitment to make education possible to the best candidates in field, despite their parental status. In addition, those with families and homes in the state are more likely to stay in the state after completing their degrees, adding to the human capital of the state and improving the quality of education, research, and service fields.

Program review

Some universities advocate program review as a mechanism to evaluate quality. The Task Force agrees that program review is important, but we also believe that there are

constructive and destructive types of program review. The Task Force makes the following observations.

1. Healthy program review is used to help plan for the future and stimulate improvement. The causes, not the symptoms, of non-competitive performance must be determined based on both internal and external standards. Opportunities to remove barriers to success should be considered through institutional support that is contingency-based.. The manner of evaluation should incorporate best practices for the discipline/program, as well as addressing broader, common themes such as appropriate productivity, time to graduation, research and grant seeking efforts by students and faculty, etc.
2. Unhealthy program review involves the imposing of sanctions without: 1) giving programs a chance to improve, and 2) taking into account the reasons behind the program's current situation. As often as not, quality issues are related to faculty critical mass, access to resources, etc. However, review may reveal that the current dysfunction may be driven by historical decisions (e.g. inappropriately high or low resource allocation) that may no longer be functional or relevant to the program's viability.
3. Program evaluation should be discipline-specific and data from peer institutions should be used to make meaningful comparisons.
4. Faculty workload for faculty who are committed to graduate education must be reviewed as a fundamental contribution to the University's engine, and not as uncompensated overload activity. Specifically, undergraduate teaching loads should be balanced in a way that reflects a faculty member's involvement in research and graduate education. The most objective way to do this is to benchmark teaching loads, by department, to a set of peer institutions. The Task Force notes that departmental chairs have authority over teaching loads, and this authority should be used in a manner consistent with the goal of not penalizing those faculty members who chose to engage in graduate-level research and advising. Because chairs typically come from and return to the faculty, there must be pressure for these actions as the Dean-level.
5. Professional graduate programs undergo periodic external review by their accrediting bodies. Some of these reviews can be used as models for reviewing non-accredited programs. Further, reliance on adjunct faculty should be monitored and limited. Graduate programs should not be grown at the expense of quality. There are examples of this currently in our graduate curricula that should be examined more closely.

Recommendations

- New sources of money must be found, and existing university resource allocation models evaluated, in order to provide a revenue stream that is in line with the role played by graduate students at research universities.
- Establish and maintain a competitive financial package for recruiting and retaining high quality graduate students in today's market. The University of Maine should budget each year so that the total amount available divided by the total number of centrally-supported assistantships is equal to the average of the New England Land-grant universities. Provide higher minimum stipends for Doctoral students relative to

Master's students. As an example, competitive packages for fiscal year 2007 might include a minimum yearly stipend of $13,500 per year for Master's students and $16,000 per year for Doctoral students. This practice of differential stipends is widespread among research universities in recognition of the different roles played by Masters and Doctoral students in their missions, and the smaller, more competitive pool from which Doctoral students must be recruited. Stipend salaries must be incremented annually to maintain competitiveness through time. The package should also provide fully subsidized health services for graduate assistants, and affordable coverage for their spouses, domestic partners and dependents.

- The current policy in Maine's Department of Health and Human Services of not allowing subsidized childcare for graduate students at the University of Maine is discriminatory and should be reversed.
- Increase the total number of institutionally funded graduate teaching and research assistants across the campus. This would allow the University to reduce current undergraduate teaching loads of tenure-line faculty in many cases while simultaneously becoming a more competitive research university. ***At the very least, the Task Force recommends rapidly recovering the 47 centrally-funded TA positions that were lost to budget cuts over the past 15 years.***
- Establish a sustainable administrative policy for supporting graduate programs at a level consistent with our Carnegie status. Quality of graduate programs is essential for our State's premier doctoral/research institution.
- The University of Maine should periodically evaluate the quality of its graduate programs, and in particular its Doctoral programs, through external review. Marginal programs should be carefully evaluated, given the opportunity to improve, and failing improvement they should be considered for termination. The University simply can not afford the luxury of maintaining weak programs. Quality of graduate programs, particularly Doctoral programs, is essential for a doctoral/research institution. In addition, quality of professional programs is essential for a public flagship university in a state with only one major graduate institution.
- External reviews from accrediting bodies should be used to evaluate programs and assist in planning. This is already done for some programs as part of required external reviews, but it should be extended to all graduate programs.
- Continue with plans for providing a dedicated building or buildings for graduate student housing at the University of Maine. In particular, examine the impact this might have on attracting international students and increasing the cultural and ethnic diversity of the campus. New accommodations will provide a focus for graduate student life, and will enhance the University's recruiting power.
- Continue with the plan to raise needed funds for Fogler Library from State Bonds and the President's Comprehensive Campaign. In particular, we must regain access to the leading journals in digital form in the University's primary areas of scholarly expertise and interest as well as promote publication by professors in and support of high quality refereed open-access journals. Otherwise research competitiveness or we cannot continue to improve. Purchase and upgrade analytical equipment as needed. Gigabit ethernet should be available in all buildings within a reasonable time frame.

Charge Issue 5 – Funding Our Graduate Mission

Preface

How can we increase funding for our graduate mission? We have identified several possible sources of funding or resource reallocation for enhanced graduate student support. No doubt there are many more. The Task Force sees this as a problem primarily for our senior administrative leaders. However, we do offer the following recommendations.

Recommendations

- **Return a portion of indirect costs (F&A) to the Graduate School.** In the University's new research plan, a percentage of ***growth*** in indirect cost recovery over and above some base level will be used to, among other actions, increase the number of Doctoral research students on campus. We applaud this plan, encourage distribution of all indirect costs to be phased in over time, and encourage the continued development of a strong bond between the Graduate School and the Office of the Vice President for Research. We further ask senior leaders to consider budgeting progressively a portion of proposed baseline F&A funds directly to the Graduate School over the next 5 years to support graduate stipends, fellowships and other forms of support. For example, if only one million dollars were transferred each year to the Graduate School by 2010, we could transform the University of Maine and, through strategic allocation of support, go a significant distance to increasing our Doctoral and Master's enrollment by 350 students each. We could also go a long way to eliminating the State's standing as number 50 out of 52 in the number of graduate students in science and engineering, which is where most of this indirect cost recovery is generated. This proposal is in keeping with the recommendation in the 2005 Maine Science and Technology Action Plan.
- **Direct a fundraising campaign to University of Maine Graduate School alumni with funds ear-marked for improved graduate education.** Use the upcoming Comprehensive Campaign to establish both an Endowment and a rich culture of Annual Giving for the Graduate School by organizing a specific fundraising campaign around the theme of Graduate Research and Education at the University of Maine. Since graduate students typically move into careers in industry, higher education, or the professions upon completing their degrees, Graduate School alumni represent a promising and largely underutilized field for fundraising.
- **Streamline institutional management**. We recommend that the new administration continually evaluate the direction in which we are moving in terms of institutional management, and the tools we are using to get there. As far as we know, there has not been an open and transparent efficiency analysis of the institutional administration.
- **Increase number of grant-supported graduate assistants in programs able to attract external funding.** There are a number of departments on campus that support a majority of their graduate students from centrally-funded teaching assistantships or research assistantships. Some of the departments represent fields of study for which significant external funding is available (**Table 1**). The Task Force asks why it is that

these departments are not securing more external funds for support of their graduate assistants? As the University of Maine is a research university, graduate programs at the University in areas for which external funding is historically and presently available should be required to support a significant percentage of their graduate mission through grants and contracts. If workload barriers, particularly related to the undergraduate mission, have prevented faculty from focusing on grant seeking activity, this problem should be addressed through national peer benchmarking. The potential gain from increasing external funding is worth cultivating, and in many cases, teaching assistants can lighten faculty responsibilities to provide needed time for grant seeking.

- **Evaluate current distribution of graduate assistantships.** The Task Force recommends that the Graduate Dean oversee a serious analysis of how centrally-funded assistantships are distributed across the campus. The current distribution (**Table 2**) is entirely historical and may not represent the best interest of the institution. In many instances the number of Teaching Assistants in specific departments has not changed substantially for 30 years or more, even though teaching loads, faculty research productivity, availability of external funds and relevance to the core missions of the university may have changed dramatically in that time. The Task Force recommends that the Graduate Dean establish a committee to develop a rational approach for the distribution of centrally-funded assistantships, and the total number of assistantships required to achieve our goal of 700 new graduate students. ***The overarching goals of this committee should be to develop a strategy that maximizes every department's ability to fund their graduate programs from external sources without compromising the undergraduate teaching mission.*** We recognize that some departments traditionally have little access to external funds, but on the other hand we see a number of departments/disciplines that do have such access, yet the majority of their assistantships are centrally funded. This problem is complex, but needs to be tackled.

"Rensselaer also supported its graduate program far more from internal sources (primarily through teaching assistantships), than did the peer/aspirant group. Approximately 50 percent of the student support in engineering, 60 percent in science, and 70 percent in the humanities came from internal sources. For the peer/aspirant group these numbers varied from 20 percent to 50 percent, with the higher numbers generally corresponding to humanities programs."
Transformation of the Graduate Program of a Technological Research University. Journal for Higher Education Strategists, Volume 2, No. 1, pp. 3-20.

For the faculty to endorse an analysis of Teaching Assistantship distribution and recommendations for reallocation, the process must be fair and transparent (based on predetermined criteria). ***The only sensible way of conducting such an analysis is to compare our circumstances and policies, by department, with a carefully selected set of peer institutions. Therefore, we recommend that an appropriate set of peer institutions be selected for the University of Maine.*** In our explorations, we have been surprised to find that the University of Maine stands out as an institution that does not have a set of institutions that it benchmarks itself to in all aspects of what it does – academic and administrative. These selections should be made by our department of Institutional Studies in close collaboration with the faculty and senior administrative leaders on the basis of who we are competing with in our quest to improve in the national landscape of

research universities. The peer group should obviously come from the pool of public Carnegie Research/High and Research/Very High institutions. The number should be larger rather than smaller to average irregularities due to niche programs, which will vary from institution to institution.

An analysis of these peer institutions should inform decisions for TA distribution and other resource allocation. The use of TAs in units/colleges who service general education requirements for the university represent a more cost-effective alternative to using adjunct faculty for this purpose, particularly when faculty lines are so costly to replace. Graduate students can both practice the trade of teaching through participating in the service mission, while effectively bolstering research productivity and competitiveness in departments/consortia that want to increase participation in graduate education. This kind of support pays for itself through earned tuition dollars, grant and contract funding, patents and spin-off companies, and helps under-funded areas in the arts, humanities and social sciences to compete for the grant opportunities in their areas.

Departments can object to losses in TA reallocation, but should develop alternative peer institutions and metrics as a counterpoint. For example, is a department's teaching load particularly heavy in relation to its peers, does it have a particularly large number of majors relative to its peers, does it have particularly strong research performance relative to its peers, can a department show through peer analysis that the field does not traditionally have access to external funds, etc. In all of these analyses, the measures must be made in terms of faculty FTE. Total SCH served in peer departments without normalizing to faculty FTE is not sensitive to workload.

The allocation of assistantships to the various programs and activities of the campus must follow a serious, data-driven process that is open and accessible so that the conversation on the optimal allocation of resources will focus on issues of performance rather than historical precedence. Not everyone on campus will agree with such a process. The Task Force suggests that if decisions continue to be made on historical precedence and subjective internal measures, then there is little point in spending time engaged in strategic planning. ***We recommend that the Dean of the Graduate School work with programs to identify target percentages for internal and external funding.*** For example, it may be reasonable for programs in science and engineering to have as the target no more than 40% of graduate student funding come from the institution, whereas the percentage might be higher in the social sciences, arts and humanities.

Charge Issue 6 - Marketing our graduate mission

Preface

Two important roles played by all public state research universities are to: (1) serve the state's citizenry and government agencies, and (2) help individuals to achieve a better quality of life through the upward mobility afforded by education. The University of Maine is an active, visible, and collaborative member of Maine society. In the 21st century, the graduate degree, particularly in many professional careers, will be required

in order to gain well-paying employment. In some fields, such as education, business, public administration, social work and nursing, a graduate degree is becoming mandatory for employment or advancement. The many and varied roles played by our graduate programs in the State's economic and social development cannot be overstated. Yet, our past strategies for transmitting this vital message to the citizens of Maine, and to their legislative representatives, have clearly been ineffective. In strengthening graduate research, education and scholarship for the public good, we need to keep our graduate students at the center of all activities. The perspectives and contributions of graduate students are essential to public relations, and their energy and vision for the future transmit a powerful and welcome message to state legislators. In fact, they may well be the most effective advocates that we have.

The Task Force concludes that while the people and legislators of Maine have some appreciation of University-based research and development, they do not understand the unique role of the University of Maine and its graduate programs. They seem to believe that all of the campuses in the system are the same, and that all towns should have a university unit. Several of the Deans to whom our committee spoke saw the identity of the University of Maine as a major problem. We believe they are right and that the public does not see UMaine as the "flagship" campus. We do not understand why the public does not understand our graduate mission. We suspect that part of the problem is that the University of Maine has not emphasized its role in research and graduate studies until very recently. The fact that all of the campuses and the system have "University of Maine" in their name may have added to the confusion. The widespread habit of calling the University of Maine "UMO" makes us sound like a branch campus. Whatever the reasons, we are certain that the identity of the University of Maine is a major impediment to marketing our graduate mission.

It is time that the University of Maine let the community know the inherent benefits of the graduate mission that is largely unrecognized at the present time. The Task Force is pleased to say that we perceive a change in thinking in the University in this regard. Significant effort has recently been expended in developing a series of reports and brochures about the university's research and graduate missions, targeted to the state legislature and general public, to help them understand the great contributions that the University of Maine is making to the state. We must increase these efforts, highlighting people and achievements. ***Many citizens of Maine may not be educationally prepared to understand the details of what we do, but if they understand that their children will have a better life because of it, then we will make friends and supporters throughout the state.***

Recommendations

- Initiate a highly prestigious Maine Legislative Fellowship Program to fund outstanding graduate students across the various colleges to communicate with the Maine Legislature about the value to the State of graduate research and education. Yearly stipends and benefits for these awards should equal or exceed those of equally prestigious fellowships in our peer cohort. The fellowships could be split between 3 Doctoral students receiving 2 years of funding each, and two Master's students

receiving one year of funding each. These fellows would serve as ambassadors for the University of Maine, communicating the vitality of our programs and our vision of the future to our elected representatives and their constituents. The Maine Legislative Fellowship Program should be under the direction of the Graduate School Dean.

- Continue to publicize the accomplishments and contributions of graduate students using the various web environments, marketing tools and publishing media available at the University of Maine.
- Appoint a professional-level marketing/development officer for the Graduate School.

Charge Issue 7 - Attracting increasingly better graduate students

"The vitality and creativity of bright, young students working in a research lab can invigorate a research program and launch new lines of inquiry. The presence of a strong cadre of graduate students is often one of the most effective recruiting tools for attracting high-quality faculty."
Report of the Graduate Education Committee, Association of American Universities, 1998

Preface

Teaching and research are the two major imperatives of competitive public research universities like the University of Maine. However, beginning in the middle of the twentieth century and continuing into this one, research has increasingly defined the quality of major public institutions. Although everyone expects a public flagship university to provide excellent teaching, fine student programs and activities, and the other attributes of an effective student experience, research quality and productivity are what identify a campus as belonging among higher education's premier institutions. While the discussion is generally presented in terms of research, it is vital to recognize that ***research and advanced graduate education are two sides of the same coin***. It is virtually impossible to do advanced graduate education without research; nearly all the major research in research universities is coupled with strong graduate programs. This at once illustrates and demonstrates a crucial point: ***advanced graduate students participate in a significant part of the actual research in research universities***, in collaboration with their primary advisor and other members of their group. Faculty leaders guide, facilitate, collaborate, promote, evaluate, fund and synthesize the work of their graduate students, but the students devote extensive hours necessary to run the experiments, search the libraries, collect the data and analyze the results.

Graduate students therefore represent not only a commitment within our mission but also a key element in defining the competitive quality of the institution. For this reason, research universities compete fiercely for the best graduate students, knowing that in attracting quality human capital they are building institutional capacity for cutting-edge research and excellence in undergraduate teaching and mentoring. Excellent graduate students are well aware of this competition for their quality, and the strategies for attracting them are really very simple.

a) ***Excellent graduate students want to work with excellent faculty***. One of the most important improvements we can make to our graduate environment is to continually increase the quality of our faculty and provide them with real incentives for becoming engaged in graduate advising. Many UM faculty who are very active in graduate advising

talk in terms of being “penalized”, or talk about graduate advising as an “extracurricular” activity.

b) ***Excellent graduate students want to work in world-class programs*** that will give them a competitive edge when they enter the job market. This is related to point (a) above, but it goes beyond the individual faculty member. They want to be part of a group in which there is a critical mass of faculty and other graduate students. They find the richness of intellectual exchange in these groups to be exciting, and they find a sense of future security in knowing that this group has an international reputation for excellence and a track record of placing graduate students in their career of choice. Many of them are looking for world-class *interdisciplinary* programs, but many are not.

b) ***Excellent graduate students want competitive stipend and insurance packages.*** Absent competitive packages, excellent students will not come. They also want guarantees. Many competitive research universities have found ways to guarantee Doctoral students 5 years of funding through a mix of teaching/research assistantships, bridge funding, and fellowships.

c) ***Excellent graduate students want to feel like they are part of a great university.*** An important component of this is having a campus culture and environment that celebrates our graduate mission. Having the Graduate School hidden away in a basement is an excellent example of what *not* to do if we want to attract the best students.

d) ***Excellent graduate students want access to world-class resources like libraries, instrumentation and cyber infrastructure***. In the sciences and engineering, the loss of Science Direct had a noticeable negative impact on graduate student perception of the University of Maine. The campus should take a national leadership role in conjunction with other leading research universities in redirecting the efforts of its faculty to support and contribute to the open-access peer-reviewed scholarly literature. Although the V.P. for Research supplements adoptions of critical journals on an emergency basis for some disciplines, this is not a solution to this fiscal crisis. Paying exorbitant and continually rising electronic subscription prices to overseas monopolistic academic publishers from State of Maine resources also does not provide a long-term solution. By pursuing intelligent avenues that increase access to the very best of scholarship and bring the long-term cost of journals down we can make the campus a model for the nation. Further, instrumentation and laboratory access is not available in many of our best programs due to historically low seed and deprioritization of research needs in these departments. The impact on faculty motivation and morale is significant and greatly degrades our external grant-getting potential.

e) ***Excellent graduate students want strategic teaching experience, not repetitive years of intro-level laboratories and courses.*** This is particularly true for excellent Doctoral students; they will not enter a program in which they will need to TA for 3-5 years. The discerning ones seek diverse teaching in upper-level classes and developing their own course materials in preparation for an academic career.

Recommendations

- The University's Strategic Plan must clearly state that the University of Maine is ambitious and competitive in a manner consistent with its Carnegie Research/High status, and emphasize the crucial role of graduate research and education in all that it does. The University's graduate and undergraduate missions should be promoted with equal strength.
- Departmental promotion and tenure guidelines should place an appropriate emphasis on graduate research, scholarship and education consistent with our Carnegie Research/High status. Where departments do not have strong graduate programs of their own, the guidelines should encourage, where appropriate, participation in interdisciplinary graduate study. Departments should have clearly written criteria for appointment and reappointment to graduate faculty, and these criteria should seek to promote and maintain the quality of the department's graduate program.
- Faculty recruiting and retention packages should commit to nationally competitive salaries and startup packages.
- The University should implement policies that recognize and reward strong faculty performance and participation in graduate research, scholarship and education.
- Establish and maintain a competitive financial package for recruiting and retaining high quality graduate students in today's market. (see Recommendations under Charge Issue 4 above).
- Focus on quality, not quantity of programs. Quality graduate programs require a critical mass of faculty and graduate students who share ideas and generally enrich the intellectual environment. If programs are very small, in terms of either faculty and/or students, they cannot provide this rich intellectual environment. Hence graduate programs need periodic review. Those programs that are ineffective (due to many possible factors - e.g. adequacy of resources, size of faculty, size of student body) or those which are redundant with other existing programs should be considered for elimination or combination into more vigorous interdisciplinary programs. The latter is a solution that may effectively strengthen and redefine faltering graduate programmatic efforts.
- Establish a targeted Maine Doctoral Fellowship Program for Maine residents who want to pursue full-time enrollment in doctoral degree-granting programs at the University of Maine.
- As a final recommendation, we encourage the Dean of the Graduate School to consider implementing some of the "best practices" identified in the 2005 report of the Woodrow Wilson Foundation entitled *The Responsive PhD*. The best practices are many, and some can be implemented with few additional resources. Our graduate environment needs improvement in many programs in career training, real teaching experience, mentoring aimed at the students' career interests and other practices that round out our efforts to increase quality. We are also aware that to do these things ***the Graduate School needs a real budget.***

Charge Issue 8 - The appropriate size and function of our graduate school

"The first principle of Woodrow Wilson's initiative on the doctoral degree may appear at first bizarre or tautological. Every gripe, every conclusion from all the reports and our attempts to turn the reports into action prove one thing: ***the Ph.D. degree requires strong graduate schools and graduate deans with real budgets and real scope—a far stronger central administrative structure than typically exists at present."***

The Responsive PhD: Innovations in US Doctoral Education. The Woodrow Wilson National Fellowship Foundation, 2005.

"The graduate school ideally stands at the very center of a research university. It is where everything comes together. Graduate students imbibe the scholarly and research strategies employed by faculty while they also develop their abilities as mentors of undergraduates. Therefore the graduate school not only should be given means to govern its own programs…in authentic rather than very junior partnership with the programs and colleges; the graduate school should become the intellectual center of the university."

The Responsive PhD: Innovations in US Doctoral Education. The Woodrow Wilson National Fellowship Foundation, 2005.

"A dramatically strengthened role for the graduate school and deanship is thus the first assumption and ultimate conclusion of the Responsive Ph.D., for, without a well-designed instrument, any other recommendation will have no route to reality. And while it is clearly the case that a graduate school must find common ground with programs and colleges, it requires some of its own turf as well—a budget with a function."

The Responsive PhD: Innovations in US Doctoral Education. The Woodrow Wilson National Fellowship Foundation, 2005.

Preface

The 2005 Woodrow Wilson Foundation Report on the Responsive Ph.D. provides a very compelling case for giving graduate schools the budgetary means to implement best practices in relation to graduate research and education, and to provide academic leadership and guidance for their universities. Some of the best practices listed in the report are highly effective, and include a wide range of practices aimed at graduate student career preparation, helping students to navigate their dissertations, monitoring core curricula for interdisciplinary doctoral programs, ensuring quality in student mentoring, helping development the graduate community, rewarding faculty for excellence in graduate mentoring, promoting graduate exchange student programs, promoting links between graduate and undergraduate research, providing merit-based assistance to departments that show strong performance in graduate research and education, and a host of other ***practices that can make the difference between a great graduate institution and a not-so-great one.***

Due to their ability to foster academic and research collaboration across traditional college and departmental boundaries, to complement the resources of individual graduate programs in managing marketing, admissions, records and student services functions and to promote the graduate mission to internal and external constituencies, effective graduate schools are highly visible symbols of strength that have nurtured remarkable success in the great research universities of America. One need only visit the graduate schools of

many of our competitors to see the contrast with our situation. Here, we have a graduate school that is effectively hidden in a basement, inaccessible to people who cannot use stairs.

Graduate School Operating Budgets in Selected New England Land Grant Universities (FY06)

Institution	Maine	Vermont	Rhode Island	New Hampshire
Graduate Enrollment	2289	1303	2803	2407
Senior Staff	2	2	3	2
Professional Staff	1	1	3	3
Clerical Staff	4	5	3	5
Operating Budget	**$393,331**	**$800,000**	**$900,000**	**$966,875**

Table 4. Comparison of Graduate School personnel and operating budgets for the University of Maine, University of Vermont, University of New Hampshire and University of Rhode Island. These budgets include only personnel, printing, mailing, travel, office supplies and other basic operating expenses.

To give some perspective to the budgetary circumstances at the University of Maine Graduate School, **Table 4** provides operating budget comparisons with our three nearest neighbors and competitors. These three institutions are similar to the University of Maine in many respects, and all three are classified by the Carnegie Foundation as Research/High. Yet, their respective Graduate School operating budgets are all between two and three times greater than the operating budget for the University of Maine Graduate School.

While many offices serving students at the University of Maine theoretically serve both graduate and undergraduate students, graduate students and faculty consistently encounter an environment and procedures aimed primarily toward the needs of traditionally-aged undergraduate students. In an era in which technology plays a critical role in information and marketing, the Graduate School receives no direct support from the campus webmaster for its web pages, although several other institutional offices do. This lack of significant financial and symbolic support hinders UMaine's ability to compete for excellent graduate students at both the national and international level.

The most effective graduate schools typically exercise no control over faculty lines or departmental resources, yet they nurture faculty collaboration across departmental boundaries and work effectively in a flexible and adaptive manner. In effect, they can act as a "virtual" school that allows individual faculty to be members of multiple groupings simultaneously that can be made and broken, as circumstances require. But, most importantly, this effective structure and function leaves management responsibility and accountability at the department level. The success of this sort of model clearly demonstrates that control of faculty lines is not essential for institutional leadership. The control of financial resources confers power, but so does a clear and compelling vision and mission. ***In a practical sense, what really works for institutional change at research***

universities is the availability and control of sufficient financial resources to entice the existing institutional structures to move in an institutionally desirable direction. We do not require a massive new bureaucracy. However, if the Graduate School at the University of Maine is not given a budget that allows it to encourage, implement and reward best practices at the University, then all of the vision in the world will have little effect on the outcome.

"In all this, there is no substitute for money. Money makes success possible, money creates powerful incentives for colleges, departments, and programs to work harder, and money buys the chance to accelerate change. Everyone in a university is an expert on money. All university people watch where the money goes and then try to do whatever they observe attracts the money. Consequently, the alignment of expressed values (research competitiveness for example) with the distribution of money produces a powerful impact."
Lombardi, J.V., 2003. Competing for Quality: The Public Flagship Research University. The Reilly Center for Media & Public Affairs, Louisiana State University.

Recommendations:

- The Graduate School should have a budget large enough to allow it to implement and reward best practices in graduate research and education at the University of Maine. The Task Force strongly recommends that a Graduate School budget be created which allows the Dean of Graduate Studies some discretionary control over funding to reward high performance and best practices in the graduate arena. The budget should be competitive with those for graduate schools at the most closely matched New England Land Grant universities: Rhode Island, New Hampshire and Vermont. This recommendation is in line with the conclusions of the Woodrow Wilson Foundation Report on the Responsive Ph.D. The Graduate School should not be given control over faculty lines or departmental resources.
- The Graduate School should have the required financial resources to increase scholarships, awards and centrally-funded assistantships in order to meet the increased enrollment goals set out in this report. The Dean of the Graduate School, in consultation with the Graduate Board, should draw up a plan, with budget, that will provide a path to this enrollment increase. The Dean should use these resources in a way that best balances the teaching and research functions of graduate assistants. Incentives should be delivered to units who demonstrate measurable improvement in quality and performance that is competitive with national peers.
- The Graduate School should be moved to an accessible building that better reflects its vital function in the mission of the University of Maine. As with the University of Maine Honors College, the option of having the Graduate School located in a building dedicated to graduate student housing should be explored. Apparently, there is a plan to move the Graduate School to Stodder Hall. We applaud this plan and recommend that it be followed through as soon as possible.
- The University should upgrade its marketing efforts to include the graduate programs as equally important to undergraduate programs in all that it does. Track our graduate students after they leave, highlighting those who stay in the State and make important contributions to the enterprises and citizens of Maine. The Graduate School should maintain an exciting and forward-looking website that attracts the attention of high

quality graduate students (and faculty). A Web/Development Officer should be employed by the Graduate School to manage these efforts. Having to rely on undergraduate work-study students for such functions is a clear sign of lack of commitment to the graduate mission.

APPENDIX A

Survey: Improving Graduate Research, Education and Scholarship at the University of Maine

The 2005 University of Maine Coalition on the Graduate Environment
01/15/2005

The Question:
In order to improve the graduate environment, graduate education, and graduate research/scholarly activities on campus what are your 2 best ideas that could be implemented with new resources and your 2 best ideas without new resources?

Survey Respondents

Aria Amirbahman – Civil and Environmental Engineering
Carolyn Ball – Public Administration
Dan Belknap – Earth Sciences
Emmanuel Boss – Marine Sciences
Richard Borgman – Business
David Bradley - Mathematics
Susan Brawley –Marine Sciences
Dorothy Breen – Education
Bill DeSisto – Chemical Engineering
Liz DePoy – Interdisciplinary Disability Studies and Social Work
Dusty Dowse – Biological Sciences
Sue Estler – Education
Ben Friedlander – English
Todd Gabe – Resource Economics and Policy
Marie Hayes - Psychology
Keith Hutchinson - Biochemistry, Microbiology, and Molecular Biology
George Jacobson – Biological Sciences
Scott Johnson – Earth Sciences
Nory Jones – Business
Richard Judd - History
Peter Koons – Earth Sciences
Jim McClymer – Physics and Astronomy
Susan McKay – Physics and Astronomy
Stom Ohno – Plant, Soil and Environmental Sciences
Eric Peterson – Communication and Journalism
Michael Peterson – Mechanical Engineering
Paul Rawson – Marine Sciences
Alan Rosenwasser – Psychology
Doug Ruthven – Chemical Engineering
Dan Sandweiss - Anthropology
Ann Schonberger – Mathematics and Women's Studies Program
Phillip Silver - Music
Roy Turner – Computer Science
Judy Perkins Walker – Communication Sciences and Disorders

Charles Wallace – Animal and Veterinary Science
Alan White – Forestry
Carol Wood - Nursing

Note: All survey responses are included in this document with only minor editing where appropriate. All reference to specific departments has been modified so as not to name departments. Multiple responses with the same idea are included multiple times, indicating the relative number of advocates for the idea. Some ideas were obtained verbally from the respondents. Some respondents replied on behalf of their department.

1. **Increase Support for Graduate Stipends and Benefits to a Competitive Level**
   a. Increase TA and RA stipends. The numbers are now reflective of late 70s thinking. NSF and NIH RA numbers are three times what we offer. We have students with RAs on grants working next to students with TAs or University RAs and it is VERY BAD for morale.
   b. Substantially increase the number of University Graduate Research Assistantships and Teaching Assistantships available, and distribute them equitably across campus, in proportion to the number of PhD students in each program; and bring Teaching Assistantship salaries up to nationally competitive standards.
   c. Tie grad stipend increases to at least faculty salary increases, if not more.
   d. Increase stipends and travel money. NIH standard stipend is now approx $22K. NSF is even higher. We are not going to be able to attract the best students into the sciences without reaching that level somehow. It should be a standard number every time a faculty member includes a stipend on a grant.
   e. Increase pay for assistantships. Reallocate resources if necessary.
   f. Raise graduate TA stipends. This is important if we are to remain competitive in recruiting top students. We have one of the top MA-only programs in the country in our Department, but we are finding it harder to compete for the best students because they receive much better TA offers from other schools.
   g. Increase teaching assistant stipends to nationally competitive levels.
   h. Expand and increase the stipends for University Graduate Research Assistantships and Provost fellowship.
   i. Increase stipends.
   j. Increase number of graduate assistantships.
   k. If there is no new money, use money from grant IDC to increase stipends, and/or reorganize administration and use savings to increase stipends.
   l. Raise stipends (morale is very low because of the low stipends) for TAs.
   m. Raise stipends for graduate assistantships...we're simply not competitive.
   n. Improve stipends (i.e., equivalent to national average) and benefits packages for grad students (e.g., health care for 1/4 time, dental and child care facilities).
   o. Pay most all health benefits, even for families.
   p. Increase number of positions for TAs.
   q. Support more first year students through assistantship to help raise the population.
   r. Increase the number of TAships and RAships available through central funding. Increase the cash value of these assistantships.

s. We are limited in our ability to attract as many students as our faculty could accommodate because of money, which we would use to: a) increase stipends so as to be competitive with other schools and b) increase the number of stipends.
t. More money for grad assistantships is probably on everyone's list.
u. If we were to have more resources, I would like to see them first used to give graduate students more support in the form of grants, traineeships, scholarships, assistantships, etc.
v. More funding for graduate assistants to facilitate research in all colleges.
w. Increase TAships, Stipends and benefits. We need to increase the level of graduate stipends and the number of institutional TAs and RAs. Up till now, I have recruited mostly MS and not PhD students because I cannot give prospective students any assurance of funding beyond the typical 2 to 3 years of funding available from my research grants. UMaine currently has few institutional RA/TA opportunities to help with BOTH recruiting and rewarding/retaining high quality students. And the typical salary level for graduate assistants at UMaine is abysmal.
x. One thing is to increase stipends, but some programs have no support at all for Grad Students. There are a lot of programs on this campus that have little grant research and get very little or no TA support. Thus my recommendation is more grad student support--more graduate assistantships that are not grant dependent for such programs, more scholarships that can be used to attract very good students. The Provost Fellowships are a good model for this. Why not a fundraising campaign for scholarships and assistantships? People like to give for such things.
y. More TAs, with TAs assigned to researchers rather than to classes in order to offload teaching administration from the researcher.
z. Increase the TA stipend to $14,000.
aa. Increase the number of centrally funded RAs
bb. Increase the stipends of centrally funded RAs

2. Workload and Faculty Incentives

a. Reduce teaching loads. Though we aspire to a status equivalent with large research universities, we assign faculty teaching loads consistent with regional comprehensives. Research takes time and good teaching takes time. The higher the teaching load the more it impinges on the ability to focus on research. Our loads are 3 and 3 and sometimes more. Serious public research institutions typically max at 2 and 2 or 2 and 1. Systematically reducing teaching loads would require a corresponding increase in the number of faculty or teaching assistants to take up the slack.
b. If a chunk of grant overhead were returned directly to the Principal Investigator each year, or if the University of Maine pooled some of the IDC money and gave, say, $5,000 per year, per PhD student, to the primary advisor to “grease the wheels”, active researchers could maintain active PhD programs.
c. Give departments and faculty incentives to save or even generate new income in certain areas by returning these savings/income to use in priority areas. Right now, every time I've seen savings implemented at the department level, the savings just disappear into the central administration’s budget, so there is little incentive to generate additional savings/income. With appropriate incentives, we could unleash

the vast creative power of the many individual faculty on this campus. This power is currently untapped as far as budgetary issues go, with most decisions being centrally made by a few, with token faculty input.

d. Provide access to research assistantships for faculty. The faculty research fund does not fund research assistants who can be immensely helpful in moving a research project along especially in the areas outside the sciences that have less access to external funding.

e. Review the incentives for graduate level teaching and advising. In places where numbers become the criteria in evaluations and other decision making e.g. class sizes, advising loads, and budgeting the incentive is to favor undergraduate priorities.

f. Reduce teaching load across campus for active researchers -- with reduction as an incentive.

g. Make a major push to ensure that research proposal submitted include support for RA's. Sometimes the choice appears to be one of summer salary for the faculty member vs. support for an RA. Obviously, we need to provide some other career advantages to those who do a great job of supporting grad students over the years. Along those lines, we could have a policy of returning a modest amount of indirect to a PI who is successful specifically in raising external funding for an RA.

h. The best way to improve is to offer more to the people we want to attract--if it can't be money, let them eat status.

i. Provide release time and resource support for faculty who are productive grant proposal writers.

j. Implement a realistic faculty workload formula that rewards those who work hard to support graduate students. Any cost to the university should be offset by a rational adjustment to the base funding of the university. In the absence of a rational plan, extra costs could be offset by increasing tuition, increasing class size, or other creative solutions.

3. Academic Resources, Technology and Infrastructure

a. Improve campus infrastructure to provide better resources for students (e.g., improving library resources, interdisciplinary doc programs, greater allotment of money for travel funds to conferences).

b. Improve library resources for research. The cutbacks have been particularly hard on journals in social sciences and arts & humanities.

c. We should provide more training for faculty in mentoring graduate students. Some of this is being done, but the student-advisor connection is one of the most crucial pieces of successful graduate education.

d. Increased support for the library. It cannot be said often enough that the library is one of the biggest roadblocks for increasing the quality of graduate education and research.

e. Increase funding of library through re-allocation of indirect costs. I've changed my view on this and feel that there should be no return-on-indirect to the department and probably dean level. It becomes too small a pile of cash to do much with. Better to pool and use for more costly items, for example to improve library resources, particularly access to journals.

f. Provide better physical office/computer space for graduate students.

g. Add faculty lines in stepped increments over five years, with the aim of establishing new Ph.D. programs in the humanities and social sciences.
h. Improved technologies in terms of distance education, collaborative technologies (like the Access grid) to nurture and facilitate communication and collaboration in the classroom and in research activities.
i. Digitizing Fogler materials and making them accessible on-line.
j. Library situation as discuss in the Senate is another big issue, which also requires investment.
k. Re-start access to ScienceDirect
l. We really need to invest in the library - it forms the cornerstone of a strong graduate program in any discipline. At present, my students and post-docs continue to use accounts at other institutions or pester their friends at other institutions for many of the articles they need. While I recognize that we can get articles from other institutions, working through interlibrary loan is not an efficient use of time, particularly for class projects. It is not just an issue of efficiency, however. Declining library resources hurt our image and ability to recruit new graduate students.
m. Readily available conference rooms that are Internet-enabled, AccessGrid-capable, or otherwise configured for collaboration with distant colleagues.
n. Gigabit ethernet in all buildings within a reasonable time frame.
o. Improve our promotion and tenure process to support and retain people who are strong and productive. The second recommendation flows from the first, and that is to restructure the support and processes for seeking and managing extramural resources for grad education and scholarship. Of course, we need a strong faculty cohort to engage in fund raising, and improving the promotion and tenure process would be critical for that to happen.

4. Creative and Social Graduate Environment

a. Create a space on campus where interesting things happen for graduate students (e.g., a foreign film festival with films each week that the graduate students select)---these could be open to the public as a revenue stream, but grad students should be able to have a major part of the event.
b. Greater attention to increasing diversity and to improving the campus climate with regards to diversity, especially for women, students of color, lesbian, gay, bisexual and transgender students.
c. Create a Humanities Center to promote research and conversation across the disciplines; the center would invite speakers, host conferences, promote research, and provide support for specific projects in the form of grants, release time and office space.
d. Have a seminar series sponsored by the graduate students to bring prominent scholars/educators to campus.
e. Establish residential housing in a building set aside exclusively for graduate students, and provide graduate students with a student center/lounge in a central location (Memorial Union?).
f. Interdisciplinary seminar series with presentations by graduate students and/or presentations about issues related to graduate research.

g. Graduate students need a physical place to meet and work together. Our department has no such space. That presents a problem, especially for our commuting students, people who work in schools and travel here to attend class or meet with faculty. They need a lounge type space, and worktables to meet in small groups.
h. Perhaps a grad school sponsored symposium that would change in topic each year.
i. Campus-wide effort to draw students into research forums (e.g. interdisciplinary colloquia series).
j. Improved communication and collaboration among faculty and grad students for more interdisciplinary endeavors including research.
k. One problem that our program suffers from greatly is the lack of a seminar series, where we could invite folks from other institutions to present their research. This way, the students also get to network with faculty from other universities. Perhaps a solution would be to have the administration (Grad School in particular) allocate funds to the programs that offer a PhD degree to start seminar series.
l. I enjoy the graduate exposition in the spring - perhaps a continuing graduate "research cafe" or other forum could further highlight the achievements of some of our most talented grads.
m. My students did reflect that a grad dorm put up by UMaine would be too expensive for grad students to want to live there.
n. Provide temporary housing for prospective graduate students and for new students while they are searching for places to live in August.
o. We need to provide a better, more attractive living situation for our grad students. Estabrooke, although a glorious old building that if renovated would be lovely, is not lovely to live in now. Why can't the university dedicate perhaps a hall of a nice building, or better yet some suites, to Grad students? (In the long term we do need to spend money and develop a nice graduate dedicated facility.)
p. Improve on-campus housing options for graduate students.

5. Visibility, Profile, Recognition, Synergy and Marketing

a. Establish new, high-visibility interdepartmental programs along the lines of the genomics initiative. I am voting with my feet. I have been working in the trenches on an undergraduate neuroscience program that will start with a minor this year, moving to a major in two, and then, hopefully, to a graduate program. This is just one example. We are looking for extramural funding, positions, and a high profile.
b. A high priority UM and UMS goal should be to retain Carnegie Extensive Doctoral ranking. Productive PhD programs should get priority in hiring for new and replacement positions. I think a rather big effect occurs when critical size is reached and maintained. This investment should provide more funds for grad student support as well as increased grant productivity.
c. Start a Legislative Fellow program that provides $30,000 fellowships to 5 talented graduate students each year. The program would favor Doctoral students over Masters students. They earn their pay by spending 20 hours per week visiting Legislators in Augusta or in their own districts, or touring them around the campus. Student contact with Legislators is an effective mechanism for enhancing their awareness and commitment to graduate education.

d. Hold an annual competition with named cash prizes for best Masters and Doctoral theses in the major areas. Give the prizes prestigious names--e.g. The Robert Kennedy Outstanding Dissertation Prize in Natural Sciences. The selection process would both encourage submission and identify candidates for regional and national awards that apparently exist.
e. Give more prestigious titles to existing RAs and TAs, both centrally and unit funded--e.g. The Bryand Teaching Fellowship in Earth Sciences.
f. Try to recognize the importance of the graduate students by the University awarding prizes for outstanding teaching and research; much like we do in the College of Engineering except we only have one award.
g. Increase visibility of UMaine compared to USM with state government to obtain grants. Send reps to talk to agencies, particularly their Research Divisions, about UMaine's abilities to enter into cooperative agreements. USM has an office in Augusta. UMaine does not.
h. Publicize accomplishments of grad students more on the UMaine website etc.
i. An annual publication highlighting graduate student research, writing, etc.
j. Recognize graduate students for their scholarly work. Appoint them (grad students) to key boards/committees.
k. Research or performance rewards, even on a monthly basis.
l. If the Grad School were to be elevated to a higher visibility (both physically and figuratively), that would be helpful.
m. Showcase our alumni from the graduate programs to boost moral, and involve them in helping raise funds for exisiting and future graduate students in the same specific programs they graduated from.
n. Get a good home for the Grad School. While the Grad School can function out of a basement, it does very little to present the image we want to present to potential students and faculty. Let's put the offices of the Grad School in an attractive location that will actually aid in attracting students, including students with handicaps that now cannot even go to our Grad School offices.
o. Establish formal ties with national and international labs for graduate internships for graduate students -- this will establish national ties for student, help with his/her training.
p. Increase grant productivity: A truly great university has a large % of active, successful researchers. UM should work to increase this by starting a mentoring program: A successful proposal writer teams up with a less successful or new proposal writer. Each is to be awarded $500 when a proposal is submitted within the year (or next available cycle).The idea is that by tying a small amount of money to the program it will keep the very busy mentor involved more than good intentions alone. I suggest a pilot program of 10 to 20 mentors (max cost $20 K, not all would complete program, the extra indirect should easily fund the program).
q. Look for success stories with ex-grad students who have become integrated into Maine’s economic system and then follow that up with a mechanism for communicating that to folks outside the university.
r. Track graduate students once they have left the university, collate the data, and make it available for study (as well as for fundraising efforts).

s. Improved communication and collaboration with outside stakeholders such as Maine businesses, the state legislature and governor's office, no-profits, etc. to work synergistically on research projects that will help the state and other outside stakeholders while simultaneously contributing to faculty research and the university mission.
t. Bring to campus more research branches of federal agencies (NOAA, FDA, USGS etc') that will help fund students and increase the critical mass of researchers. It is a shame that the NOAA lab is off campus at the industrial complex...
u. We need more funds and a strategy to help market the Grad School, and also individual programs (e.g., funding so programs can update or develop new brochures, marketing CDs, websites, and so on). Partially we are marketing to the state of course, and that can be helpful if our image improves.
v. Have a person in each college that is specifically charged with graduate recruitment. That person would be able to assist departments to better "sell" their graduate programs. This might only need to be a graduate assistant (PhD level) position. But more distributive work at the college level to help to recruit graduate students.

6. Bridging, Opportunity and Student Research Funds

a. Have funds set aside, at the discretion of the graduate director, to send people for travel to DC (or other places) to discuss their proposals with project/program officers. In our college, the dean already does this to a limited extent, but I feel this would help other colleges, a broader approach.
b. Travel money would include both travel for students and some support for bringing in guest speakers.
c. University support for prospective grad student visits.
d. Provide funding during the final year of a student's program to attend and make a scholarly presentation or performance at an appropriate conference or meeting.
e. Encourage increase in external funding for students, either through training grants or as line on research grants. I haven't thought of much in the way of "carrots" to do this, without cost. Perhaps at least some recognition in the calculations of teaching and research loads. One "stick" could be to limit length of support on teaching assistantships or UM research assistantships, thus forcing faculty who want graduate students to be more pro-active in finding outside support.
f. Increase the funding levels for travel to research and to conferences, and distribute this equitably across the University's graduate programs.
g. Set aside a percentage of indirect from external funding to provide a pool of bridging money for PhD students. This money should go preferentially to individuals and programs that contribute to the pool.
h. Support graduate student for travel to meetings and to give papers at meetings.
i. Provide bridging funds for students transitioning out of high profile programs like GK-12 and IGERTs.
j. More money for grad students to go to conferences. There is some now, but it is scarce.
k. Additional resources put is into a plan for graduate education and research along the lines of the current MAPI plan. The state provides some support in the form of

MEIF funds, but the MAPI program seems much more broadly supportive of our university in previously unsupported sectors outside science and engineering.

l. Increase funding to assist in scholarly activities of students from more travel funds to conferences to research funds.

m. More frequent meetings to dispense money available for grad student conf. travel. Right now there are only 2 dates I think and sometimes grad students get papers accepted and the deadline for applying for money has passed.

n. Greater assistance in creating collaboration on grants to create an environment competitive with USM.

o. Make funds available for traveling to Washington to meet with program managers and prospective program managers.

7. Curricular Issues

a. There is a genuine dearth of graduate courses, at least in the areas I am familiar with. I think this is a result of a simple conundrum. Faculty get far less credit for teaching a small grad course with 7 students than they do for a large undergraduate course. Despite "area requirements", it is far too easy under the current system for a grad student to end up with piles of credits for "problems" and "directed reading" courses rather than grunt and groan formal graduate lecture courses. Parenthetically, there are few, if any laboratory courses at the grad level. I suggest a restructuring of the requirements such that formal courses be required in full measure.

b. All graduate students who will do a thesis, either a master's thesis or doctorate, need to be advised to take appropriate research methods courses in order to be sufficiently prepared to conduct a research project and write their theses. Currently, our master's thesis students sometimes don't take any research methods courses.

c. Funding for interdisciplinary research methods course for IPhDs.

d. University wide “seminar” where selected students will give a presentation on their work.

e. Provide tuition credit money for grad students to take courses outside their departments if their department requirements take up all the tuition credits they get with their assistantships. We have trouble with this in our graduate concentration. There are people who want to take the concentration, but their programs are so structured that they can't afford the extra tuition, even though they are willing to spend the extra time to enhance their credentials.

f. Create Ph.D. level course numbering 700-level. USM has this and we do not.

g. Create and provide support for a core set of research courses for grad students so that they will be prepared to collaborate with faculty and/or conduct their own funded scholarship.

8. Administrative Leadership and Cultural Shift

a. The President should make clear to the University community that graduate education, especially at the Doctoral level, is the primary dedicated function of this campus within the UM System, and announce a specific plan for strengthening these activities.

b. Educate University administrators and support services to be equally mindful of the graduate mission and graduate students in all they do. If successful, on line and

printed materials would speak as loudly to grad students as undergraduates, student services and activities would engage and address needs of graduate students as clearly as undergraduates; student records communications would not assume all students are undergraduates and classes are all lectures (grad classes more likely to be small seminars--every semester we have to scramble to find more appropriate spaces than those assigned.)

c. Prohibit the university from setting up any new unit that offers grad degrees or continuing to have such a unit if the University (Graduate School) doesn't offer that unit credible numbers of TAs to support graduate training/education. It is patently unfair to some of our best graduate students to have areas of the university in which only 1-2 TAs exist. This puts these students at a marked disadvantage in the job market when they leave UMaine and are competing with peers from other institutions who have done university TAs.

d. Annually audit print and online publications for the degree to which they fully include the graduate mission on a par with the undergraduate (perhaps Marketing staff with AGB reps).

e. It's important to emphasize the need to foster an environment where we can recruit and retain PhD students. Many departments offer only MS degrees, or they have a token number of PhD students. Our department with 11 faculty has graduated only 2 PhD's in the last 8 years, even though we have graduated many MS students. As a result, much of the work coming out of our department is not published in the top journals. We can become a strong research university only when we have a critical mass of PhD students.

f. PhD offering programs should be given extra advantage by the administration when it comes to hiring new faculty. New faculty hires should not be solely based on the departmental teaching load or undergraduate enrollment. Lack of faculty active in research is what really hurts our department now. Among other things, this limits the number of advanced courses in a given field.

g. Electronic "green sheet" -- or even a local FastLane-like system for grant preparation and administration.

h. More support from ORSP for post-award grant management. Make access to post-award budgets easy (e.g., Web-based) and comprehensible (i.e., not accountant-ese).

i. Establish a competitive process for assigning RAs that treats all units fairly (doesn't eliminate those where it is impossible to raise RAships via grants but also permits units with grant-funded RAs to get bridge RAs when critically needed).

j. We should continue to look at the effectiveness of services that we provide to graduate students and see how we can make those services more supportive and user friendly: health care, housing, childcare, etc.

k. The Graduate School should work closely with the undergraduate component of the university to minimize any potential duplication of efforts.

l. Implement a policy of more equitable distribution of Awards, Grants, and Assistantships, based on the number of graduate students in each program.

m. Rationalize the fee structure. The distinction between fees for thesis credits and course credits seems artificial. It might be better to agree on a fee for the entire program (M.S. or PhD). This would be pro-rated for the normal duration of the

program and charged at the prorated rate each term with a modest continuation fee for time beyond the agreed norm.

n. Review thesis format requirements. These seem unnecessarily restrictive. For example, in some theses that deal with several distinct (but related) topics it makes more sense to compile the references at the end of each chapter rather than in one block at the end of the thesis, but this option seems not to be allowed.

o. Respond quickly to faculty inquiries to ensure smooth processing of department-related requests and paperwork.

p. Consider requiring an external examiner (external to the University) for PhD theses. This provides a useful quality control and is especially useful for smaller PhD programs where no one other than the supervisor may have the necessary depth of expertise to review the thesis in a meaningful way.

q. Have greater accountability at all levels of graduate education. That would result in more acknowledgement when things are done well, and a greater chance for improvement when things are not done as well as they should be.

r. Look into streamlining paperwork and administrative procedures in the Graduate School. Try to reduce paperwork for graduate students, and reevaluate whether the program of study governs what should really be the purview of the student's committee.

s. I would like to see some of our current strong leadership simply stay in place. Specifically, I would like to see the Dean of the Graduate School remain in her current position, and the two positions of interim president and provost remain with those who serve in those capacities at the present time. We have had a lot of administrative turnover, and I believe the University's mission would be best served by encouraging the three administrators mentioned above to be candidates for the positions in which they currently serve so well.

APPENDIX B

Quotations from American Research Universities Regarding Graduate Research and Education

"We must have a shift in our thinking about the role of graduate education to attain the level of excellence we desire. A substantially expanded graduate studies effort is critical to our academic aspiration and to our effectiveness as a great research university. Outstanding professors attract superior graduate students and, in many instances, the money to help support their research. But these professors by themselves will not be enough. We must create a dynamic, exciting, discovery-driven intellectual environment that will draw superior graduate students, comparable to those in the nation's best graduate programs."
Texas A&M University, Vision 2020

"SUBGOAL 5: Recruit a diverse high quality graduate student body and provide a supportive environment.
The Graduate School has greatly increased the emphasis on recruitment of doctoral students with the goal to increase graduate enrollment by 100 students per year through 2008. Aggressive recruitment initiatives have begun to better market WSU graduate programs, with more collaboration among graduate programs in an integrated marketing campaign. New scholarship programs continue to be developed, with increased Graduate Scholars awards, increased Achievement Awards for College Scientists (ARCS), and the newly established Masters to Doctoral transition awards to promote increased doctoral enrollment."
Strategic Plan Implementation, 2003-2004, Washington State University

"Aspirations: To achieve distinction for Duke in graduate education and scholarship among the top tier of private graduate research institutions in this country.
To attract the best of the country's graduate applicants to provide a core intellectual resource for Duke's faculty and for its undergraduate instructional programs.
To educate and prepare the next generation of professional researchers and scholars through Duke's Ph.D. and non-professional Masters degree programs."
The Graduate School of Duke University - The next step: A plan for 2001-05

"C: Graduate Education
One of the hallmarks of the U.S. higher education system is its most enviable graduate-level education and training programs. This distinction is most apparent at the doctoral level. As a consequence, the U.S. graduate research and education system is burdened with the enormous task of instructing and preparing the highly skilled workforce required to meet the dynamically changing global needs. Doctoral students are not only considered the backbone of successful research programs but they are also viewed as junior scholars providing academic mentoring and guidance to their graduate and undergraduate peers. This bi-directional vertical and horizontal enrichment of both knowledge and social skills is considered a key factor in raising the bar of excellence across the academic horizon, leading not only to improvement in student performance but also recruitment and retention of outstanding undergraduate and graduate students."
A Report of the Vision of Research and Graduate Education Committee of the Tennessee Board of Regents. A Component of the Vision of Excellence Initiative, 2005

"Research and scholarly endeavor increasingly characterize The University of North Dakota. Its new status as a "Doctoral/Research University Intensive," the highest recognition granted by the Carnegie Foundation, indicates UND has increased the size of the graduate school, particularly at the doctoral level, and has expanded the scale and scope of research conducted on the campus. This success is reflected in an expanding volume of external grants and contracts supporting research, published research results, and growing national awareness of UND's research capacity, especially in areas that have been strategically targeted to become national centers of excellence. UND is ranked well within the top 100 doctoral-research universities and is moving steadily toward the top 50."
The University of North Dakota Strategic Plan II, 2005.

"The University at Albany, while remaining committed to its role as a comprehensive research university, must focus its allocation of resources for graduate and professional programs in areas of distinctive academic strength and, hence, competitive advantage for our institution. Likewise, we must identify and invest in programs which have developed specific strategies to attain such academic excellence. Such investment in programs of current and emerging strength will assure the intellectual rigor and national competitiveness which must characterize all of the University's graduate and professional programs and will, therefore, position the University at Albany for election to membership in the Association of American Universities (AAU)."
Strategic Plan, State University of New York at Albany

"A university of national eminence is known also for its ability to transmit knowledge to a student body selected from among the best, who in turn become leaders in their chosen professions. A concerted campus-wide effort must be mounted to create the conditions and incentives for competing effectively for the best graduate students and for guaranteeing that they are well-educated, well-mentored and well-placed. One of the University's widely recognized strengths has been its ability to recruit and graduate a highly diverse group of graduate students, and success in this area must remain a university priority."
Strategic Plan, University of Maryland College Park, 2000

***"Graduate Education:** Research universities invest heavily in graduate education, where distinguished senior scholars at the forefront of their disciplines work closely with beginning and advanced graduate student scholars to extend the frontiers of knowledge and maintain the historic knowledge that underpins new discoveries. Graduate education enriches culture and stimulates economic development by creating and applying new knowledge and technologies."*
Strategic Plan, University of Tennessee, 2005

"LSU Objective 2: Increase number and quality of graduate students and programs
Actions:
1. Increase the total number of high quality graduate students, particularly in doctoral fields that complement research strengths and in key areas of leadership and development for the state.
2. Continue to increase diversity of graduate students and faculty.
3. Increase quality and competitiveness of graduate programs through targeted investments and systematic program review."
Strategic Plan, Lousiana State University, 2003-2010