

Report of the Task Force on Research and Graduate Education Priorities at  
the University of Kentucky  
Fall 1997

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Introduction

In his letter to the university community on April 29, 1997, President Charles T. Wethington, Jr., announced the formation of a University Task Force on Research and Graduate Education. His charge to the Task Force was to identify institutional strengths and to recommend priority areas for strategic investment that would lead the University over the next two decades to higher distinction in graduate education and research, consistent with its mission and current strengths. To improve its effectiveness overall, the University must make strategic decisions about priorities in the context of institutional challenges for the future. By building on its strengths, the University will focus its priorities selectively and identify ways in which it can move more expeditiously during the next two decades toward higher national status among the

nation's public comprehensive research universities.

One of the contexts for appointment of a University Task Force on Research and Graduate Education was legislative consideration of changes in post-secondary education that ultimately led to approval of House Bill No. 1 by the General Assembly of the Commonwealth on May 30. As it pertains to the University of Kentucky, House Bill No. 1 states in part:

The General Assembly declares on behalf of the people of the Commonwealth the following goals to be achieved by the year 2020: a major comprehensive research institution ranked nationally in the top twenty public universities at the University of Kentucky (Section 2, b).

HB No. 1 also defines the University's responsibilities within the Commonwealth and call upon it to provide high quality research and graduate education programs which are consonant with its statewide research and service missions, including but not limited to agricultural research and extension services, industrial and scientific research, industrial technology extension services, and research related to the doctoral, professional, and post-doctoral programs offered within the University (Appendix I, A).

Where does UK presently stand as a nationally ranked, public research university? According to one respected source, Hugh Graham and Nancy Diamond's *The Rise of the American Research Universities* (Baltimore, Johns Hopkins, 1997), we find some of the answers. In their measures of "Per Capita Publications and Research & Development Funding Indices for Public Institutions, 1986-90," UK ranks approximately 45th, in the company of universities such as Florida, Massachusetts, Kansas, Mississippi and Georgia. In the top tier are UC-Berkeley, Wisconsin-Madison, North Carolina-Chapel Hill, Illinois at Urbana-Champaign, Indiana, Purdue, etc. In their ranking of public universities by "Combined Index Ratings for Top-Science and Social Science journals, and by Arts and Humanities awards," UK stands approximately 47th alongside such institutions as Michigan State, Iowa State, LSU and Georgia Tech, among others. The study groups some 156 public research universities into four tiers in their study, and even though UK is not included in their top tier of 32 research institutions, it is consistently ranked in the middle of the second grouping of 25. Independently corroborating these findings, the National Science Foundation in its most recent report also ranks the University of Kentucky 45th among public research universities on the basis of total research expenditures for FY 1995.

Some of the University's academic and research units have merited national recognition, including designation among the top programs of their peer groups within their particular field of endeavor. In 1987, for example, research grants generated by faculty efforts totaled \$48 million; by comparison ten years later, grant and contract income to the University reached the sum of \$122 million at the close of FY97. Research and graduate education programs in such fields as aging, equine medicine, biotechnology, pharmaceutical sciences, toxicology, and others in the humanities and social sciences have attained national stature, as the Task Force sets forth later in its identified Targeted Areas.

Realists will point to the immense achievements the University must accomplish over the next 20 years if it is to reach its mandated goal; skeptics will argue that it is unattainable and therefore not worth the effort. But scholars in all disciplines know that seemingly Herculean tasks are accomplishable at times by approaching them systematically, identifying and building on strengths, strengthening weaknesses, and painstakingly moving toward success. Failure is not failing to reach the goal, but failing to begin the process.

The University's response to the challenge to enhance its role as the

flagship university of the Commonwealth and its visibility as a nationally recognized public university, particularly in its research and graduate education missions, is one, which must be resolute and innovative. As it charts its course for the future, the University must look to its own resources first, and not rely solely on the Commonwealth to provide essential additional resources. To begin the process, the Task Force has assessed the University's internal strengths in research and graduate education to identify "Targets of Opportunity" for both immediate and future investment (Appendix I, B). By reaching consensus about areas that have already achieved national distinction or that, with proper investment, are capable of achieving it, the University can invest strategically for the attainment of top-twenty status in an ever-expanding framework of areas targeted for enhancement during the next five years or over the next two decades (Appendix I, C).

In the mid-1960's our faculty predecessors, under the leadership of President John W. Oswald, charted the course for UK to become a comprehensive, Carnegie I Research University. Shortly after his arrival, Oswald formed an Academic Advisory Council of faculty and administrators to recommend on university plans for the centennial year and beyond. Relying on the wisdom of several internal faculty and administrative studies and consulting widely with department chairs, deans and appropriate faculty committees, the council presented its report, "Beginning a Second Century," to the Board of Trustees on June 12, 1964, as a plan for the University's future development. As the University celebrated its 100th year, Dr. Tomas D. Clark, distinguished professor of history and chair of the Centennial Committee, remarked that it was the "proper time for stock taking" and for looking forward to "a more enlightened future" (Carl A. Cone, *The University of Kentucky*, p. 154). Now, thirty-three years later, circumstances once again provide the opportunity to take stock and chart our course for a more enlightened future.

#### Task Force Goals and Processes.

We are currently formulating a strategic plan for 1998 - 2003 that calls upon the University to sustain and enhance areas of endeavor in graduate education and research that have attained or are capable of attaining national visibility and high distinction. To help set directions for these next five years, the Task Force identified, through a process of peer review and qualitative assessment, specific Targets of Opportunity within twelve Institutional Areas of Strength. This process went forward with a keen awareness of the Institution's status as a comprehensive research university and its tradition as a land-grant institution, with the concomitant need to address the economic development of the Commonwealth while achieving the goal of top-twenty status set for it by the State. The Task Force has also provided a plan for the implementation of its recommendations as well as strategic indicators to measure future success in attaining them.

Members of the Task Force on Research and Graduate Education represent a broad array of interests and responsibilities within the University (Appendix I, D). The thirty-seven members include a number of distinguished faculty, department chairs, center directors, and academic deans-representing the physical sciences and engineering, the life sciences, the biomedical sciences, social sciences and education, humanities and fine arts, as well as research and graduate program centers.

Ex officio members include the Chancellors for the Medical Center and the Lexington Campus, the Vice President for Research and Graduate Studies, and liaison representatives from support areas as well as research administration officers.

In keeping with President Wethington's commitment to broad involvement in this process, the Task Force relied at each stage on faculty peer review in assessment, evaluation, and subsequent formulation of recommendations. Over the past six months, the Task Force has sought to include faculty, department chairs, deans, and other administrators in the process of individual and group decision-making. In July, the Task Force sent letters to faculty members throughout the University (Appendix II, A), requesting their comments and guidance on priorities that should guide the University's investments in graduate education and research. In early August, the Task Force invited department chairs and center directors to submit a report aimed at identifying graduate and research strengths within each unit, their future priorities, and their five-year goals (Appendix II, B). Approximately 140 academic and research units responded to the Task Force's invitation. Subsequently, college deans were asked to provide their assessment of college strengths as well as their determination of priorities relative to the programs contained within their unit (Appendix II, C). Recommendations to the Task Force came also from the Medical Center and the Lexington Campus Chancellors.

While the Task Force focused on research and graduate education, as was its charge, it received counsel and talked about the important relationships between the graduate education and research enterprise and other integral components of the University. Among these topics were the valuable and unique character of undergraduate education linked directly with research and graduate education; the importance of professional colleges, their programs, and scholarship in research universities; the implications for excellence in the Institution's core disciplines; and the role of diversity and inclusive learning as a condition for excellence. Among those providing counsel along these lines was the Chancellor's Lexington Campus Blue Ribbon Committee. These and other important dimensions in university life were topics addressed by the Task Force despite the fact that they were not specifically a part of its charge. Since the Task Force is advisory to the President, its information and recommendations will be important to the University's Strategic Planning Team. As well, Task Force findings will provide an important source of information for decision making in response to opportunities for State and private investments in the future of UK as Kentucky's comprehensive national research university. Task Force subcommittees undertook their assessment of each of the proposals, which had been received along with institutional data sets from a variety of sources. Evaluation criteria included qualitative factors relating to students (applications, admissions, research presentations, publications, degree productivity, placement, time to degree, post-graduate performance, awards & recognition, unit financial support, etc.) and to faculty (publications, citation indices, grant and contract funding, awards and recognition, etc.) (Appendix III, A). These quality factors were then examined in the context of an assessment of Program Effectiveness (leadership, strategic planning, administration, utilization of resources, participation in collaborative research/graduate education activities, enhancement of faculty/student diversity, achievements & recognition). While the factor of "Unit Centrality" (Appendix III, B) was not one of the specific criteria examined, it was taken into consideration in subcommittee actions. The Task Force developed several questions to guide its deliberations in subcommittee evaluations of materials that had been submitted (Appendix III, C).

One of the primary goals of the Task Force, within its capabilities, was to determine the "stature" of those programs or units, which had submitted reports. In addition to providing general summative comments, the subcommittees also reached agreement on a descriptor of the program stature

of each unit: a) distinguished, nationally competitive, b) positioned to achieve national stature, c) positioned to achieve higher stature regionally and possibly at national level, d) meeting reasonable expectations, but limitations hinder progress, or e) limitations impair program's capacity to meet reasonable expectations. Each program was also rated on the basis of its effectiveness at carrying out its primary responsibilities (instruction, degree programs, research, etc.).  
Targets of Opportunity.

>From the 140 reports submitted for consideration by Task Force subcommittees, a group of units was identified as institutional "Targets of Opportunity" for future investment. These programs represent a select subset of the University's 60 doctoral programs, more than 90 master's and specialist programs, and an extensive array of research centers and institutes. They are the units within whose graduate degree programs and specialized research activities the Task Force believes the University has achieved national stature, or is capable of achieving it within a reasonable time frame and with strategic investment of resources:

Tier I: "Distinguished, Nationally Competitive Programs":

Aging & Gerontology	Agronomy
Anatomy & Neurobiology	Biochemistry
Chemistry	Chemical & Materials Engr.
English	Geography
History	Mathematics
Microbiology & Immunology	Pharmaceutical Sciences
Physics & Astronomy	Physiology
Psychology	Public Policy & Administration
Spanish	Special Education
Toxicology	Veterinary Science

Emerging Area: Ecology, Evolution & Behavior

Tier II: "Programs Positioned to Achieve National Stature":

Agricultural Economics	Animal Sciences
Anthropology	Biomedical Engineering
Business Administration	Civil Engineering
Communication	Computer Science
Economics	Electrical Engineering
Internal Medicine	Music
Nutritional Sciences	Plant Pathology
Markey Cancer Center	Prevention Research Center
Kentucky Heart Institute	

Emerging Areas: Biopharmaceutical Engineering  
Humanities Computing

Because it had in hand the 1996 Report of the Committee on Graduate Education, chaired by Professor James Boling, the Task Force on Research and Graduate Education did not have to undertake lengthy deliberations on issues relating to graduate students, faculty, or research infrastructure. The primary recommendations of the Boling Report have been substantially subsumed into this Report in the sections entitled "Strengthening Graduate Education," "Expanding Faculty Resources," "Strengthening Research Infrastructures" and "Enhancing Support Systems."

At its work-session on university strategic planning, November 18, Board of Trustee members heard and discussed a preliminary report of Task Force perspectives on key institutional strengths and opportunities. Several

Trustees articulated or echoed the conviction that the University presently does not have, nor is it likely to acquire or generate sufficient resources "to be all things to all people." In the context of fiscal uncertainties, the University must determine wherein its greatest strengths lie, wherein its highest quality and most effective programs exist, and whereby it can serve its students and the citizens of the Commonwealth and Nation with ever-heightened effectiveness and distinction. In so doing, the University's Strategic Plan for 1998 - 2003, as well as subsequent plans, will need to include an on-going assessment process to determine that "Targeted Programs" are producing the desired benefits from investment in them and that they are being sustained in their forward momentum. As well, this same assessment process should identify other units for investment-graduate degree or research programs capable of achieving national recognition or those emerging initiatives which in future may enable the University to utilize its faculty and fiscal resources innovatively in new configurations of educational and research programs.

Section I  
Areas of Institutional Strength  
in Research and Graduate Education

"[M]uch leading science nowadays proceeds not by placing one brick upon the other within a single discipline, but by solving complex problems that cut across many disciplines."  
(The Economist, Oct. 4, 1997)

A major outcome of the evaluation and assessment of responses from individuals and reports from academic or research units was the identification of Areas of Institutional Strength. These areas of strength are a product of program self-assessment comments about specializations and strengths as detailed in the 140 proposals received by the Task Force. Areas of Strength are not intended to connote administrative structures; rather, they represent a matrix of broadly based fields of specialization:

- o Aging and Neuroscience
- o Community Development and Health Services
- o Computation Science and Information Technology
- o Culture, Society and The Arts
- o Environmental Science and Ecology
- o Education and Public Policy
- o Genetics and Molecular Biology
- o Human and Animal Nutrition
- o Management Systems
- o Materials Science
- o Prevention and Health
- o Technology and Economic Development

In each Institutional Area of Strength, the Task Force has indicated Areas of Specialization; it has identified Contributing Units, i.e. degree program areas or research centers; and it has specified Targets of Opportunity for investment among graduate education and research units, representing some of the University's most nationally visible graduate degree and research programs. It is important to note that these Institutional Areas of Strength provide evidence of the University's current research and graduate education activities and of viable ties to the expectations and future needs of the Commonwealth as set forth in House Bill No. 1. They are in keeping with the University's self-appraisal of its identity as a Comprehensive, Research I Institution and as an Historic

Land-grant University. By identifying and investing in its strengths, the University will be better able to meet the Commonwealth's expectations, and it will concomitantly move toward greater national visibility and stature.

#### Aging and Neuroscience

Special opportunities exist at UK to enhance its already well-recognized strength among the nation's major research universities in the broad area of aging and neuroscience. The Sanders-Brown Center on Aging, a state-mandated Center of Excellence, is a multidisciplinary center for research, teaching, and clinical and community services dedicated to improving the quality of life for older adults. The Center, with its nationally recognized program in Alzheimer's disease, is one of the original ten National Institutes of Health-funded Alzheimer's Disease Research Centers, an NIH-funded program project grant in Alzheimer's disease, the high profile longitudinal "Nun Study" and multiple NIH grants in Alzheimer's disease. The Center also has a highly productive stroke program, emphasizing clinical trials and patient management. The doctoral program in Gerontology, one of only five in the United States, involves 19 departments in the University and is unique for its multidisciplinary focus on aging and health.

Surrounding the University's expertise in aging are its many strengths in the basic neurosciences. There is a program project grant on "Aging of the Central Dopaminergic System in Primates" in the Department of Anatomy and Neurobiology; a program project grant in Alzheimer's disease in the Department of Pharmacology; a Head Injury program project grant in the Division of Neurosurgery; and a training grant in "Molecular and Cellular Basis of Brain Aging" in the Department of Physiology (all NIH funded). The Magnetic Resonance Imaging and Spectroscopy Center emphasizes neurobiology and aging and has several NIH grants in this area. There are also strong programs in neuroendocrinology in the Departments of Physiology and of Anatomy and Neurobiology with several NIH grants.

Areas of Specialization: Alzheimer's disease, stroke, Parkinson's disease, head injury, radionuclear chemistry, clinical geriatrics, cellular and molecular biology of neuron degeneration, cognitive and development studies, biobehavioral gerontology, geriatric psychiatry, neurosurgery, neuroendocrinology and aging, neurobiology, immunology of aging, cardiovascular disease, policy studies, health services, magnetic resonance imaging and spectroscopy.

Contributing Units: Allied Health, Anatomy and Neurobiology, Anthropology, Architecture, Behavioral Science, Biochemistry, Biological Sciences, Biomedical Engineering, Chemistry, Civil Engineering, Dentistry, Educational and Counseling Psychology, Family Studies, Geography, Gerontology, Health Services Management, Interior Design, Internal Medicine, Law, Microbiology and Immunology, Neurology, Neurosurgery, Nursing, Nutritional Sciences, Nutrition and Food Science, Pathology, Pharmacology, Pharmaceutical Sciences, Philosophy, Physiology, Preventive Medicine and Environmental Health, Psychiatry, Psychology, Social Work, Sociology, Special Education, Toxicology, Biostatistics Laboratory, Sanders-Brown Center on Aging, Kentucky Heart Institute, Neuroscience Institute, Interdepartmental Neuroscience Program, Kentucky Transportation Center

#### Targets of Opportunity:

I. Anatomy and Neurobiology, Biochemistry, Chemistry, Geography, Gerontology, Microbiology and Immunology, Physiology, Pharmaceutical Sciences, Psychology, Special Education, Toxicology, Sanders-Brown Center on Aging

## II. Anthropology, Biomedical Engineering, Civil Engineering, Internal Medicine, Nutritional Sciences, Kentucky Heart Institute

### Community Development and Health Services

A wide range of university research, education, and service initiatives address the health, education, social, and economic problems of citizens of the Commonwealth. Half of Kentucky's citizens live in small rural communities, and U.S. Census data reveal that rural Kentucky residents consistently rank among the lowest 20% of other states' residents on measures of health, education, social, and economic well being. Social and economic transformation is underway as markets for tobacco, coal, forestry products, manufactured goods, and technology innovations and services are changing.

Communities confront challenges in the development and maintenance of their infrastructure systems in the face of shrinking financial resources.

Issues such as water supply and quality, sewage treatment, streets, parks, utilities, schools, and land use require long range planning and financing. Cost effective, quality solutions to these issues will improve the quality of life of Kentuckians, especially those in rural areas. Academic, research, and service units at UK are developing innovative approaches to these issues.

Kentucky's health service needs include, among others, prenatal care and child health services; prevention and treatment of cardiovascular disease, cancer, diabetes; and prevention of motor vehicle and occupational injuries and fatalities. Research and training focused on health promotion and disease prevention address the impact of health interventions ranging from gene therapies to public health campaigns. Research programs are designed to reduce health risks through educational innovation, environmental design, and community development projects. The University's history of leadership in prevention research provides continuing opportunities to improve the quality of life for Kentuckians.

Areas of Specialization: Rural environmental infrastructure, transportation, urban planning, health services research, communications, health and social services delivery systems, clinical health services, health professions training (allied health, dental, medical, nursing, and pharmacy), health administration, regional transformation, community development; social, political, economic and cultural forces; education reform

Contributing Units: Agricultural and Home Economics Extension, Agricultural Economics, Allied Health, Anthropology, Architecture, Civil Engineering, Dentistry, Economics, Educational and Counseling Psychology, Family Studies, Forestry, Geography, Health Services Management, Kinesiology and Health Promotion, Landscape Architecture, Law, Medicine, Nursing, Pharmacy, Public Health, Public Policy and Administration, Rural Sociology, Social Work, Sociology, Special Education, Appalachian Center, Kentucky Transportation Center, Center for Prevention Research, Computational Sciences Center, Institute on Kentucky Education Reform, Area Health Education Centers, Communication, Preventive Medicine and Environmental Health, Center for Rural Health, Southeast Center for Agricultural Health and Injury Prevention, Kentucky Injury Prevention and Research Center, Sanders-Brown Center on Aging, The Family Center, Water Resources Research Institute, Center for Robotics and Manufacturing Systems, Center for Business and Economics Research, Center for Entrepreneurship, Interdisciplinary Early Childhood.

Targets of Opportunity:

I. Geography, Public Policy and Administration, Special Education

## II. Agricultural Economics, Anthropology, Civil Engineering, Communication, Economics, Center for Prevention Research

### Computation Science and Information Technology

The economic development, health maintenance, and educational success of communities depends upon ready access to information and services communicated through new information technologies. As a major research university with broad, nationally recognized expertise in computation science and information technology, we are well positioned to facilitate the locating of high technology industries in the state and the effective networking of the state both within its boundaries and internationally. University research activities, as well as graduate and undergraduate education, use computing and broad-band communication. Many such activities involve scholars from different departments and colleges at UK or at universities or research institutes throughout the U.S. and the world. With the advent of high-speed supercomputers, large-scale computation has become an essential tool for research, complementing theory and experiment, and has created avenues for collaboration across many disciplines, such as numerical analysis, high-energy physics, parallel computing, fluid dynamics, materials research, atmospheric studies, astrophysics, and computational chemistry and pharmacy. For their future employment, students must be trained in computing and electronic communication skills. Distance-learning programs that are delivered electronically will profoundly change both undergraduate and graduate education. Economic development and educational advances in the Commonwealth rely increasingly on our capacity to deliver high quality expertise in this vital area.

Areas of Specialization: Applied mathematics, discrete mathematics, bioinformatics, medical informatics, numerical analysis, astrophysics, atmospheric studies, chemistry, electronics, high energy physics, fluid dynamics, materials science, statistics, pharmaceutical sciences, biosystem modeling, information technology, industrial computing, artificial intelligence, distributed computing and networking, computer-vision and computer graphics, image processing, image encoding, databases, theoretical computer science, computational physics, theoretical inference, applied probability, applied statistics, mass communication, humanities computing

Contributing Units: Biological Sciences, Biomedical Sciences, Biomedical Engineering, Biosystems and Agricultural Engineering, Chemistry, Communication, Computer Science, Curriculum and Instruction (Instructional Systems and Technology Design), Electrical Engineering, Geography, Law, Library and Information Science, Linguistics, Management (Decision Science and Information Systems), Mathematics, Mechanical Engineering, Pharmaceutical Sciences, Physics & Astronomy, Special Education, Statistics, Agricultural Communications, Biostatistics Laboratory, Center for Computational Sciences, Humanities Computing, Sanders-Brown Center on Aging, Survey Research Center, Mathematical Sciences Computing Facility, Survey Research Center

### Targets of Opportunity:

I. Anatomy and Neurobiology, Biochemistry, Chemistry, Geography, Physics and Astronomy, Mathematics, Microbiology and Immunology, Pharmaceutical Sciences, Physiology, Special Education

II. Biomedical Engineering, Business Administration (DSIS), Computer Science, Electrical Engineering, Humanities Computing

### Culture, Society, and the Arts

We must understand our past if we are to advance our future ethically and effectively. At the University of Kentucky, faculty and students in the

humanities, arts, and social sciences have addressed questions relating to such issues as how we communicate, how we make good decisions, how we generate ethical values, and how social forces impact our cultures and our lives in an age of rapid change. This work has illuminated how and when the New World was populated, how and why the Civil and Vietnam Wars tore asunder American society, how computers and the internet can clarify medieval manuscripts and preserve American Jazz, how the Appalachian South was industrialized, and how scientific discoveries transform ethical systems. This scholarship, honored by Pulitzer, Bancroft, Guggenheim Foundation, Ford Foundation, Fulbright, National Science Foundation, Mellon Foundation, and Grammy Award committees, provides the basis for continuing nationally recognized innovation in culture-related studies.

Multidisciplinary activities provide for joint research and educational opportunities in such diverse areas as humanities computing, international studies, Social Theory, and American Studies, including African American Studies, Appalachian Studies, and Women's Studies, among others.

Areas of Specialization: Literary history, literary theory, critical studies, interpretation, esthetics, ancient and modern cultures, cultural resources, international studies, creative and performing arts, architectural design, classical studies, ethnic studies, art history, value theory, social theory, linguistic theory, historic preservation, transnational relations, social psychology, race, class and gender studies; global and comparative perspectives; humanities computing

Contributing Units: Anthropology, Architecture, Art, Classics, Diplomacy and International Commerce, English, Family Studies, French, Geography, German, History, Interior Design, Landscape Architecture, Latin American Studies, Law, Linguistics, Music, Philosophy, Political Science, Psychology, Russian and Eastern Studies, Spanish, Sociology, Theatre, African American Studies, American Studies, Japanese Studies, Judaic Studies, Social Theory, Women's Studies, Computational Sciences Center, Humanities Computing, Appalachian Center, Special Collections and Archives, Office of International Programs

Targets of Opportunity:

- I. English, Geography, History, Psychology, Spanish
- II. Anthropology, Music, Humanities Computing

Environmental Science and Ecology

Understanding the environment, how it works, how we influence it, and in turn, how it affects our well being, are key issues for the 21st century. Environmental Science and Ecology, the science of studying the environment and our interactions with it involves life scientists, medical researchers, physical scientists, engineers and social scientists drawn from some forty departments across the University. The University of Kentucky has the breadth of research strength required to become an internationally renowned institution of excellence in this multidisciplinary field.

Broad areas of research expertise in Environmental Science and Ecology at UK include: ecology and natural resources (e.g., management of agricultural, forest and freshwater ecosystems), environmental health (e.g., environmental influences on cancer and other diseases), physical environmental sciences (e.g., air, soil and water pollution), and environmental public policy.

Many of the research groups in this field are nationally recognized and are among the best at the University of Kentucky. We seek to solidify strengths in these fields and to integrate them into an even more distinguished focus. Enhancement and integration of the University's

expertise in this field are vital for the future physical, economic, and spiritual well-being of the people of the Commonwealth.

Areas of Specialization: Ecology, evolution and behavior; conservation biology; wildlife and natural resources management; agricultural, forest and freshwater ecosystems; plant defenses; plant productivity; biodiversity; environmental physiology; toxicology; molecular mechanisms of carcinogenesis and disease; air, water and soil pollution; environmental engineering; environmental measurement and monitoring; mining and mineral resources; environmental geosciences; energy resources; waste management; environmental public policy and public administration; landscape architecture and land use management; transportation systems

Contributing Units: Agronomy, Anthropology, Architecture, Biochemistry, Biological Sciences, Biosystems and Agricultural Engineering, Chemical and Materials Engineering, Chemistry, Civil Engineering, Environmental Systems; Ecology, Evolution and Behavior; Electrical Engineering, Entomology, Forestry, Geography, Geology, Horticulture and Landscape Architecture, Internal Medicine, Law, Mechanical Engineering, Microbiology and Immunology, Mining Engineering, Neurology, Pathology, Pharmaceutical Sciences, Pharmacology, Philosophy, Physiology, Plant Pathology, Psychology, Public Policy and Administration, Rural Sociology, Toxicology, Veterinary Science, Kentucky Geological Survey, Kentucky Water Resources Research Institute, Markey Cancer Center, Sanders-Brown Center on Aging, Center for Applied Energy Research, Kentucky Transportation Center, Geographic Information Systems Laboratory, Preventive Medicine and Environmental Health, Business Environmental Assistance Program

Targets of Opportunity:

I. Agronomy, Biochemistry, Chemistry, Chemical and Materials Engineering; Ecology, Evolution and Behavior; Geography, Microbiology and Immunology, Pharmaceutical Sciences, Physiology, Psychology, Public Policy and Administration, Toxicology, Veterinary Science

II. Anthropology, Civil Engineering, Electrical Engineering, Internal Medicine, Plant Pathology, Markey Cancer Center

#### Education and Public Policy

Graduate and research programs in education and public policy serve the land-grant mission of the University of Kentucky with masters, specialist and doctoral programs designed to prepare leaders for schools and the private, nonprofit, and government sectors. Faculty are involved in research on effective teaching practices, technology applications, assessments of learning, and the effects of policy on educational enterprises. In addition to its internationally recognized faculty in education policy, University of Kentucky faculty have policy expertise in the environment, health, welfare, and government budgeting. In all policy areas, a major goal of research is to improve the effectiveness and efficiency of government policy by advancing knowledge in the social, economic, and political factors that influence policy and to identify intended as well as unintended consequences of policy decisions. Strengths in education and public policy have been a major contributing factor to the development of a progressive educational system and a progressive government for the Commonwealth of Kentucky. Faculty serve state and local governments, health care organizations, and groups such as the Kentucky League of Cities and the Council of State Governments.

Areas of Specialization: Leadership development, educational and public administration training, public financial management, educational finance, health administration, policy processes, governmental policies, communication law, equity pedagogy, higher education policies, educational assessment, distance learning methodologies, instructional design systems

and technology

Contributing Units: Administration and Supervision, Agricultural Economics, Computer Science, Civil Engineering (Transportation), Communication, Curriculum and Instruction, Economics, Educational and Counseling Psychology, Educational Policy Studies and Evaluation, Family Studies, Landscape Architecture, Law, Nursing, Political Science, Public Policy and Administration, Rural Sociology, Social Work, Sociology, Special Education, Agricultural and Home Economics Extension, Center for Health Services Management, Office of Higher Education Research, Distance Learning, Appalachian Center, Institute on Education Reform, Institute on Technology in Education, International Business and Management Center

Targets of Opportunity:

- I. Public Policy and Administration, Special Education
- II. Civil Engineering (Transportation), Communication, Computer Science, Economics

Genetics and Molecular Biology

Remarkable advances in molecular genetics have revolutionized basic and applied medical and agricultural sciences. Faculty from the University of Kentucky have earned international recognition in these areas and their efforts have been strengthened by the unique interface of the Colleges of Agriculture, Arts and Sciences, and Medicine. Their work reveals how genes are regulated and expressed and how biomolecules function in living organisms. Biomedical scientists are making progress in deciphering the genetic and molecular basis of diseases such as coronary heart disease, infection, Alzheimer's disease, and cancer, as well as revealing the molecular bases of normal physiologic processes such as aging and immunity. The expectation is that our progress in these areas, along with advances in biotechnology, will lead to advances in gene therapy. Similarly, plant biologists are unraveling the molecular bases of plant defense against disease and pests, the genetic control of crop growth and development, and the biochemical and metabolic processes that determine plant quality and composition. Studies on immunogenetics and infectious diseases of horses represent internationally renowned areas of research excellence that are uniquely important to the Commonwealth. The general area of genetics and molecular biology will serve the economic vitality of the agricultural community and the physical health of all Kentuckians.

Areas of Specialization: Cellular and molecular biology, immunology, molecular virology, structural biology, cardiovascular biology, microbial pathogenesis, metabolic biology, genetic engineering and biotechnology, molecular genetics and development, immunogenetics, DNA repair, genetic regulation, cancer research, nutritional sciences, neurosciences, reproductive biology, bioprocessing, biopharmaceutical engineering, biological chemistry

Contributing Units: Agronomy, Anatomy and Neurobiology, Animal Sciences, Biochemistry, Biological Sciences, Biomedical Engineering, Biopharmaceutical Engineering, Biosystems and Agricultural Engineering, Chemical Engineering, Chemistry, Clinical Sciences, Dentistry, Entomology, Forestry, Horticulture, Microbiology and Immunology, Nutrition and Food Science, Nutritional Sciences, Orthopedics, Pathology and Laboratory Medicine, Pharmacology, Pharmaceutical Sciences, Physiology, Plant Pathology, Statistics/Biostatistics, Toxicology, Veterinary Science, Equine Infectious Diseases Center, Sanders-Brown Center on Aging, Center for Pharmaceutical Science and Technology, Kentucky Heart Institute, Tobacco and Health Research Institute, Markey Cancer Center, Drug and Alcohol Abuse

Center, Magnetic Resonance Imaging and Spectroscopy Instrumentation Center, Computational Sciences Center, Forum for Reproductive Sciences

Targets of Opportunity:

- I. Agronomy, Anatomy and Neurobiology, Biochemistry, Chemistry, Chemical and Materials Engineering, Microbiology and Immunology, Physiology, Pharmaceutical Sciences, Toxicology, Veterinary Science,
- II. Animal Sciences, Biomedical Engineering, Internal Medicine, Nutritional Sciences, Plant Pathology, Biopharmaceutical Engineering, Kentucky Heart Institute, Markey Cancer Center

#### Human and Animal Nutrition

The University of Kentucky offers a novel multidisciplinary program of research and graduate education in nutritional sciences. This program has areas of strength in animal, clinical and human nutrition and involves more than thirty faculty from nineteen departments across campus. Faculty collaborating in this program are primarily from the Colleges of Agriculture, Allied Health Professions, Human Environmental Sciences, and Medicine. Research and training involve molecular, cellular, genetic, biochemical, physiological, ruminant, social-psychological, clinical, and community medicine-based approaches to nutrition. These efforts are funded by federal agencies such as the U.S. Department of Agriculture and the National Institutes of Health, as well as by industry groups and foundations. Faculty and students are highly productive in terms of scientific publications and presentation of their research findings. Faculty laboratory facilities conduct research on human, animal and cell culture studies using state-of-the-art trace mineral, vitamin, lipid, amino acid, enzyme, hormone, stable and radioactive isotope, microcirculatory, and energy assessment analysis. Clinical facilities for training and research are available on campus and at other locations in the Commonwealth.

Outcomes of these initiatives in nutrition have positive impact on citizens of the Commonwealth and the nation through improved production of the food supply, optimization of health, and prevention of animal and human diseases.

Areas of Specialization: Ruminant nutrition, food science, nutrition and reproduction, biochemical and molecular nutrition, community nutrition, nutrition dietetics, nutrition and chronic disease, maternal and child health, eating disorders, molecular medicine and endocrinology, gastro-enterology, pediatrics, nutrition management

Contributing Units: Agronomy, Anatomy and Neurobiology, Animal Sciences, Anthropology, Biochemistry, Behavioral Science, Clinical Nutrition, Dentistry, Internal Medicine, Medicine, Nutrition and Food Science, Nutritional Sciences, Oral Pathology, Psychiatry, Psychology, Rural Sociology, Sociology, Surgery, Toxicology, Veterinary Science

Targets of Opportunity:

- I. Agronomy, Biochemistry, Psychology, Toxicology, Veterinary Science
- III. Animal Sciences, Anthropology, Internal Medicine, Nutritional Sciences
- IV. Management Systems

The development and growth of business enterprises is critical for the economic development of the Commonwealth. In the manufacturing and service sectors the challenges of international competition, increased use of technology, environmental regulation and shortages of skilled workers require enhanced management systems and improved production techniques to allow Kentucky firms to compete effectively. Several academic and research units at the University of Kentucky in Agriculture, Engineering, Business and Economics, the Medical Sciences and Social Sciences are focused on issues such as the design of production systems, construction management, mining operations, modeling of manufacturing processes, organization of business firms, risk management, health management, public and non-profit

management, international marketing, information systems, capital investment decisions, and valuation of physical and financial assets. The contributions of these units can substantially enhance the productivity of existing businesses and government enterprises and facilitate the start-up efforts of Kentucky entrepreneurs.

Areas of Specialization: Production/marketing systems design and implementation, construction management, modeling of manufacturing processes, forming and machining, mining operations, industrial organization, medical management, risk management, international trade and marketing, trans-border economic processes, behavioral research, valuation, capital investment

Contributing Units: Accountancy, Agricultural Economics, Agronomy, Allied Health, Anthropology, Biosystems and Agricultural Engineering, Civil Engineering, Communication, Computer Science, Economics, Educational Administration, Family Studies, Forestry, Geography, Health Administration, Health Policy, Horticulture and Landscape Architecture, Kinesiology and Health Promotion, Law, Library and Information Science, Mechanical Engineering, School of Management, Public Policy and Administration, Nursing, Patterson School, Robotics and Manufacturing Systems, Sociology, Agricultural and Home Economics Extension, Center for Entrepreneurship, International Business and Management Center, Kentucky Transportation Systems, Health Services Management, Appalachian Center, Center for Applied Energy Research

Targets of Opportunity:

- I. Agronomy, Geography, Public Policy and Administration
- II. Agricultural Economics, Anthropology, Business Administration, Civil Engineering, Computer Science, Communication, Economics

#### Materials Science

Materials research is a cornerstone in the development of new technologies and is an area in which eight Nobel prizes have been awarded since 1985. Materials research is strongly interdisciplinary, often requiring chemists to make new materials, solid-state physicists to measure and understand properties, and engineers to develop and fabricate new devices. UK has increasingly garnered international visibility in materials research programs, which involve dozens of faculty members in Arts and Sciences, Engineering, Medicine, Dentistry, and Pharmacy. Selected focus areas include: Carbon-Based Materials ("Buckyballs," carbon nanotubes, metal carbides, adsorbents and catalysts); Novel Electronic Materials (low-dimensional materials, layered and linear-chain conductors and superconductors, magnetic materials); Nanostructured Materials (thin films, micro-electronic devices); Membranes (Biological and non-biological membranes, chemical sensors, separation devices); and Structural Materials (composites, alloys, polymers, highway materials).

Traditional industries leaving Kentucky will be replaced by others based on new technologies. A strong materials research program at UK is crucial to the continued economic health and growth of Kentucky. Materials research may lead quickly to new products, or may lay the foundation for later technologies. Success can attract high-tech industry to the Coldstream Research Park, provide a strong consulting base for state agencies and companies, spin off new businesses, and provide employment for Kentucky's graduates.

Areas of Specialization: Organic and fullerene conductors, low-dimensional materials, carbon-based materials, mesoscopic carbon and semiconducting

structures, superconductors, biomaterials, advanced carbon and biofunctional materials, membrane science, condensed matter and materials science, highway infrastructure materials  
Contributing Units: Anatomy and Neurobiology, Animal Sciences, Biochemistry, Biomedical Engineering, Biopharmaceutical Engineering, Chemistry, Chemical and Materials Engineering, Civil Engineering, Computational Sciences, Dentistry, Electrical Engineering, Mechanical Engineering, Nutrition and Food Science, Pharmaceutical Sciences, Physics and Astronomy, Center for Membrane Sciences, Center for Applied Energy Research, Chemical Sensor Architecture, Materials Characterization Facility

#### Targets of Opportunity:

- I. Anatomy and Neurobiology, Biochemistry, Chemistry, Chemical and Materials Engineering, Pharmaceutical Sciences, Physics and Astronomy
- II. Biomedical Engineering, Civil Engineering, Electrical Engineering, Biopharmaceutical Engineering

#### Prevention and Health

A broad array of graduate and research programs at UK is devoted to understanding how to prevent disorders and promote human health. These areas, several of which have attained national recognition, include the study of physical illnesses, emotional disorders, and social problems. The University possesses expertise in the prevention and treatment of cancer, pediatric illnesses, infectious diseases, heart disease, organ transplantation, substance abuse, mental disorder, delinquency and crime, family dysfunction, workplace hazards and occupational injuries, and social problems and deterioration. Faculty and students working on these problems design and study the impact of interventions such as gene therapies, immunotherapies, attitude change, educational innovation, risk reduction, behavior change, mass communication, environmental redesign, and community development. The University's historical leadership in research on disease prevention and human health provides a great opportunity to improve the quality of life for the Commonwealth, nation, and world at a time when this issue has assumed center stage in the public mind and in public policy debates.

Additionally, the University of Kentucky is world renowned for its successes over the years in developing effective equine health programs which have been of considerable economic benefit to the equine industry nationally and internationally. Through its many programs at the Livestock Disease Diagnostic Center, the University also continues to safeguard the health and economic well being of Kentucky's livestock industry and to assist in ensuring the safety of animal products for human consumption.  
Areas of Specialization: Biomechanics and materials, parasitology, toxicology, bacteriology, clinical pathology, environmental; physiology, radiological physics, immunotherapy, gene therapy, women's health, marriage and family therapy, substance abuse, chronic health problems, mental health, psychopathology and behavioral dysfunction, mental disorders, deviance, craniofacial development biology, orthopedics, sports medicine, health promotion, nutritional adequacy, disabilities, workplace hazards, cancer prevention

Contributing Units: Anatomy and Neurobiology, Animal Sciences, Biochemistry, Biological Sciences, Biomedical Engineering, Chemistry, Clinical Sciences, Communication, Communication Disorders, Dentistry, Educational and Counseling Psychology, Family Practice, Kinesiology and Health Promotion, Law, Library and Information Science, Mining Engineering, Microbiology and Immunology, Nursing, Nutrition and Food Science,

Nutritional Sciences, Physiology, Pharmacology, Psychiatry, Psychology, Radiation Sciences, Rehabilitation Counseling, Rural Sociology, Social Work, Special Education, Toxicology, Veterinary Science, Biostatistics Laboratory, Kentucky Heart Institute, Tobacco and Health Research Institute, Center on Drug and Alcohol Abuse, Center for Prevention Research, Center for Agricultural Health and Injury Prevention, Kentucky Center for Injury Prevention and Research, Markey Cancer Center, Sanders-Brown Center on Aging, Center for Minimally Invasive Surgery, Membrane Sciences Center, Equine Infectious Disease Center, Livestock Disease Diagnostic Center.

Targets of Opportunity:

I. Anatomy and Neurobiology, Biochemistry, Chemistry, Microbiology and Immunology, Pharmaceutical Sciences, Physiology, Psychology, Special Education, Toxicology, Veterinary Science, Sanders-Brown Center on Aging

II. Animal Sciences, Biomedical Engineering, Communication, Internal Medicine, Nutritional Sciences, Center for Prevention Research, Kentucky Heart Institute, Markey Cancer Center

Technology and Economic Development

Research and graduate education programs produce entrepreneurial results in the form of new products, technologies, and services that impact the economic health of the Commonwealth by retaining businesses, attracting higher technology industry, and providing incentives for the evolution and growth of new enterprises. The ability to respond to local and regional needs derives from basic and applied research, and from interactions in the national and international arenas. The products of these endeavors are implemented through interfaces and mechanisms that stimulate and facilitate the development and transfer of intellectual property.

Multidisciplinary research in several colleges and centers, coupled with the Advanced Science and Technology Commercialization Center (ASTeCC) facility and Kentucky Technology, Inc. (KTI), has resulted in a major increase in patent filings and new-start businesses. Intellectual property disclosures from medicine, engineering, agriculture and pharmacy, and many other programs form the basis for these new patents and businesses.

Developments in the Coldstream Research Campus, the Small Business Development Center, the Center for Robotics and Manufacturing Systems and other units have alerted business leaders to the need to create venture capital for technology transfer and commercialization. Existing strengths combined with strategic planning and decisions, such as the institutional commitment to advanced computing, augment the University's capacity to enhance the quality of life and prosperity of the citizens of the Commonwealth.

Areas of Specialization: Utilization of fossil fuel energy resources, engineering materials, construction engineering, hydrosystems, structural engineering, industrial computing, business computing, lean manufacturing, computational fluid dynamics, design and manufacturing, manufacturing systems, pharmaceutical sciences, biomedical sciences, biomedical engineering, machining, welding engineering, rural economic development; conservation and use of natural resources, marketing, entrepreneurship, value added of raw products, environmentally sound and sustainable production practices related to food and agriculture; operations research and management, international development, international commerce

Contributing Units: Agriculture, Anthropology, Biomedical and Clinical Sciences, Biomedical Engineering, Business and Economics, Diplomacy and International Commerce, Engineering, Geography, Interior Design, Law, Library and Information Science, Mathematics, Merchandising and Textiles, Pharmaceutical Sciences, Pharmacology, Statistics, Appalachian Center,

ASTeCC, Center for Applied Energy Research, Consortium for Fossil Fuel Liquefaction, Center for Business and Economics Research, Center for Computational Sciences, Tobacco and Health Research Institute, International Business and Management Center, Center for Entrepreneurship, Small Business Development Center, Center for Labor Education and Research, Center for Robotics and Manufacturing Systems, Kentucky Transportation Center, Kentucky Geological Survey, Kentucky Water Resources Research Institute, International Programs Office

Targets of Opportunity:

I. Agronomy, Anthropology, Biochemistry, Chemical and Materials Engineering, Geography, Mathematics, Pharmaceutical Sciences, Veterinary Science

II. Agricultural Economics, Animal Sciences, Biomedical Engineering, Business Administration, Civil Engineering, Computer Science, Economics, Electrical Engineering, Plant Pathology

Section II  
Strengthening Graduate Education

The recruitment, support, and retention of the highest quality graduate students are essential to the research and graduate education missions of the entire University. As part of the Task Force's process, the Chancellors identified better support of graduate students as an important need for their respective sectors. The document submitted by the Lexington Campus Blue Ribbon Committee listed enhanced graduate student support and quality as its first program priority, citing it as "the most common, almost universal, priority" reported by individual programs. Every dean responding to this task force listed these issues as a critical priority for their colleges. A careful reading of the reports submitted by specific programs reveals almost unanimous agreement that enhanced support of graduate students is necessary for the University to improve its standing among the nation's leading research universities.

Recognition of the importance of enhanced support and development opportunities for graduate students has grown steadily on campus over the past few years, culminating in the 1996 Report of the Committee on Graduate Education, chaired by Professor Boling. Issues pertaining to graduate student recruitment and support were examined thoroughly in the Boling Report, and specific priorities were recommended. Strong support has been voiced over the last year for many of the Committee's recommendations concerning graduate student support. The Task Force on Research and Graduate Education endorses the recommendations of the Boling report (Appendix IV, A) as they pertain to graduate student support. Enacting these recommendations would represent a reasonable step toward addressing the multiple needs the University faces in recruiting and graduating the best possible graduate students; future investments must build on these initiatives.

The Task Force recommends that a request be made for recurring funding from the Research Excellence Trust Fund, to be matched by annual income from new or rededicated private endowments for the University; these funds would be used for the following initiatives to improve graduate student recruitment and support as follows:

1. Provide full-time graduate assistants (both TAs and RAs) a tuition-free education during the period they hold their assistantship. The Task Force estimates that if \$400,000 were available to fund in-state tuition scholarships for Research Assistants, in-state tuition could be provided for approximately 125 Research Assistants. As recommended in the Boling report, this could be facilitated by the State's enacting a statute that would permit graduate assistants to pay in-state tuition only, which, then

in turn, could be defrayed by tuition scholarships.

2. Increase the number and/or support levels of graduate assistantships in order to compete successfully with other nationally ranked research universities in recruiting the best possible graduate students to the University. Included in this priority is the need for the University to strengthen its ability to recruit a diverse graduate student body, capable of providing strong intellectual leadership to all segments of American society and the international community. In most academic fields, the University of Kentucky's support packages for graduate assistants are not competitive with those offered by the leading public research universities.

The gap is particularly apparent regarding support for research assistants, where UK often lags well behind its competitors. Additional funds could be used in any number of ways to improve graduate student stipends, depending on specific program priorities, by offering:

- o competitively available "add-ons" to existing assistantship stipends (modeled after the currently used \$3000 Quality Achievement Awards);
- o research start-up/recruitment packages for graduate students, providing them with first-year funding for their initial research and/or professional expenses;
- o increases in TA/RA stipend amounts; and
- o increases in the number of funded assistantships.

The Task Force estimates that \$750,000 would be necessary to improve substantially the University's graduate student recruiting success using one or more of the approaches indicated above.

3. Support for the University's new Multi-year Fellowship program. Based on recommendations from the Boling Report and consistent with the support available to students at peer research universities, the Graduate School implemented in 1997 a plan to create, over a three-year period, 30 multi-year fellowships, each carrying a 12-month \$15,000 stipend along with full tuition scholarships. After three years, the Graduate School will have reallocated \$577,000 to fund the multi-year fellowships. This reallocation must be supplemented by new funding if the University is to maintain a competitive fellowship program. The Task Force estimates that at least \$500,000 is necessary immediately to maintain a minimally adequate fellowship program.

4. Support of graduate student research and professional development. Patterned after special support programs initiated by the Graduate School this year, these awards would provide funding for the following important activities:

- o Graduate student travel to present scholarly papers and research at professional conferences;
- o Funding for research at a site distant from campus (archival research, laboratory study, field experiences); and
- o Funding to prepare graduate students to become excellent teachers both at the University of Kentucky and at their subsequent academic positions. Many graduate students teach undergraduate students as part of their academic responsibilities. In order to strengthen graduate student teaching skills and enrich the educational experiences of undergraduates, teaching development programs should be an integral part of the graduate experience. It is also important for the University to continue its current commitment to preparing graduate students to become effective faculty for the future, a commitment currently embodied in its Preparing Future Faculty program. The Task Force estimates a cost of \$150,000 for these activities.

5. Provide funds to support undergraduate research experiences. Part of the mission of an outstanding university is to provide its undergraduate students an education distinguished by their inclusion in original research

and the process of discovery. As stated by the Lexington Campus Blue Ribbon Committee, the University must "affirm the central role of undergraduate instruction on the Lexington Campus, and even more important, develop the synergy between excellent research and exceptional undergraduate experience." Such synergy can be promoted through the development of expectations and opportunities for all undergraduates to be involved in faculty-directed team research/scholarship. To facilitate the development of these new opportunities, the Task Force estimates that \$200,000 would be necessary.

6. Provide an enhancement of graduate assistant health benefits. Per the Boling Committee recommendation, graduate assistants should be able to purchase health insurance comparable to that provided university employees, aided by some University subsidy of the costs of the insurance. The issue of graduate assistant health benefits is an increasing area of concern nationally. The University of Kentucky's health insurance options for graduate students are not competitive with those of many institutions, especially those that purchase health insurance for their graduate assistants.

7. Increase the number of post-doctoral scholars appointments. Such appointments are critical to the growth of the University's research programs and provide additional training necessary for many Ph.D.s to secure permanent positions in academic institutions or multidisciplinary industries.

Two questions pertaining to the above priorities must be addressed. First, should new investments in graduate student support be made across the board or aimed initially at programs that have been identified as targets for investment? A related question is whether targeted programs should be expected to devote any new resources they receive to the same kind of support programs or whether they will be given flexibility to tailor these resources to address their most pressing needs. The Task Force recommends that proposed enhancements 1 and 2 (above) in graduate student support be made available to those programs identified as Targets of Opportunity for investment. The Task Force further recommends that Multi-year Fellowships, an opportunity to purchase University employee health insurance, and the student development initiatives in 4 (above) be available to all graduate students. Of course, the competitive nature of Multi-year Fellowships and the student development initiatives contribute selectively to the support of the University's strongest graduate students.

Targeted programs should be given flexibility in how they deploy new graduate student support resources. One program may conclude that in-state tuition scholarships for RAs would best sharpen its competitive edge; another may elect to increase the stipend for TAs; a third may opt for increasing the number of assistantships. In many cases, a mix of these alternatives will be most strategic. Given that the programs targeted for enhancement have either proven or potential excellence, it would be best to allow them considerable latitude in selecting the new support mechanisms best suited to their needs and aspirations.

### Section III

#### Expanding Faculty Resources

Any university can only be as great as its faculty. The key to the University of Kentucky's status as one of the nation's leading research universities depends on its ability to recruit and retain distinguished faculty. As reported by the Boling Committee on Graduate Education, the

University of Kentucky has had excellent success in recruiting outstanding untenured faculty. It has, however, been less successful at retaining its established faculty and in attracting nationally prominent senior scholars to its ranks. One major reason for these problems is that university salaries continue to lag behind benchmarks. As it seeks to increase excellence, the University will find that inadequate faculty salaries are an ever-larger obstacle than in the past. For the University of Kentucky to compete successfully with the nation's leading research universities, it must have the resources to pay competitive faculty salaries.

In addition, many of the program submissions to the Task Force mentioned the small number of faculty at UK compared to those institutions whose reputations and achievements currently exceed ours. The majority of even the strongest programs at UK are considerably smaller than their counterparts at benchmark institutions. Of greater concern, it is not unusual to find UK program faculties only half the size of the faculties of the top-20 programs whose ranks we aspire to join. It is essential that the University provide for selective increases in faculty size.

The Task Force recommends that priority be given to the recruitment and retention of additional outstanding faculty. Whether the strategy should be to hire additional faculty at the beginning level and build from that point, to invest in the University's current excellent faculty so as to retain them, or to recruit senior scholars with nationally distinguished reputations can best be decided by the individual programs. As with the recruitment of graduate students, a culturally diverse faculty should remain a priority for the University as it strives to achieve higher levels of academic excellence and to educate and enlighten all areas of society. As a first step in improving the University's faculty and staff, an immediate investment from the Research Excellence Trust Fund, matched by reallocated institutional funds or new endowed income from development gifts to the University, should be devoted to the following ranked priorities. It is essential that these initial investments be followed with additional funding if the University is to hire sufficient faculty and staff to reach its mandated goals over the next five years (1998-2003).

1. Add 40 new faculty lines to enhance specific programs. At an average salary of \$50,000 per year, these new lines would require two million dollars in recurring funding. Along with the cost of these hires, a million dollars in nonrecurring research start-up costs should be provided.

2. Create 25 Commonwealth Professorships. Added to the base salary, each of these professorships would provide \$20,000 in additional annual salary or scholarly support funds to recipients, who would be a mix of current and recruited faculty. The Commonwealth Professorships would be an excellent mechanism for retaining key faculty. This priority would require \$500,000 in recurring funding.

3. Develop endowments sufficient to add five endowed chairs (at one million dollars per chair) per year for the next five years, as recommended by the Boling Committee Report. These endowed chairs would be used to recruit or retain outstanding scholars who bring with them international reputations for research excellence and proven ability to sustain significant extramural funding for their work. Placement of these chairs should be consistent with the programmatic opportunities targeted for enhancement in Section I of this report.

4. Increase compensation for the 12-month workload of Chairs and Directors of Graduate Studies. These positions, especially in large programs, require a yearlong effort, although the official faculty appointment may be for nine months. The summer months also allow crucial access for students whose family or work duties prevent them from participating fully within the traditional nine-month academic calendar. Therefore, it is critical to

provide summer compensation to departmental and program administrators who are responsible for the direction of their programs on a year-round basis. The Task Force recommends that new recurring funding be provided for summer compensation for Chairs and Directors of Graduate Studies.

#### Section IV Strengthening Research Infrastructures

The future of the research enterprise at the University of Kentucky lies clearly in the quality of its faculty, staff, and students. Although we cannot underestimate the importance of hiring the best faculty and staff and recruiting the best students at all levels, we recognize that their success is predicated upon having the facilities and equipment necessary to enable them to be competitive. This section of the Task Force Report summarizes several research infrastructure needs that are necessary for our future success.

##### Research Equipment

The need for equipment purchase, replacement and maintenance has never been greater than it is today. We find increasingly that modern instrumentation, often driven by the same computer technology that we see across campus, has an ever decreasing "half-life". Where nuclear magnetic resonance spectrometers were once purchased and operated for ten or more years, these same instruments, without upgrades and new software, are obsolete in five or fewer years. Social scientists now routinely use enormous data sets and need sophisticated software programs that can only be run on sophisticated computational equipment. Where once humanists required little more than access to a library, they now need access to computing and imaging equipment. Typewriters and IBM punchcards are as obsolete in modern research as the horse and buggy are in transportation, and equipment costs that were once regarded as non-recurring must now be considered recurring. Bond Issue Funding. The last major investment in research equipment occurred in 1987, when a \$20 million dollar bond issue for research equipment was used to purchase equipment. Unfortunately, this equipment is now out of date and needs replacement. In addition, the introduction of computer technology into research equipment and numerous scientific developments has made possible new equipment technologies that are essential for our research and graduate education programs to be competitive. There is need for a new \$20 million dollar bond issue to upgrade and renew research equipment.

Faculty Start-Up and Continuing Support. A crucial need within the University is a revolving fund to purchase new equipment for a variety of disciplinary areas. Although it will be necessary to purchase equipment for those areas targeted for enhancement in the immediate future, it will also be important to maintain and improve equipment in general. Just as equipment undergoes rapid change, disciplines experience an equally rapid infusion of new ideas and new methodologies from other areas. The invasion of molecular biology in the agricultural and medical sciences represents but one of many such examples. Those areas that we select for targeted enhancement do not function independently of other disciplines. If we are to ensure the success of these investments, it is also important to maintain and improve equipment for other areas of the University that are essential to maintaining the research enterprise.

To accomplish these investments, we rely principally on two mechanisms for purchasing new equipment. When new faculty are hired, they bring new ideas and a need for new equipment, particularly in such areas as engineering and the sciences. Although start-up costs may involve a need for supplies or

personnel, the major cost is the purchase and maintenance of new equipment.

The Task Force recommends that the University establish a recurring fund to provide a stable base for faculty start-up and other new equipment purchases.

Matching Grants for Equipment. A need also exists to purchase equipment for continuing faculty. Major pieces of equipment are often acquired using federal funding sources; such grant applications usually require University matching commitments. As these needs and opportunities for funding are often idiosyncratic, it is impossible to develop plans in advance, which anticipate these matching requirements. In the past, the University has been able to compete on an ad hoc basis. If the University of Kentucky were to provide recurring annual funds for this purpose, we could meet matching requirements and effectively double our money for equipment. The availability of such equipment funds would do far more than just fulfill our matching requirements on federal grants. It would enable us to meet two other significant needs. Each year, some equipment becomes outdated or irreparable, and unfortunately, federal funds are often not available to purchase replacements. Keeping up with the ever-expanding palette of brand-new instrumentation is even more challenging. New research techniques are introduced and become standard before the next biennial equipment authorization request is written. Each year, some equipment needs to be upgraded if the faculty are to maintain a competitive advantage with faculty at other universities in competing for individual research grants. As well, we find that more and more of our equipment cannot simply be repaired using in-house staff. There is an obvious need for an active program to 1) replace equipment that cannot be obtained through federal grants, 2) upgrade equipment that needs it, and 3) repair equipment through the purchase of equipment maintenance contracts from manufacturers. In past years, the University has made effective use of peer-reviewed proposals for the limited equipment and maintenance funds now at its disposal.

In order to meet institutional research equipment needs, the Task Force recommends that during the period 1998 -2003 the University establish an annual \$4.7 million dollar research equipment fund for purposes of providing a stable funding base for these important needs: Faculty Start-Up and Continuing Support (\$4M), and Matching Equipment Grants and Maintenance (\$700K).

#### Technical and Professional Staff.

A major factor limiting the success of some programs - particularly those in the sciences - is insufficient technical, administrative, and support staff. High quality staff increase the University's ability to conduct its research and education missions efficiently and effectively. Well-trained technical staff are critical to the best use and maintenance of the increasingly sophisticated technology employed in modern laboratories and classrooms. Competitive staff salaries, achieved in part by implementation of the It's about Staff program, are also critical to the University's ability to employ a first-rate staff.

Research facilities, particularly the shared-use facilities on campus, have demonstrated the value of having full-time, well trained staff to run samples, to train graduate students and postdoctoral fellows, and to perform routine maintenance. The watchful eye of a competent research staff member can prevent catastrophic equipment breakdowns that cost the University much more in lost research time and emergency repairs than the cost of the staff member's salary. In some instances, a lack of technical staff forces faculty to perform these functions. Consequently, these faculty have less time to devote to their own research or the submission of grant proposals to replace or upgrade this equipment.

In these days of increased scrutiny of cost accounting by federal funding agencies, there is increased need for competent budgeting and management staff. The roles of departmental business managers have expanded far beyond keeping a simple set of books and making sure that the light bulbs work. Departments need business managers who can handle complex, computer-based accounting, federal safety mandates, hazardous waste disposal, cost accounting standards, as well as the usual business of building management. Hiring and keeping competent departmental business officers saves many hours of faculty time and potentially saves the University from fines or litigation when federally mandated standards are not understood and followed. In addition to technical and administrative personnel, we also need to look at the staff necessary to drive our technology transfer efforts. Such activities are certain to be part of any first-class university in the future. The important link between enhanced research and economic development is realized through effective mechanisms to promote transfer of university technology from the discovery phase to the market. To this end, the ability to accommodate current businesses that have been spun off from technology-transfer activities in ASTeCC has been oversubscribed; new facilities to house incubated business in our university-based research campus at Coldstream must be developed. To the extent that the University could be helpful in constructing such facilities or being a guarantor of loans for projects brought forward by developers in the private sector, the overall continued growth in technology transfer would be greatly advantaged. This not only creates new businesses here in central Kentucky, but it also allows us to retain creative researchers as faculty. The Task Force recommends that funding be provided for the recruitment and retention of new staff in selected Target of Opportunity areas. Summary. If over the course of the five years of the strategic plan (1998-2003) the University were able to develop a \$5 million dollar recurring fund on an annual basis, then it would have made a highly significant advancement toward meeting the needs which have been detailed above for start-up, matching requirements, replacement, upgrade, repair of a significant fraction of the equipment inventory on an annual basis, and for hiring the necessary technical and professional staff to support needs in a number of research-related arenas.

#### Facilities

The University of Kentucky, like most universities, possesses facilities designed for faculty, staff, and students of a previous decade and regrettably, sometimes, of several decades ago. An active program to assess and renovate facilities would enhance the research programs at the University. If we define "research" broadly, such a program embraces libraries, studios, offices, and laboratories. The opening of the W. T. Young Library is a singular step forward in addressing the needs for a new library that will support research in all disciplines. Programs to enhance the facilities of the university will, of necessity, include renovation of current research facilities and the construction of new facilities to house the expanding research programs.

Renovation Needs. Renovation funds have been in very short supply at the University of Kentucky during the 1990's because of earlier budget cuts and the inability to identify significant renovation funds for an aging campus where the major research buildings were built in the 1950-1960's. One approach to resolving this issue would be to request a bond issue in the amount of \$30 million dollars to renovate 400,000 sq. ft. of research space. We estimate that the cost of the renovations will average \$75/sq. ft. if the renovation begins in FY99.

Renovation needs are particularly apparent in all areas of the University.

On the Lexington Campus, for example, remodeling needs are urgent in the College of Engineering (Departments of Computer Science and Electrical Engineering) as they are in the College of Arts and Sciences' School of Biological Sciences. The same is true in the Medical Center sector where the Chandler Medical Center and College of Dentistry buildings were built in the early 1960's. Numerous other examples exist across the University where there is great need for modernization. The renovation of these facilities would be an important step toward providing the kinds of facilities that attract and retain the best faculty, staff, and students. Only with high quality research facilities can the University remain competitive for the kinds of external funding which will increase its standing among other universities.

**New Facilities.** The University is in serious need of new research facilities to accommodate on-going research and to provide facilities for the new faculty and students whom we will need to attract to become a top-20 public university. The University has instituted a master plan for the future development of the campus. Consistent with this report and the master plan, the University has identified facilities that now have high priority for consideration in the State's capital 1998 -2000 construction budget: a Mechanical Engineering Building, an Allied Health and Aging Building, authorization for a Plant Sciences Building, and funding for the College of Agriculture's facilities on its Woodford County Farm. Along with these new facilities, that are vital to the University's future, there is also a need for the maintenance and operating funds necessary to maintain these facilities over time.

Reports to the Task Force from virtually all areas of the University spoke of the need for new and expanded facilities if the University is to enhance its posture as a competitive nationally prominent research institution. The Task Force strongly recommends a revisiting of institutional priorities for its capital construction list which would take into account the needs of Targets of Opportunity identified within this Report. If these units are to be enhanced and if the University is to become more competitive as a Research I Institution, then certain research facility needs require high priority for the immediate future.

One of the most pressing needs, as identified in unit reports submitted to the Task Force, is for new research facilities to support basic research programs in the Medical Center and on the Lexington Campus. Expansion of research activities in programs such as biomedical sciences, nutritional sciences, biomedical engineering, biological sciences, and pharmaceutical sciences are largely dependent on the acquisition of adequate space to accommodate their research programs. One important corollary to the need for new basic research facilities is the fact that the National Institutes of Health, the largest non-defense provider of federal research funds, is expected to double its current \$12 billion dollar annual budget for research over the course of the next decade. Another is the fact that the pharmaceutical industry is undergoing major changes whereby they are reducing their in-house research activities and are depending more on academic medical centers. Predictions are that within the next five years the pharmaceutical industry will double its yearly research budget to some \$30 billion dollars per year.

The Task Force has identified as one of the major Areas of Institutional Strength the field of Genetics and Molecular Biology whose contributing units are represented in both the Medical Center and Lexington campuses. In this context, the Task Force recommends consideration of a bond issue for \$60 million dollars to build a 240,000 gross (150,000 net) sq. ft. state-of-the-art facility (\$250 per sq. ft.) that could house genetics and molecular biology groups, among others. Such a building would be an

important factor in the enhancement of the multidisciplinary focus that successful biomedical and biological sciences programs have taken over the past decade; it would also focus the first new research facility in the fastest growing research area of the University where strength is already present and the ability to attract new funding is most promising. As well, a biosciences research facility of this magnitude could also provide much-needed multidisciplinary research space for ecologists and environmental biologists whose federally funded research activities are presently constrained by lack of space and inadequate room for expansion. Several of the University's strong multidisciplinary units, some of which are in the social sciences, do not have adequate facilities to meet their needs. Groups working in health communications, drug and alcohol abuse prevention, injury prevention, and several others have brought considerable recognition and research funding to the University. In many cases their research is carried out in space rented from the private sector because of the lack of available space on campus. Such restrictions often impair their effectiveness and their contributions to the University's research programs. They also result in reduced levels of interaction with other campus-housed units--one of the prime requisites for effective multidisciplinary activity. In its planning for future capital construction requests, the University should give consideration to the possibility of constructing a new multidisciplinary facility of approximately 60,000 gross sq. ft. to meet current and future needs and to promote closer interaction among the social sciences, humanities, and other disciplinary areas.

#### Section V

#### Enhancing Support Systems

##### Computing and Computer Technology

Computing and Computer Technology have become indispensable tools for academic scholarship in all disciplines at the University of Kentucky. Marked advances in both research and graduate education will in many cases depend on the quality of our computational support services. To compete at the highest levels, UK must at a minimum furnish faculty and graduate student offices with appropriate computing equipment, up-to-date software, and high-speed network access. Stable operating funds and support staff are essential to maintain systems, provide data storage and backup, install software, and give training and consulting with new installations and upgrades. Many on-campus research projects need the crucial support of qualified technicians to build tools, design circuits, repair and maintain equipment, help carry out experiments, etc. Without this support, the research projects cannot be done in a timely fashion and will not be competitive with those carried out in other universities or national laboratories. To recruit and retain competent technical staff, it is essential to have salaries.

The range of computational equipment supporting research at UK may be compared to a pyramid. At its base are the desktop facilities for faculty and graduate students. Some researchers require the specialized power of a UNIX workstation for visualization and computation; others require a fast PC with large amounts of local data storage to run statistical analyses or to archive huge image databases and retrieve data quickly; still others require high speed text processing and image manipulation on a PC. Regardless of the application, faculty need ready access on their desktop to a state-of-the-art workstation or computer connected to a high-speed network for access to library catalogs, online resources, and the ever-growing digital libraries, as well as for productive collaborations with other scholars and graduate students on campus and at other institutions across the nation and the world. At the mid-levels of this

pyramid are specialized college and departmental servers, which provide essential complementary and supplementary facilities for the workstations. At the apex are highly specialized, high-performance parallel supercomputers, for which the University is already well known. A comprehensive research university must furnish this broad range of computational services. Missing or inadequate facilities at any level of the pyramid will degrade the entire research enterprise by impeding work and encouraging the most successful research faculty to seek positions elsewhere. In addition to providing on-campus access to computing facilities, the University could greatly enhance its research and graduate programs, not to mention its recruiting capabilities, by upgrading off-campus access to servers and by arranging subsidized programs for graduate students to purchase home equipment and internet access.

#### Libraries

Graduate education and research are also dependent on excellent, efficient library and information services. For areas targeted for excellence, information resources must be comprehensive and current, as doctoral students require access to all of the literature in their fields and researchers in all disciplines must have the most recent information accessible. Research is built on previous scholarship and libraries are repositories of this ever-replenishing information. It is necessary for all serious research libraries to provide access to research material in both print and digital formats. This will be true for the foreseeable future, if not forever, given the unlikelihood of any research library ever having the means or the staff to digitize millions of books. An adequate materials budget to acquire books and journals in a print format or in an electronic format when available is fundamental to a library serving the needs of any major graduate and research university. Without this comprehensive foundation, enhancement of graduate and research programs is simply not possible.

One of the factors that distinguishes a research library from other libraries is the collection of primary research material, including manuscripts, special private collections, state papers, diaries, rare books, maps, prints, drawings, and unique data sets of all imaginable kinds. Although they can in many ways provide superior research access to such holdings, digital versions of unique documents can never be identical substitutes for these documents. Serious research scholars will always recognize that digital images are in fact images, and the great research libraries will remain those that take responsibility for collecting and preserving original documents for posterity.

By providing electronic access to selected parts of our most distinctive holdings, our libraries will not only make unique collections available for research around the world but also bring attention to what is extraordinary here. For example, the Modern Political Manuscript Collection at the Libraries' Special Collections Department currently ranks among the top 20-25 such programs in the country, while the supporting Oral History Program is ranked among the top 5. They become truly valuable holdings when scholars use them. When the William T. Young Library opens, the libraries plan to move Special Collections to the King South 1931 Building, where with appropriate staff it could develop its nascent digitizing capability so that the extraordinary holdings in the unit can be shared by way of the Internet with students and faculty participating in the Commonwealth Virtual University and distance education programs. A digitizing program is also essential for the UK records retention, required by law. With the opening of the Center for Electronic Texts and the Center for Advanced Research in Humanities Computing in the WTYL, these

opportunities for digitizing primary research material will be greatly enhanced. A geographic information system (GIS) would also find a logical home in the WTYL.

When the new library opens, the University will have a state-of-the-art facility with a communications infrastructure far superior to other research libraries. To take advantage of these incomparable facilities, it will be necessary to maintain high-end workstations, digital cameras, scanners, and related equipment in the Libraries. The current NOTIS integrated library system must be replaced within the next few years by a system that allows remote access to a fully integrated catalog with direct links provided by librarians to digital resources available on the Web and the digital libraries steadily accruing at UK. A newly trained and increased staff must not only provide access to the print holdings the Libraries will continue to collect, but also undertake aggressive collection development of electronic resources, and expert access through a single-entry, PC-based, Web compatible, front-end to all library information resources (cf. the current home page of the Libraries at <[www.uky.edu/Libraries](http://www.uky.edu/Libraries)>). Training library clients must become an important function for librarians, including working with faculty and graduate students to help them integrate information technology in their research and teaching.

#### Communication Technologies

The University of Kentucky must continue its commitment to a first-rate communications infrastructure. Our first priority should be to expand and enhance local campus networks, which now include the new library, building ever faster ATM backbones and offering users switched fast Ethernet, to support research computing as well as virtual laboratories and classrooms. We must maintain our leadership in national partnerships, in particular NSF's Partnership for Advanced Computation Infrastructure (PACI) and the Internet 2, to develop a high performance communications technology grid by continuing to provide the resources of a major regional node. Higher speed regional network interconnectivity is, and will continue to be, absolutely essential for research and graduate education at regional universities and laboratories. There will be a major funding requirement to develop our part of the national technology grid.

A distributed, operationally transparent, hierarchical computational architecture offers the potential for optimizing the use of valuable high performance computing resources in ways not possible for each of the independent centers serving only their local users. Together with the increasing availability of high-speed, broad bandwidth, communication networks, it is now feasible to have a shared and distributed computational infrastructure. Technology holds vast potential for greater collaboration among researchers, who will be able to share access to data bases, exchange research results, and hold discussions on a real-time or near real-time basis. This would involve desktop-to-desktop audio-and-video sessions among distant colleagues, separated physically by institutional and geographical barriers. The same real-time video and audio now sought for live teaching and collaboration are likely to experience rapid growth in use as archives for streaming media and as content for high performance world wide web-based applications. Universities hold in their library collections some of the world's most valuable scholarly collections; selected works among them are already being converted to digital form. Having real-time access to such written, visual, and audio records would stimulate more vigorous digital conversion of these collections, making them widely available for primary research, while protecting the original sources from unnecessary handling. Two crucial communications requirements

are multi-media, including streaming video and virtual meeting rooms, and a network that will support the smooth distribution of video. The two are important because the first supports the emerging virtual university classroom and the second supports the movement to using visualization of research data.

UK is an established leader in deploying a communications infrastructure to support its research mission. If we meet current commitments and planning, UK will continue its success and will become an integral regional research node on the national technology grid.

## Summary Conclusions and Observations

### Task Force Goals

The Task Force on Graduate Education and Research initiated its activities with three specific goals: 1) to evaluate individual research and graduate degree programs' capabilities for national and / or international recognition; 2) to identify broad programmatic areas of existing strengths, and opportunities for future development, within the University's graduate education and research efforts; and 3) to establish strategic indicators and an implementation plan for achieving institutional goals relating to graduate education and research.

A process involving faculty, academic and research units, deans and other administrators has been the avenue by which the Task Force sought to convey to the university community a new awareness of the Institution's mandated mission in graduate education and research. In turn, a keener awareness of institutional mission should be helpful in effecting the cultural change which is necessary for the University to reposition itself for future advancement. If the process in which the Task Force and the University Community have engaged proves to be but an aberration, then the results will be short-lived and of little consequence. On the other hand, if this is a process which ultimately charts the University's course toward achieving higher national distinction as a public graduate education and research institution during the coming decades of the 21st Century, then it will have fulfilled its purpose.

The model for achieving success is not a difficult one to formulate. The University's athletics program has successfully incorporated it for over a half century. It requires selective but sustained institutional commitment, long term investment in the best faculty, nationally competitive students, quality facilities, state-of-the-art equipment, and the development of an expectation that the University and its constituents will not settle for less than nationally-competitive status. The analogy could be carried further, but such is not necessary. Suffice it to say that the Task Force believes that the University of Kentucky can and will make the kinds of selective but sustained commitments that will lead to higher national and international stature in its graduate education and research programs than in the past. To achieve this ultimate goal, the Task Force has set forth in its Report specific recommendations for incorporation into the Institution's Strategic Plan for 1998 - 2003.

### Task Force Outcomes.

The corpus of the Task Force Report contains recommendations on the two primary goals assigned to it by President Wethington, namely identifying potential targets of opportunity for investment and determining broad areas

of institutional strength. The projected time frame for these recommendations is two-fold: the period of the next institutional strategic plan (1998 - 2003) and the twenty-year period mandated in House Bill No. 1 during which the University of Kentucky is to have achieved top-twenty status on the basis of several measures which may be applied to determine its institutional progress.

**Targeted Programs.** The evaluation of research and graduate degree programs to determine which have achieved or are capable of achieving national distinction has not been an easy process, owing to the inherent differences among programs, the imprecise measures for making such determinations, and the lack of consistent national norms for program assessment. While the Task Force has relied on external measures when available, identification of Targets of Opportunity has involved departments and schools, chairs and directors, deans and chancellors, as well as peer review groups from the membership of the Task Force. The result is a determination of units that justifiably occupy a top tier of "Distinguished, Nationally Competitive Programs" or a second tier that are "Positioned to Achieve National Stature". Units identified as Targets of Opportunity represent, in the opinion of the Task Force, those programs in which reasonable investment during the next strategic plan period of 1998 - 2003 could be expected to produce nationally visible results.

**Areas of Strength.** The Task Force has identified twelve major areas of strength or foci of research and graduate education activities. It bears repeating that these areas are so identified on the basis of "research and graduate education" activities; they are not intended to promote some underlying concept of administrative structure. They represent twelve broad areas of endeavor in which the University of Kentucky has achieved distinction or in which it has demonstrated its capacity to become more effective and better recognized in the future. Targets of opportunity grow out of these areas of strength which are consonant with the Institution's tradition as a land-grant university and its status as a comprehensive research university.

**Systemic Recommendations.** Sections II and III of this Report incorporate major recommendations from the 1996 Boling Report that address institution-wide issues relating to graduate education (students, faculty and staff) and research (equipment, facilities, etc.) which require support that, in the main, would be of benefit to all graduate education and research units. Section IV identifies essential support systems that merit continuing enhancement (computing and computer technology, libraries, communication technologies), if the graduate education and research agendas are to prosper.

**Implementation Strategy.** The Task Force on Graduate Education and Research serves in an advisory capacity to the President; therefore, its recommendations are subject to determination by him and his administrative staff as to which to implement and the timeframe for implementation. The Task Force proposes that the next step in implementation of this process would be to invite designated Targets of Opportunity (both Tiers I and II) to identify specific needs, establish priorities to be accomplished, and indicate anticipated achievements during the strategic plan period. In terms of immediate consideration, the President will likely want to identify those Targets of Opportunity (Section I) for which the University will seek resources from the Fund for Research Excellence held by the Council on Post Secondary Education, and to determine which recommendations in Sections II, III, and IV of this Report might be most appropriate for CPE funding in the context of House Bill No. 1. Other funding considerations for Target of Opportunity units or of systemic needs in graduate education and research will likely be a part of regular budgetary

considerations in terms of establishing funding priorities for 1998-99 and subsequent annual budgets.

When the planning period for the strategic plan of 2003 - 2008 begins, an internal assessment process should likely be undertaken once again 1) to determine the success of currently targeted programs at achieving their stated goals, and 2) to identify other programs or emerging initiatives which should be targeted for the next five-year period.

#### Recommended Strategic Indicators.

Relative to some of the major considerations formulated by the Task Force in the body of this report, the following are specific items which are being recommended to the University's Strategic Planning Committee for inclusion as Strategic Indicators of anticipated accomplishments during 1998 - 2003:

- Achieve ranking of ten research and graduate education programs in the numerical top-20 or top quartile of public research universities, as measured by ratings of individual disciplines, scholarly productivity, citation rankings, extramural support, reputation ratings, or other suitable measures
- Improve UK's national ranking among U.S. public research universities in total research expenditures from 45th to 40th
- Increase by 10% the number of faculty and graduate students who have earned national or international awards for their scholarly research, teaching, or service
- Increase by 15% the number of graduate students who have published their research in refereed journals, presented their research findings at professional meetings, and/or have earned recognition for their juried creative products
- Add 40 faculty positions, establish 25 endowed chairs, and fund 25 Commonwealth Professorships, to strengthen selected research and graduate education areas
- Increase faculty and graduate assistant stipends to the median of top-20 public research universities
- Provide full-time graduate assistants (both TAs and RAs) a tuition free education during the period they hold their assistantship
- Increase the annual number of graduate degrees awarded by 10% by the year 2003
- The University will continue development of the WT Young Library as the premier information service for the Commonwealth and by 2003 improve its rankings from 34th to 29th among public research libraries.
- The University will add and/or substantially renovate 400,000 sq. ft. of research and instructional space by 2003.