

EXECUTIVE SUMMARY

KEYNOTE ADDRESS

George E. Walker
Vice President for Research
and Dean of the Graduate School, Indiana University

- It is important to establish vigorous, informed, cooperative efforts that promote the value of university research within federal, state and private sectors.
- The message we give the public must be focused and sincere. We must know and respond to the public's agenda for us.
- How does the public rate the value of university research? In general, they see its benefits, but suspect that it takes away from the learning experience for the undergraduate. It is important to improve the learning environment in tangible ways that allow stakeholders to see research as part of teaching and learning. At Indiana, we make sure large numbers of undergraduates have a research experience.
- You must have undergraduates, citizen groups, business leaders and powerful legislators and executives who are willing to "carry your water" for you. Hoosiers for Higher Education is a large grass roots organization that recruits alumni to educate the general public about the University and higher education issues. These volunteers keep in contact with elected officials. They advocate for our institution wherever they go and none of them are affiliated with the University.
- As a marketing strategy, we impress on students that the prestige of the institution depends on research and this adds value to their degree. As a result, our undergraduate students specifically requested that their tuition be increased an additional one percent, with that money invested in hiring more faculty to teach and do research.
- To generate graduate student enthusiasm and earn their trust, we have at Indiana initiatives involving day care, health insurance, and a placement center. We give them representation in faculty governance, and on key university committees. The Graduate Student Organization meets once or twice a year with the Board of Trustees and this has been a positive experience for them and the Trustees.

- Faculty morale is important. Faculty can play a vital role in advocating for research because of their enthusiasm and their knowledge. Link faculty together through your funding mechanisms so that they support each other. At Indiana, the researchers in the humanities care about the Cyclotron Facility in the sciences because they know that resources generated by the Cyclotron are a significant source of funding for their own centers.
- We support and publicize research and scholarship on teaching.
- We make sure every small and medium business in Indiana receives assistance and information through the Industrial Research Liaison program. We also provide access to the university's best strategists and scientists, laboratories, tools and information technology through the Advanced Research & Technology Institute, a private not-for-profit agent of Indiana University.
- At the federal level, top university officials regularly visit our congressional delegation. Our people also have leadership roles in the national higher education associations where we are seen advocating for support from federal funding agencies.
- Cooperation among institutions is especially important at the state level. When we approach the legislature, we work with Purdue University on major funding initiatives and we both win.

RESPONSE TO THE KEYNOTE ADDRESS

Robert E. Barnhill
 Vice Chancellor for Research and Public Service
 University of Kansas

- Leadership at every level is essential for institutional research competitiveness. This includes the faculty as well as administrators.
- Only the flexible will thrive. Universities must be flexible in their approach and they must have clear goals and expectations.
- Strategic intent by top leadership, coupled with natural advantages and local expertise, can lead to research enhancement that lifts the entire institution.
- Performance metrics are important because we will become what we measure. Universities often do not set research goals, or if they do,

the goals don't have quantitative measures. If we want the support of the public, it is essential to have quantitative, easily understood goals.

- An institution has arrived at a suitable research destination if it has: high institutional rankings; world class research areas; cash; full utilization of the university community; and it adds value to society.
- In the late 1990's, we assessed the feasibility of conducting world class research on the four campuses of the University of Kansas by issuing a call for proposals. The steering committee reviewed these proposals and selected four megathemes: information technology, human biosciences, the human condition, and environmental science & engineering. We then inventoried the three research universities of Kansas and determined four strategic initiatives in science and technology for the state: Information Technology, Human Biosciences, Agricultural Biotechnology and Aviation. We are promoting these initiatives at the state, regional and national levels.
- Graduates are the largest form of technology transfer from research universities. At the University of Kansas, we have quantified the economic impact for our state. The graduates of our three Kansas research institutions, whose income is a result of their degrees, pay \$700 million in state taxes annually, a figure that exceeds the annual state appropriation to these universities.
- The University of Kansas is participating in a poll of the public through Research!America. It will assess the support of science in general in our state.

PANEL OF RESEARCHERS

J.E. Leach, Plant Pathology, Kansas State University

Harris Cooper, Psychology, University of Missouri - Columbia

Valentino Stella, Pharmaceutical Chemistry, University of Kansas

Steven Barlow, Speech-Language-Hearing, University of Kansas

- Undergraduate programs are enriched by graduate programs. When we bring undergraduates into the laboratory, working with graduate students, we teach them the scientific method and collaboration. They even come to understand globalization. When a university has a good research program, undergraduates are exposed to state-of-the-art equipment and technologies.
- The amount of social research available to policy makers has dramatically increased and yet the promise of evidence-based decision

making in social policy remains largely unfulfilled because disparate results and flaws in design discourage policy makers from using university research. Many social scientists now agree that the key to providing accessible policy information is to synthesize research findings through systematic reviews of multiple studies. Two such online resources are now available for policy makers: The Cochrane Collaboration and the Campbell Collaboration. The Cochrane Collaboration prepares, maintains and ensures accessibility of systematic reviews of the effects of health care interventions. The Campbell Collaboration works in much the same way in the areas of public policy on education, crime and justice, and social welfare.

- We have the ability to move new technologies beyond the concept stage to commercial reality. This brings value to society in terms of rapid access to health improvement, and it brings economic benefits to the University and the State. The University and the companies created from research at the University must protect intellectual property by filing patents in a timely manner. It is better to delay publication of information on novel technologies until patents or copyrights are filed. Patent protection is essential for commercialization, but its real value lies in enabling development of a new drug which might save lives or enhance the quality of life. Companies will not invest in research that does not have a patent. Delaying publication until patents are filed conflicts with the traditional aim of academia ▽ sharing new knowledge in a timely manner. But the cost to society is great when a promising new technology is never developed because it was not protected prior to publication.
- Many neurological problems in children born prematurely are not discovered using traditional diagnostic tools until the child is a toddler, or enters preschool or elementary school. The key is early identification. During the past decade, a new approach and corresponding technology has been developed with the mechanisms of neuroplasticity in mind for use with premature infants at risk for brain insult. Collaboration is essential for research in this area. To be successful, one must enlist hardware and software engineers, mechanical design specialists, machinists, electrophysiologists, statisticians, pediatric nurses, developmental pediatricians, neonatologists, and researchers. Gaining access to clinical test sites is critical; the principal investigator must convince the host site that the question under study is significant and bears direct relevance to patient care, with little or no risk to the test population. Biomedical research costs money and extramural support is essential.

ADMINISTRATIVE PERSPECTIVES

Jack Burns, Vice Provost for Research, University of Missouri
Thomas Rosenquist, Director, Research Development, Nebraska Medical
James Guikema, Associate Dean, Kansas State University
Brady Deaton, Provost, University of Missouri - Columbia
Marsha Torr, Vice Chancellor for Research, University of Nebraska

- Learning about science and technology ranks highly on the personal agendas of most citizens, yet only one in nine persons believe he or she is well-informed, and only one in four claim to be scientifically literate. Science reporting is essential to forming public opinion. Traditional public relations departments are the information outlets on university campuses. More and more public research universities, however, have decided to take the message directly to non-academic audiences through alternative means. The University of Missouri-Columbia has developed *Illumination*, a full-color, 32-page research magazine issued by the Office of Research Publications. Its purpose is to inform, entertain, inspire and show Missouri residents how state and federally funded research benefits them. It also explains to the public how research enhances the teaching mission and it demonstrates the leadership of the University of Missouri nationally. *Illumination* provides public recognition of individual scientists and scholars whose contributions might not be recognized by the media. This is the perfect time to grab hold of the public's attention as scientific discovery expands the boundaries of human knowledge in new ways.
- Research sponsored by a grant from the National Institutes of Health became an explosive political issue in Nebraska once media coverage showed that it involved embryonic neurons obtained from elective abortions. Despite the worthwhile purpose of the research addressing a major incurable neurodegenerative disorder the issue polarized the community, brought about public debate between the Governor and the University President, and made the integrity of research a divisive issue in the Nebraska legislature. Among the lessons learned are: some research issues are explosive and dangerous; universities that conduct controversial research must be fully prepared; and the university must be aggressive in assuring the integrity, independence and objectivity of its research enterprise.
- By working with K-12 education, we reach important partners who carry our message that university research deserves state-wide investment. Kansas State University places education students who

will teach biology in research settings in their sophomore and junior years so they experience the scholarship of science. The University of Kansas has a program to place graduate students in the sciences in K-12 classrooms.

- We are now into a third generation approach for building research systems on most of our campuses. The first generation consisted of hiring good scientists and providing them with the best support and facilities possible and leaving them alone. This caused many scientists to prosper, but had less benefit to society than expected. A second generation approach incorporated more systematic quantification of the relative costs of individual projects and involved monitoring progress against objectives, particularly in the private sector. Each project may have had great merit in the second generation, but the collective effort wasn't always attractive. A third generation approach involves designing a purposeful and strategic web of interlocking research activities, focusing on interdisciplinary and multidisciplinary approaches to key scientific issues. The third generation requires constant monitoring and adjustments to achieve breakthroughs in science, but higher education and research must incorporate processes of continual change.
- We must look at the public policy dimensions of what we do. It challenges our best thinking in science. And we must develop a culture of openness.
- Universities have traditionally been on high moral ground, presenting unbiased, in-depth assessments of complex issues. However, we are experiencing a shift as universities face tremendous pressure to find dollars that will build quality, cutting-edge programs, and as we enter into unknown realms which scientists now have the means to explore and manipulate. Contemporary issues—often involving research and rapidly changing technologies—are at the very least confusing to the public and may in the end shake the public's long-standing confidence in the universities. How do we shape public perception in the brave new world?

EPSCoR REPORT

Thomas N. Taylor, Director of Kansas NSF EPSCoR, University of Kansas

- The Experimental Program to Stimulate Competitive Research is premised on the belief that universities and their science and engineering faculty and students are valuable resources that can potentially influence a state's development in the 21st century just as

- agriculture, industry and natural resources influenced economic development in the 20th century. The goal is to identify, develop, and utilize a state's academic science and technology resources in a way that will support wealth creation and a more productive, fulfilling way of life for a state's citizenry. EPSCoR increases the R&D competitiveness of an eligible state through the development and utilization of the science and technology resources at its major research universities.
- Kansas joined EPSCoR in 1991 and has received three awards to date. The program in Kansas links faculty at the University of Kansas, Kansas State University and Wichita State University. Kansas is an EPSCoR state because in 1989 it ranked 33rd among states receiving federal R&D support, and less than one-half of one percent of all federal research dollars awarded to colleges and universities.
 - Kansas NSF EPSCoR has: fostered inter-institutional, inter-state, and regional research projects; assisted in hiring faculty; funded multi-user equipment; provided start-up funds to faculty early in their careers (FIRST Awards); supported special initiatives; sponsored strategic planning workshops; funded faculty travel to funding agencies; fostered industry-university research partnerships; provided editing assistance to faculty who are writing proposals; and funded large infrastructure-building research projects.

STATE POLICY AND UNIVERSITY RESEARCH

William R. Docking, Chair, Kansas Board of Regents

Kim Wilcox, Executive Director, Kansas Board of Regents

- The Kansas Board of Regents was recently given increased responsibilities. It now supervises and coordinates the state's 19 community colleges, 11 technical schools and a municipal university, in addition to continuing as the governing board for the state's six public universities. Of these many institutions, only three are designated doctoral degree-granting, research institutions. Thus, the time and energy available to devote to research is necessarily limited.
- By its nature, research is a "local" activity. The Board sees its role in these capacities: determining institutional direction and providing institutional support. Otherwise, it chooses to give faculty and scientists the freedom to do research without fear that the Regents will try to shape the direction of their efforts. However, as stewards of the public's trust, the Board is responsible for ensuring that the research is focused so as to meet the needs of the state in the broadest sense. This is accomplished largely through institutional mission. The Board

works with the institutions to minimize unnecessary duplication, and to define focus. The result is that the state does indeed have three engineering schools, but each with a unique focus—the University of Kansas is known for digital communications, Wichita State University for aeronautics, and Kansas State University is known for agricultural engineering. The Board monitors compliance with university mission especially in the approval process for new academic programs. And it has considerable influence over legislative funding requests for new research centers and initiatives. In terms of institutional support, the Board works on funding initiatives such as the Partnership for Faculty of Distinction program, which uses state matching funds to encourage the creation of endowed professorships by private donors. The Board is also proud of the ongoing programs and funding established through the Kansas Technology Enterprise Corporation (KTEC).

- The relationship between state policy and university research is bi-directional, in that research should inform public policy and policy decisions often direct/fund research. We should work to ensure that the outcomes of research result in changes in society. One of the most fundamental means of realizing social change is the legislative process. Yet, academia has not been effective in helping legislators make informed policy decisions based on research. The Universities must take responsibility for bridging the gap.

INITIATIVES IN KANSAS CITY ON BIOMEDICAL RESEARCH

Jared J. Grantham, M.D., University of Kansas Medical School
William Brundage, Exec. Director, Kansas City Area Life Sciences Institute
James Spigarelli, President and CEO, Midwest Research Institute

- The University of Kansas has created a strong growth environment for renal research, and has established a successful clinical care unit through repeated investments in this research area since 1952. As the field developed, so did KU's program so that by today it has achieved national and international recognition, and is responsible for having trained 50 nephrologists, many of whom work regionally. Its clinical care program is one of the best, boasting the highest three year success rate for kidney transplant survival among the centers in Kansas, Missouri, Nebraska, and Iowa. Now in the year 2000, the Kidney Institute at KUMC is comprised of 34 collaborating faculty with over 100 research associates, and significant funding from the National Institutes of Health.
- The Kansas City Area Development Council and the Civic Council of Greater Kansas City established a Life Sciences Task Force which set

forth steps that must be taken to develop a "nationally known center of established, world-class life science companies, private and academic research institutions, and emerging, entrepreneurial companies." As part of this planning effort, the Life Sciences Institute was established to provide accountability, evaluation, oversight, resource allocation, collaboration, fundraising, lobbying and marketing. Five scientific/medical areas will be the focus of the Institute: human development and aging; cancer; cardiovascular diseases; neurological diseases; and infectious diseases. Fundraising will begin in September, 2000 once the business plan has been approved by the Kansas City Area Development Council and the Civic Council of Great Kansas City.

- Life sciences research and technology transfer will be an important part of the economic development of Kansas City over the next 10 to 20 years. Alliances that achieve use-directed fundamental research make an impact on the community in the most rapid manner. Kansas City has a good start in building valuable alliances among research organizations, foundations and civic institutions. For a research center to make an economic impact, it also needs capital, legal advice, and CEO's to mentor start-up companies. The Midwest Research Institute is preparing a strategic plan that will model the investment needed for R&D and also for education, technology transfer, and commercialization. It is important to create an infrastructure to support the creation of new companies that will add to the high technology job opportunities of the region.