

REIMAGINING THE UNIVERSITY

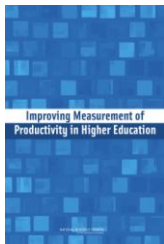
SELECT LIST OF REPORTS ON HIGHER EDUCATION FINANCING AND REFORM*

Government-University-Industry Research Roundtable Meeting
October 9-10, 2012



RESEARCH UNIVERSITIES AND THE FUTURE OF AMERICA: TEN BREAKTHROUGH ACTIONS VITAL TO OUR NATION'S PROSPERITY AND SECURITY (PGA 2012) *Research Universities and the Future*

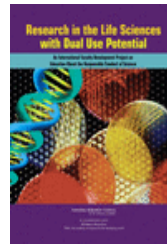
of America focuses on strengthening and expanding the partnership among universities and government, business, and philanthropy that has been central to American prosperity and security. The report focuses on the top 10 actions that Congress, the federal government, state governments, research universities, and others could take to strengthen the research and education missions of our research universities, their relationships with other parts of the national research enterprise, and their ability to transfer new knowledge and ideas to those who productively use them in our society and economy.



IMPROVING MEASUREMENT OF PRODUCTIVITY IN HIGHER EDUCATION

(DBASSE 2012) In the current environment of increasing tuition and shrinking public funds, a sense of urgency has

emerged to better track the performance of colleges and universities in the hope that their costs can be contained while not compromising quality or accessibility. *Improving Measurement of Productivity in Higher Education* presents an analytically well-defined concept of productivity in higher education and recommends empirically valid and operationally practical guidelines for measuring it. In addition to its obvious policy and research value, improved measures of productivity may generate insights that potentially lead to enhanced departmental, institutional, or system educational processes.



RESEARCH IN THE LIFE SCIENCES WITH DUAL USE POTENTIAL: AN INTERNATIONAL FACULTY DEVELOPMENT PROJECT ON EDUCATION ABOUT THE RESPONSIBLE

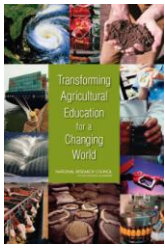
CONDUCT OF SCIENCE (DELS 2012) This report describes the outcomes of the planning meeting for a two-year project to develop a network of faculty who will be able to teach the challenges of research in the life sciences with dual use potential. Faculty will be able to incorporate such concepts into their teaching and research through exposure to the tenets of responsible conduct of research in active learning teaching methods. This report is intended to provide guidelines for that effort and to be applicable to any country wishing to adopt this educational model that combines principles of active learning and training with attention to norms of responsible science.



REDESIGNING CONTINUING EDUCATION IN THE HEALTH PROFESSIONS

(IOM 2010) *Redesigning Continuing Education in the Health Professions* illustrates a vision for a better system through a

comprehensive approach of continuing professional development, and posits a framework upon which to develop a new, more effective system. The book also offers principles to guide the creation of a national continuing education institute.



TRANSFORMING AGRICULTURAL EDUCATION FOR A CHANGING WORLD (DELS 2009) During the next ten years, colleges of agriculture will be challenged to transform their role in higher education and their relationship to the evolving global food and agricultural enterprise. If successful, agriculture colleges will emerge as an important

venue for scholars and stakeholders to address some of the most complex and urgent problems facing society. Such a transformation could reestablish and sustain the historical position of the college of agriculture as a cornerstone institution in academe, but for that to occur, a rapid and concerted effort by our higher education system is needed to shape their academic focus around the reality of issues that define the world's systems of food and agriculture and to refashion the way in which they foster knowledge of those complex systems in their students. Although there is no single approach to transforming agricultural education, a commitment to change is imperative.



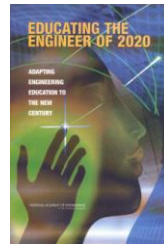
PARTNERSHIPS FOR EMERGING RESEARCH INSTITUTIONS: REPORT OF A WORKSHOP (PGA 2009) Constituting one-third of all U.S. institutions of higher education, emerging research institutions (ERIs) are crucial to sustaining the

nation's technological competitiveness through innovation and workforce development. Many, however, are not fully engaged in sustained sponsored research. This book summarizes the discussions at a workshop that examined the barriers ERIs face in building more robust research enterprises and approaches for overcoming those barriers.



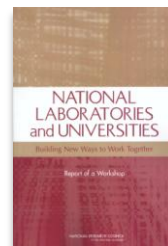
RISING ABOVE THE GATHERING STORM: ENERGIZING AND EMPLOYING AMERICA FOR A BRIGHTER ECONOMIC FUTURE (PGA 2006) In a world where advanced knowledge is widespread and low-cost labor readily available, U.S. advantages in the marketplace and in science and technology have begun to erode. A comprehensive federal effort to bolster

U.S. competitiveness is urgently needed through actions in four broad areas: improvements in K-12 science and mathematics education, increasing the nation's investment in basic research, attracting the best and brightest to pursue science and engineering degrees, and changing the innovation environment so the US is the most attractive country in the world in which to invest.



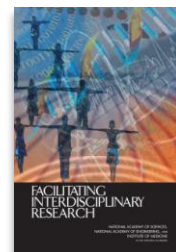
EDUCATING THE ENGINEER OF 2020: ADAPTING ENGINEERING EDUCATION TO THE NEW CENTURY (NAE 2005) *Educating the Engineer of 2020* is grounded by the observations, questions, and conclusions presented in the best-selling book *The Engineer of 2020: Visions of Engineering in the New Century*. This new book offers

recommendations on how to enrich and broaden engineering education so graduates are better prepared to work in a constantly changing global economy. It notes the importance of improving recruitment and retention of students and making the learning experience more meaningful to them. It also discusses the value of considering changes in engineering education in the broader context of enhancing the status of the engineering profession and improving the public understanding of engineering.



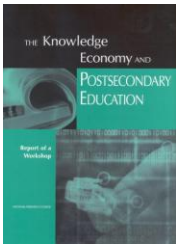
NATIONAL LABORATORIES AND UNIVERSITIES: BUILDING NEW WAYS TO WORK TOGETHER—REPORT OF A WORKSHOP (PGA 2005) In 2003 a workshop was held to explore the current state of collaboration between DOE's national laboratories and universities. The workshop

examined new models for collaboration that can provide increased value to both parties, especially in the areas of institutional incentives and structures, scientific user facilities, building the science and engineering workforce, and conducting research in a classified environment. Participants identified key barriers and best practices related to collaboration.



FACILITATING INTERDISCIPLINARY RESEARCH (PGA 2004)

Interdisciplinary research can be one of the most productive of intellectual pursuits, and its products have already delivered major social and economic benefits. It can be impeded, though, by policies that favor traditional disciplines. Drawing on case studies of successful programs, results from surveys of individual researchers and university provosts, and lessons from the national labs and industry, the report identifies steps that researchers, teachers, students, institutions, funding organizations, and disciplinary societies can take to more effectively conduct, facilitate, and evaluate interdisciplinary research programs and projects.



THE KNOWLEDGE ECONOMY AND POSTSECONDARY EDUCATION: REPORT OF A WORKSHOP (DBASSE 2002) **The Workshop on the Knowledge Economy and Postsecondary Education** documents changes seen in the postsecondary education system. In her report Lisa Hudson focuses on who is participating

in postsecondary education; Tom Bailey concentrates on community colleges as the most responsive institutions to employer needs; Carol Twigg surveys the ways that four-year institutions are attempting to modify their curricular offerings and pedagogy to adapt those that will be more useful; and Brian Pusser emphasizes the public's broader interests in higher education and challenges the acceptance of the primacy of job preparation for the individual and of "market" metaphors as an appropriate descriptor of American higher education. An example of a for-profit company providing necessary instruction for workers is also examined.



SCIENCE PROFESSIONALS: MASTER'S EDUCATION FOR A COMPETITIVE WORLD (PGA 2008)

What are employer needs for staff trained in the natural sciences at the master's degree level, and how do these professionals contribute in the workplace? How do master's programs support educational and career goals? Tackling these and other questions, this

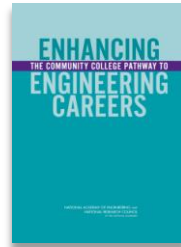
report concludes that a reinvigorated master's degree in the natural sciences can answer the demand for-science professionals in many fields and help ensure that the U.S. has the workforce it needs to stay competitive. Substantial efforts are already underway to enhance the master's in the natural sciences, particularly as a professional degree, and much can be learned from these programs.



FUNDING BIOMEDICAL RESEARCH PROGRAMS: CONTRIBUTIONS OF THE MARKEY TRUST (PGA 2006)

During an interval of 15 years, the Lucile P. Markey Charitable Trust spent over \$500 million on four programs in the basic biomedical sciences that support the education and research of graduate students, postdoctoral fellows, junior faculty, and senior researchers. The

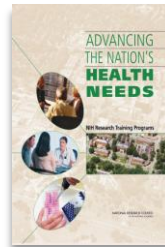
Markey Trust asked the NRC to evaluate these programs with two questions in mind: Were these funds well spent? What can others in the biomedical and philanthropic communities learn from the programs of the Markey Trust, both as an approach to funding biomedical research and as a model of philanthropy? One of five resulting reports, this volume examines the Research Program Grants, which awarded \$323 million to support investigators with a major commitment to the life sciences and to assist in the establishment, reorganization, or expansion of significant biomedical research centers or programs.



ENHANCING THE COMMUNITY COLLEGE PATHWAY TO ENGINEERING CAREERS (PGA 2005)

Community colleges play an important role in starting students on the road to engineering careers, but students often face obstacles in transferring to four-year educational institutions to continue their education.

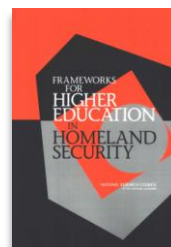
This report from the National Academy of Engineering and the National Research Council, discusses ways to improve the transfer experience for students at community colleges and offers strategies to enhance partnerships between those colleges and four-year engineering schools to help students transfer more smoothly. In particular, the book focuses on challenges and opportunities for improving transfer between community colleges and four-year educational institutions, recruitment and retention of students interested in engineering, the curricular content and quality of engineering programs, opportunities for community colleges to increase diversity in the engineering workforce, and a review of sources of information on community college and transfer students.



ADVANCING THE NATION'S HEALTH NEEDS: NIH RESEARCH TRAINING PROGRAMS (PGA 2005)

Twelfth in a series of assessments of the NIH National Research Service Awards (NRSA) program, this book examines the need for research personnel across a range of basic and clinical health fields. The total number of NRSA

positions awarded in the first three areas above should remain at least at the fiscal year 2002 level, with future increases commensurate with the rise in total NIH extramural research funding in these areas. Behavioral and social sciences research should be part of each institute's training portfolio, along with increased grants to physician scientists, a restructuring of the career development (K awards) program, and incentives to increase researchers in oral health, nursing, and health services research.



FRAMEWORKS FOR HIGHER EDUCATION IN HOMELAND SECURITY (PGA 2005)

Are there core pedagogical and skill-based homeland security program needs? This report examines current and proposed education programs focusing on various aspects of homeland security and comments on the possible parallels between

homeland security, area studies, international relations, and science policy. Potential curricula needs, particularly those that involve interdisciplinary aspects, are also suggested. The scope is limited to coursework-related offerings, primarily at the undergraduate and graduate levels.



PAN-ORGANIZATIONAL SUMMIT ON THE U.S. SCIENCE AND ENGINEERING WORKFORCE: MEETING SUMMARY (PGA 2003) Each of 32 nonprofit organizations contributing a presentation to the Pan-Organizational Summit on the Science and Engineering Workforce (November 11-12, 2002; The National Academies, Washington, DC) was invited to issue a corresponding

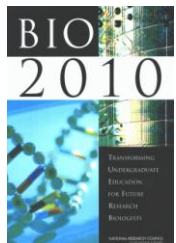
position paper to be reproduced in this volume. The bulk of this report comprises these papers. In addition, Shirley Jackson and Joseph Toole, two of the keynote speakers, have included their remarks.



ENVISIONING A 21ST CENTURY SCIENCE AND ENGINEERING WORKFORCE FOR THE UNITED STATES: TASKS FOR UNIVERSITY, INDUSTRY, AND GOVERNMENT

(2003) At the request of the Government-University-Industry Research Roundtable (GUIRR), Shirley Ann Jackson, President of Rensselaer Polytechnic Institute, presents in this

brief paper her views of the challenges of the 21st century for the science and engineering workforce. Dr. Jackson identifies factors that she believes are contributing to a declining science and engineering workforce, describes the risks and consequences of this decline, and proposes specific, short-term tasks for universities, industry, and the federal government to strengthen and revitalize the workforce.



BIO 2010: TRANSFORMING UNDERGRADUATE EDUCATION FOR FUTURE RESEARCH BIOLOGISTS

(DELS 2003) The report discusses incorporating more math, physics, chemistry, engineering and computer science into classes and laboratory work and emphasizing independent research will help undergraduate education reflect

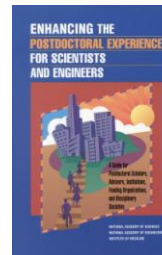
real-world science. Schools, professional societies and funding agencies should develop new teaching materials and facilitate faculty collaboration.



TRENDS IN FEDERAL SUPPORT OF RESEARCH AND GRADUATE EDUCATION (PGA 2001)

The Board on Science, Technology and Economic Policy updated its 1999 analysis (Appendix A, Securing America's Industrial Strength, 1999) of changes since 1990 in the distribution of federal research funding by field of science and engineering) by

incorporating FY 1998 and FY 1999 obligations from the NSF Federal Funds survey, with particular attention to the trends in basic research support, changes in research fields' relative dependence on research-sponsoring agencies, and the relationship between changes in research support and changes in enrollment in graduate training in selected fields of research. The Board did not recommend funding levels for any discipline but addressed procedural aspects of R&D budgeting.



ENHANCING THE POSTDOCTORAL EXPERIENCE FOR SCIENTISTS AND ENGINEERS: A GUIDE FOR POSTDOCTORAL SCHOLARS, ADVISERS, INSTITUTIONS, FUNDING ORGANIZATIONS, AND DISCIPLINARY SOCIETIES (PGA 2000)

The concept of postdoctoral training came to science and engineering about a century ago. Since the 1960s, the

performance of research in the United States has increasingly relied on these recent PhDs who work on a full-time, but on a temporary basis, to gain additional research experience in preparation for a professional research career. Such experiences are increasingly seen as central to careers in research, but for many, the postdoctoral experience falls short of expectations. Some postdocs indicate that they have not received the recognition, standing or compensation that is commensurate with their experience and skills. Is this the case? If so, how can the postdoctoral experience be enhanced for the over 40,000 individuals who hold these positions at university, government, and industry laboratories? This book offers its assessment of the postdoctoral experience and provides principles, action points, and recommendations for enhancing that experience.

*The reports listed do not include all National Academies' reports on higher education financing and reform. To find more reports on this topic, go to www.nap.edu.