

**The Government-University-Industry
Research Roundtable**

1997 Annual Report

**National Academy of Sciences
National Academy of Engineering
Institute of Medicine**

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*The Research Roundtable was created to foster strong American science and technology
through effective working relationships among government, universities, and industry.*

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CHAIRMAN'S MESSAGE

I have been honored to serve as Chairman of the Roundtable since 1992, but with my appointment as U.S. Ambassador to India, I must relinquish this role. Fortunately, one of our most esteemed members, Chancellor Joe Wyatt of Vanderbilt University, has agreed to assume leadership on an interim basis. He and Bruce Alberts, President of the National Academy of Sciences, will use the transition to bring together ideas about the most important attributes of a GUIRR Chairman in this particular era of the national science and technology enterprise, as well as about new ways to use the unique institution of the Roundtable to strengthen it. They will be glad to receive ideas on these matters from all reading this report.

In my 1997 Chairman's message I cited the extraordinary period of change currently unfolding in the national science and technology enterprise. If anything, the pace and depth of the change has increased in the ensuing period. I believe that GUIRR's optimal and vital role in the next few years will be to help our three constituencies--industry, university, and government--to maintain close and candid communication on the issues arising in this period. Entirely new approaches to organizing, funding, and carrying out research are emerging in all three sectors. Moreover, new and closer partnerships among them are being driven by both the opportunities in view, as well as by limits on resources. Under these conditions, past assumptions about the motivations, needs, and strategies of those who perform or support research may be extremely misleading. Effective communication among the sectors is the only remedy to being tied to out-dated images.

Under Chancellor Wyatt's leadership, I know the Roundtable will continue to find opportunities to stimulate innovative change in the coming year. Groundwork has been laid through the strong participation of our Federal Demonstration Partnership in the process of President Clinton's review of the relationship of the federal government and research universities. Opportunities and problems for continued attention also have surfaced through the Roundtable Council's three major meetings in 1997. These include the March meeting that highlighted new patterns of industrial research funding, our July meeting that sought new approaches to understand and rationalize the intersections of science, technology and law, and the October meeting that addressed some of the problems of restricted scientific communication resulting from competitive and commercial pressures in modern science and engineering research. The Roundtable also continues to play an active role in the overall work of the Academy Complex on future pathways for the U.S. research university system. The research and training needs and expectations of both industry and government are changing dramatically, as are a variety of other pressures on the universities, so that the evolution of this system is of great concern to all represented in the Roundtable. These and other projects and initiatives are described in more detail in the body of our report.

I want to take this opportunity to give special thanks to Roundtable members who have completed their service this year. These are Amgen Senior Consultant Daniel

Vapnek, and Sematech Chief Executive Officer William Spencer. They brought consistently insightful views of issues in government-university-industry research partnering, and we will plan to call on them occasionally for guidance though their formal service has ended.

Richard F. Celeste
February, 1998

WHAT IS THE ROUNDTABLE?

Purpose and Structure

The Government-University-Industry Research Roundtable was created in 1984 to provide a unique forum for dialogue among top government, university, and industry leaders of the national science and technology enterprise. The purpose is to facilitate personal working relationships and exchange of ideas regarding issues, problems, and promising opportunities that are facing those charged with developing and deploying science and technology resources. The Roundtable's Mission Statement, updated in 1995 following a tenth-year retreat, summarizes this goal:

"To convene senior-most representatives from government, universities, and industry to define and explore critical issues related to the national science and technology agenda and its global context that are of shared interest; to frame the next critical question stemming from current debate and analysis; and to incubate activities of ongoing value to the stakeholders.

This forum will be designed to facilitate candid dialogue among participants, to foster self-implementing activities, and, where appropriate, to carry awareness of consequences to the wider public."

The participation of the federal science leadership in an open dialogue and informal exchange of ideas precludes making formal recommendations or offering specific advice to federal agencies. Instead, the Roundtable seeks to stimulate new approaches by active dissemination of its discussions to government, university, and industry leaders, and by pro-active contacts with colleague organizations that may want to build on the idea base developed in Roundtable activities.

The Roundtable is sponsored by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. It is guided by a Council that sets the Roundtable agenda, addresses some topics directly, and oversees the plans and activities of Working Groups that address additional topics. The members of the Council are listed on pages 21-23. With the exception of the federal agency officials, who serve as long as they are in office, Roundtable Council members are appointed to staggered three year terms.

Roundtable Chairman

Richard Celeste, the former governor of Ohio and an active member of the Roundtable Council while governor, has been the Chairman of the Roundtable from 1992 until November 1997. He was appointed at that time by President Clinton as the U.S. Ambassador to India. That a person with Governor Celeste's stature, and record of leadership chose the Roundtable role for his personal time commitment attests both to the

recognized importance of the Roundtable in national science and technology policy affairs, and to its record of solid accomplishments.

Roundtable member and Vanderbilt University Chancellor Joe Wyatt has now taken the Chair on an interim basis while a permanent successor is sought. Recommendations for successor characteristics and individuals are currently being sought from Council members, agencies that support the Roundtable, and outside leaders. A major national leader who bridges the worlds of industry, academia, and public life is the likely designee.

Mode of Operation:

Several features of the Roundtable's structure and operation are central to its effectiveness:

1. Neutral Setting. The sponsorship of the Roundtable by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine provides a neutral setting with credibility among all elements of the research community in the three sectors. Diverse points of view are presented in Roundtable deliberations. The Roundtable avoids becoming a proponent for the views of any one constituency.
2. Active Council Participation. The meetings are designed so that senior federal R&D officials, top industrial research leaders, and senior state officials can be full and active participants on the Council along with university administrators and faculty. Their contributions and leadership are essential to the accomplishments of the Roundtable.
3. Addressing Problems from both Policy and Operational Levels. The combination of study and analysis by operational-level representatives in the Working Groups, and discussion by policy-level representatives in the Council, produces an environment that leads to the introduction of new ideas and new procedures into the research system.
4. Long-term vs. Short-term Issues. The Roundtable strives for a workable balance between attention to broad, ongoing concerns of the research community (for example, an examination of the current status and future prospects for the academic research enterprise and the international context for national research policies) and to the search for solutions to immediate problems (for example, streamlining administrative procedures for government-sponsored university research and for university-industry cooperative research).
5. Special Role of the Roundtable. The Roundtable is most effective as a mechanism to frame and incubate issues, allowing it to play two distinctive roles within the Academy complex and in the science and technology community as a whole. One is to initiate analyses of frontier issues that have not been elsewhere explored. The other is to help convey the results of major analytic efforts to an active leadership group and wider public, in recognition that the national science and technology enterprise is driven by the

combined efforts of diverse individuals and organizations of many sizes and types, as well as the support of the public as a whole.

6. **Implementation of Roundtable Initiatives.** The legal context in which informal dialogue can take place among top federal government, industry, and university officials restricts the ability of the Roundtable to make formal recommendations to federal agencies. Nonetheless, because many of the views of each sector in research questions are not well understood by the others, the added insight that comes from multi-sectoral discussion of them can lead to ideas that enable participants to return to their individual sectors and take new and innovative actions. Additionally, the attention of the Roundtable leaders to key issues can stimulate many other groups to take constructive actions in their own spheres.

7. **Working Groups.** The Council also appoints Working Groups to examine selected topics in depth. The groups elucidate issues, identify problems and opportunities, and consider options for dealing with them. Both near- and long-term goals are pursued. As progress in understanding a particular issue is made, the results are brought before the Council for its deliberation. When an area of concern is believed ready for public discussion, a means of stimulating discourse among all the interested constituencies is devised. These include large by-invitation events, workshops, and targeted distribution of discussion papers. Follow-up activities are organized within and beyond the Roundtable to pursue suggestions for specific policies, procedures, or programs.

8. **Flexible Financial Support.** Support for the Roundtable is provided by foundations, federal agencies, industry, universities and state agencies. The majority of these funds is provided as general support for the Roundtable, enabling the Roundtable to respond quickly to problems and opportunities as they arise and to address issues in flexible, diverse, and innovative ways.

9. **Personal Interaction.** The Roundtable is foremost a process—a process for bringing together creative individuals from the diverse constituencies concerned with the research enterprise. The ability of the Roundtable to stimulate constructive change in the system depends on its ability to transcend ordinary bureaucratic and organizational thinking, and bring innovative approaches to issues that are typically complex, intractable, emotional, and controversial.

The effectiveness of the Roundtable is based on its ability to get the right people together at the right time, supported by appropriate background material and analytical information, to introduce new ideas and deeper understandings into the policy development and implementation processes for the nation's research system. Convening additional groups and establishing connections with other organizations that can take and shape action are supplementary approaches in some instances. To that end, the Roundtable makes an effort to maintain communication and working relationships with

Financial Support of the Roundtable

An especially important accomplishment of the Roundtable during the past several years has been broadening of its base of financial support to include all the major research sectors participating in the Roundtable. Core support is provided by the major Federal R&D agencies: Department of Commerce/ National Institute of Standards and Technology, Department of Defense, Department of Energy, National Aeronautics and Space Administration, National Institutes of Health, National Science Foundation, Department of Agriculture, and Department of Transportation.

The Roundtable also has established University-Industry Partnerships as a component of its funding, as well as to enhance its ability to sense and respond to key issues arising in these relationships. The number of these Partnerships is now fifteen:

- Hewlett-Packard/Stanford
- Amgen/UCLA
- Monsanto/Washington University
- Motorola/University of Illinois at Urbana-Champaign
- Procter and Gamble/University of Wisconsin
- Battelle Pacific Northwest/University of Washington
- Rockwell/Cal Tech
- IBM/Florida State University
- Honda/Ohio State University
- Sematech/University of Texas at Austin
- Upjohn/Northwestern University
- C.R. Bard, Inc./Massachusetts Institute of Technology
- Qualcomm, Inc.-SAIC/University of California, San Diego
- Texas Instruments/Texas A&M University
- Lord Corporation/North Carolina State University

Roundtable Staff:

Thomas H. Moss, Executive Director
Allison A. Rosenberg, Associate Executive Director
Anne-Marie Mazza, Senior Program Officer
Wanda E. London, Research Associate
McAlister Clabaugh, Project Assistant

WHAT DOES THE ROUNDTABLE DO?

The Roundtable provides a place for candor among national leaders to address divisive or emerging issues, and it contributes to national policy by structuring and illuminating issues and by injecting imaginative thought into policy deliberations. It often seeks to catalyze activity by both governmental and non-governmental entities to further develop or test ideas originating in its discussions.

As a forum for national leaders, the Roundtable has unique strengths. The senior science and technology appointees in the Executive Branch of the federal government are members of the Roundtable Council. The full federal contingent, combined with the increased industrial participation achieved since 1992, and the continuing participation of university representatives, bring to the table a solid representation of the nation's key decision makers on issues of science and technology.

Council Activities, Current Major Projects, and Follow-up Planning, 1997

The Roundtable Council meets as a whole three times per year. It also directs, through its Working Groups, a variety of focused projects that evolve from ideas generated in preceding council meetings. This section outlines the thrusts of the 1997 Council meetings, and also indicates the status and plans of activities in the major project areas.

Council Meeting Topics in 1997 (Meeting Agendas, pages 17-20)

The March 1997 Council Meeting, "The Changing Market for Technology". This meeting addressed unfolding changes in the national research investment by focusing on new patterns and opportunities in industrial research funding. Several key industrial and financial leaders were invited into discussion with the Council, as well as White House Chairman of the Council of Economic Advisors, the Honorable Gene Sperling. Discussion centered on how various research organizations planned and estimated return on investment for research initiatives, as well as on how they measured results and communicated those metrics to non-technologists and oversight bodies.

The July 1997 Council Meeting, "Tensions Between Science and Law in a High-Tech Society". This session was organized in collaboration with the NRC Policy Division/Commission on Life Sciences group designing an over-all Academy Complex activity on issues at the interface of science, technology and law. Vigorous dialogue between Council members and guests with science and technology backgrounds, and those grounded in the legal profession, indicated the gap in the languages of the two professions. The ideas of this meeting were then part of the background for a two-day planning session on November 11-12 for the broader institution-wide effort. This meeting identified some specific areas and projects to help bridge this gap.

The October 1997 Council Meeting, "Openness and Secrecy in the Conduct of Research". At this session, the Roundtable Council discussed secrecy trends related to intense competition among researchers and organizations, as well as the commercialization of research results, to see if there were indications that the vitality of open scientific exchange is being affected. Strong concern was expressed from all sectors, including from industrial representatives concerned that commercial pressures might undermine the open and stimulating university research environment that has been a strong source of innovative ideas for them.

Council Meeting Plans for 1997-98

In September 1997 the GUIRR Executive Committee reviewed options for Council meeting focus in the 1997-98 period, and chose the subjects of "Openness and Secrecy in Science" and "Regulatory Burdens on Research Laboratories" as topics for the October 1997 and February 1998 meetings. Later discussions pointed to highlighting some of the dramatic new trends in science and engineering manpower needs and patterns of meeting them, including the international mobility of skilled researchers and technologists. The subject of industry and university views of knowledge needs for understanding global climate change (with the NRC Board on Sustainable Development), and the impact and potential of the social and behavioral sciences on public policy (with the Commission on Behavioral and Social Sciences), were also suggested for further development as possible Council meeting topics.

The Roundtable will also continue to explore variations of its traditional Council meeting format to provide opportunity for synergy with federal agency or other activities. This approach was exemplified by the co-scheduling of the October 1997 Meeting with a University-Industry Partner focus group giving ideas for the new Department of Defense industry-university cooperative program, and with a Department of Transportation presentation of its Garrett A. Morgan university-industry program in transportation research and education.

Other Roundtable Activities

Roundtable staff have been active in the coordination of an over-all National Research Council activity on "Research University Futures". This involved a May dinner with university presidents and foundation leaders, and a symposium on "Seeing New Opportunities for the Research University" at the August NRC Governing Board meeting at Woods Hole. The discussion keynote was presented by Franklin Raines, Director of the Office of Management and Budget. Industry, university, and state higher education leaders discussed new expectations and pressures for the research university, as well as possible pathways for adjustment to a changing environment. From this activity the Academy Complex Presidents seek to identify the highest priority issues for NRC emphasis in this arena, as well as opportunities for collaboration with other groups working on ensuring the vitality and full utilization of the research university system in

the U.S. The Raines address has attracted wide attention in its challenge to expand understanding and stakeholding in our national research university system, and many campuses are using it as a starting point for discussion and planning within their own organizations. The Roundtable may help facilitate or support such discussions on a campus or regional level where appropriate.

Collaborative activities within the NRC include Roundtable cooperation with an effort of the Board on Science, Technology, and Economic Development aimed at examining the distribution of benefits of the information-based economy; exploration of joint activities with the Board on Sustainable Development on industry and university views on knowledge needs for understanding global climate change; and with COSEPUP, an examination of how best to test research program compliance with the Government Performance and Results Act. This builds in part from some of the ideas of the October 1996 GUIRR Council meeting on "Performance Standards and Outcome Measures for the Research Enterprise".

With outside groups, GUIRR is cooperating with the State University of New York in sponsorship of the January 1998 "Triple Helix" conference on international patterns of partnerships among universities, industry, and government; with "Project Kaleidoscope" on approaches to using university research capabilities to improve undergraduate education; and with the Council on Competitiveness on their series of regional and national meetings on research partnerships.

Major Project Status and Planning

Stresses on Research and Education at Colleges and Universities: Phase II

The vitality and the diversity of American higher education and academic research have proven to be a great national asset for decades. Recently, however, the appropriate scope and balance of activities of colleges and universities, and of the roles and responsibilities of faculty and administrators at those institutions, have been subject to debate. Today, there is broad consensus that the academic community is under stress as a result of changes in local, national, and international environments, and that pressures for change -- coupled with increasing demand for limited resources -- have undermined morale on campus. Questions about which changes are necessary to alleviate these pressures, about how best to go about implementing change, and about the relative costs and benefits to society of changes proposed, are the subjects of animated and often intense debate in public forums and private discussions across the country.

In order to illuminate the major sources of stress affecting the academic research and education community, and to identify possible remedies to specific concerns, the National Science Board (NSB) and the Government-University-Industry Research Roundtable (the Research Roundtable) have sponsored a series of discussions and

meetings on campuses around the country, and they have hosted two major convocations in Washington to disseminate the results of those campus debates.

In 1993, thirteen academic institutions convened structured sessions on their campuses that included both faculty and administrators. This grass roots' inquiry captured the perspectives of members of the community on the nature and sources of significant stress affecting academe, and it elicited their views on constructive approaches to remedying those concerns. At the national meeting held in Washington that culminated this series of campus dialogues, academic participants then exchanged views with representatives of the Federal research-sponsoring agencies, Congressional staff, and interested professional and philanthropic groups. Discussion underscored that rising tensions -- resulting from an array of new pressures and changes, including new constituencies and an increasingly complex set of objectives and responsibilities -- have exacerbated divisions among faculty and administrators, undermined the trust that once marked the partnership between government and universities, and weakened public support for university research.

In order to achieve maximum value from the insights of this original phase of study, and to foster a broad sense of ownership in the effort to reestablish trust, a second phase of the project was launched in 1996. This phase retained the grass roots, campus-based approach that was the foundation of prior work. The main objectives of this second phase of study were: to catalyze discussions and change on campuses; to encourage national dialogue among all parties with interests in the academic enterprise; and to revive or recast the compact between the federal government and universities. Officials at each of the participating institutions organized discussions among faculty and administrators, separately and jointly, on a set of questions agreed on by the project's Guidance Group. Each campus developed a report summarizing those discussions, and describing constructive programs and activities underway on their campuses.

In February 1997, a National Convocation was held in Washington to bring together representatives of those institutions and representatives of the "cohort I" schools with members of federal agencies, Congressional staff, and other interested organizations. On the first day of the convocation, members of the academic community shared information about the primary sources of stress affecting their communities, and about creative practices for responding to those issues. On the second day, spokespersons from other sectors affected by changes underway in higher education and research expressed their perspectives and concerns with a larger audience that included the academic participants.

The material from the February Convocation was disseminated to participants for consideration of next steps, as well as posted on a special website (for details, see www.nas2.guirr.guircon). A final report will be available in the spring of 1998. Additionally, a short series of focused workshops, each addressing one of the top issues identified during the campus discussions and explored at the national convocation, may be convened in 1998.

Removing Barriers to University-Industry Collaboration

Collaborative partnerships between universities, industry, and government have multiplied and diversified enormously in recent decades. As universities have confronted diminishing growth in federal funding for research, and as industry has faced increasing pressure to draw on wider research resources than can be supported internally, there has been a dramatic rise in the number and creative variety of partnership programs. A report entitled "Industry-University Research Collaborations," issued early in the year by GUIRR, the Industrial Research Institute (the IRI), and the Council on Competitiveness (COC), notes that a new paradigm of research partnerships is emerging, as many disparate forces have coalesced to change the roles of universities, industry, and government, in the R&D enterprise. This new paradigm is based on the collaboration, rather than the independence, of key performers of research.

As the value of research partnerships has become clear, so have some of the stumbling blocks to optimal partnering become apparent. Certainly, it is true that many institutions have become comfortable in the context of corporate collaboration, many other schools -- and the public, too -- have questions about the right ways to address particular problems. Many worry about restrictions on the flow of information out of academe from industry-sponsored research, for example, even though the simplest measures, such as statistics on numbers of restrictive publication clauses in existing agreements, may not be the best evidence to address this concern. More important are answers to questions of how, and how often, such clauses are exercised.

In general, while constructive approaches to particular problems have been devised in specific cases and settings, there remains a need to compile and to disseminate this information broadly. In order for decision-makers and investigators across sectors -- including government, university, and industry -- to create, to manage, and to enjoy the product of collaborative research, broader appreciation of specific stumbling blocks and of creative ways around them is required. These stumbling blocks include:

- intellectual property and "background" rights;
- publication, copyright, and confidentiality concerns;
- regulation, liability, and tax law issues;
- various worries regarding foreign access;
- matters of graduate student involvement; and
- infrastructure impediments to inter-disciplinary and departmental research.

To explore the intricacies of continuing barriers to collaboration, GUIRR and COSEPUP will convene a workshop of individuals with extensive experience in formulating and managing collaborative relationships across research sectors. In addition to focusing attention on the primary trouble spots that emerge in the course of collaboration -- summarized loosely as issues of intellectual property, of institutional leadership, and of goal alignment and cultural disparity across sectors -- a primary goal of the workshop will be to identify tried and proven approaches to working through these

stumbling blocks. Issues of proprietary concern in the conduct of collaborative research will form the core of the agenda for this work.

The Roundtable has received support for the planning and implementation of this project from the Departments of Commerce, Defense, and the National Science Foundation. A two day workshop is scheduled to be held at the NAS Beckman Center in Irvine California, on March 23-24, 1998. Senior leaders from universities and industry will be joined by interested federal and congressional staff. Together they will examine a selection of case studies that illustrate the real issues and responses encountered in past partnerships. A final proceedings will be developed and disseminated broadly. The dissemination of this material should be of great value to many federal agencies, industries, and universities involved in research partnerships.

Federal Demonstration Partnership

The need to reduce growing tension between government and universities over procedures for administering federally-sponsored research was a primary basis for creation of the Research Roundtable. The most direct way the Roundtable pursues this objective is through its role as coordinator for the Federal Demonstration Partnership (FDP). The FDP, a cooperative effort among sixty-five universities or research institutes and eleven Federal agencies, is designed to improve the management of federally-funded research. The goal is to enhance research productivity without compromising the stewardship of public funds, by eliminating unnecessary administrative procedures and by streamlining those necessary to ensure accountability.

The Federal agencies and research institutions that constitute the FDP work together to design, test, and evaluate procedures aimed at improving the efficiency of sponsored research management. They also cooperate in efforts to clarify current changes to federal government-wide policies issued by the OMB.

In 1995, the FDP continued its efforts to formalize a linkage to the Federal government. In September 1995, the Director of the President's Office of Science and Technology Policy (OSTP) urged the Committee on Fundamental Science (CFS) of the National Science and Technology Council (NSTC) to "adopt as part of its charge responsibility for reviewing evaluation results" from the FDP. The Committee on Fundamental Science agreed to do this in June of 1996, and CFS will serve as the venue to articulate recommendations for innovations in federal research policy and practice to the OMB and to other federal agencies.

On June 10-11, 1996, the Roundtable hosted the kickoff session for "FDP III," so named in recognition that this is the second expansion -- and so third phase -- of this initiative, which began in 1985 as the Florida Demonstration Project. Joining the 45 academic institutions and the ten federal agencies that constituted the membership of FDP II were 20 additional research institutions, one new federal agency, and five

professional associations that make up a new class of participants called "Affiliate Members."

The meeting, attended by roughly 200 participants, was characterized by a new level of enthusiasm and creative thinking. While the original purpose of the FDP was to free investigators from unnecessary paperwork, and so ensure greater scientific value for the public's investment in research, few faculty members remained active in this initiative in recent years. Requirements for membership in FDP III included designation of both an administrative and a faculty representative for each academic or research institution, and more than 25 investigators attended this first meeting. Additionally, Dr. Harold Varmus (NIH) and Dr. Neal Lane (NSF) both participated in this christening event, challenging the group to think boldly and to present results of their work to the CFS, which -- together with Dr. Ernie Moniz (OSTP) -- they co-chaired.

Numerous original suggestions streamlining federal research grants and grants administration were presented during the June meeting. Task forces were appointed to develop some of these ideas into proposals for actual demonstrations, including just-in-time proposals; effort reporting; and development of a basic grant award.

In December 1996, Dr. Moniz challenged the FDP to consider the impact of the Government Performance and Results Act on sponsored research and to contribute to the Presidential Review Directive (PRD) on Government-University Relations. The FDP responded to the PRD in July 1997 with a report identifying several key stresses on the partnership: interrelated nature of teaching and research; the importance of streamlining the business component of the government-university relationship with the use of electronic commerce; and the issue of cost accounting/cost-sharing/cost-shifting. Moreover, the report asserted that it is necessary to define first principles underlying the government-university relationship. Over the next several months, the FDP will work with OSTP and the PRD task force to identify areas in which the FDP can be used to test new approaches.

Formulating U.S. Research Policies Within an International Context

In 1994, the Roundtable began a project entitled "Formulating U.S. Research Policies Within an International Context." The purpose of this project is to examine shifts occurring within the worldwide research enterprise and to raise for discussion possible changes that may be appropriate for U.S. research policies.

During Summer 1996, the Roundtable continued a series of focus groups, inviting members of the Congressional leadership and Congressional staff as well as representatives from government, academia, and industry to discuss their views regarding domestic and international changes affecting the research enterprise. All focus group sessions were organized around current international issues confronting the global research community and the broader implications for U.S. research policies.

As a follow-up to these discussions, an international colloquium was held in May 1997 to consider options for maintaining a world-class research enterprise. Representative of seventeen countries with a major technological base to their economies came together to compare environments and strategies. Of special attention were the trends toward internationalization of industrial research and development efforts, and what this means to the conventional policy considerations of bolstering "domestic" industry in competition with "foreign" competitors. Similarly much emphasis was placed on the emerging phenomenon of human capital mobility, in which students who are trained in one part of the world may wind up living and working in entirely different countries. A report on this meeting is in preparation, and may lead to follow-up activities especially in the human resource area.

Activities of Roundtable Working Groups

The Roundtable carries out a considerable portion of its activities in Working Groups. This allows ideas that are stimulated in the major Council meetings to be examined in detail, along with consideration of follow-up strategies to be undertaken by the Working Group itself, or through cooperation with other units of the Academy complex, or outside groups with synergistic interests.

Working Group I: Illuminating Research Costs and Administration

In spring, 1996, the Roundtable issued a report entitled "The Costs of Research: Examining Patterns of Expenditures Across Research Sectors" (see project description, above). The report, which compared research cost structures for industry, universities, and government laboratories, concludes that patterns of expenditures for research are strikingly similar across research sectors. Since the report was released last year, Working Group I has been considering possible follow-up activities. One possible direction might be to explore in greater depth the compliance costs associated with federally-sponsored research grants, both at universities and at federal laboratories.

This Working Group was also active in early stages of the development of the Federal Demonstration Project, described above.

Working Group II: Preserving and Increasing the Vitality of Research Institutions

Working Group II is responsible for overseeing work related to the ongoing, campus-based review of the stresses facing the nation's research universities. The group carries out this responsibility in conjunction with a specially appointed Guidance Group. The scope of this work is described above, and the objective is to accelerate the speed of self-discovery and self-improvement taking place nationwide on college and university campuses.

This Working Group also oversees the Roundtable's activities in the area of research collaboration and consortia. In 1996, these activities included the report, based on a workshop held late in 1995 that was cosponsored by the Industrial Research Institute and the Council on Competitiveness, on industry-university research collaboration. The follow-up activity to this effort, a two day workshop entitled "Removing Barriers to Collaborative Research", is scheduled for March 1998 under the leadership of a specially appointed Guidance Group. Overall progress and plans for this activity are presented for approval to members of Working Group II.

Finally, this Working Group has input in shaping the Roundtable's activities in the international arena. With the NSF, the Roundtable convened a major, international symposium entitled "National Science and Technology Strategies in a Global Context", described above.

Working Group III: Public Understanding of Science and Technology

Working Group III has developed a proposal for an award honoring partnerships among industry, universities, and public schools that attain outstanding achievement in improving the level of student understanding of science and mathematics. Currently, the Working Group is seeking corporate sponsors to underwrite the costs of administering the award ceremonies and prize money. Approximately \$250,000 will be allocated to awards, with the national winner receiving \$100,000 to be used to further the activities of the winning partnership.

On another activity, this Working Group has begun focusing on ways to influence the manner in which science and technology is portrayed in the media. As a follow-up to Working Group discussions, the three Academy Complex Presidents recently explored the feasibility of establishing an organization in Hollywood to develop better relationships between the media and the science and technology community, working with representatives of Clark & Weinstock and International Creative Management.

Work Group IV: Ensuring the Continued Health of Human Resources

Working Group IV is focusing attention on the professional development of math and science teachers, including both pre-service and in-service training. Recognizing that half of all the teachers who will be teaching in the year 2005 will be hired over the next decade, and recognizing the need for challenging academic standards to focus the efforts of students, teachers, and parents on improving student performance, the Working Group believes this is a uniquely propitious time to transform the quality of preparation for the next generation of teachers. A coalition of universities, business, government and the full science, engineering and mathematics community needs to be marshaled for this purpose.

If our children do not have teachers capable of teaching at the level required by the new standards, they will never meet these standards. While current reform efforts require

substantive change in how science and mathematics are taught, an equally substantive change is needed in professional development practices. Teachers can not be expected to provide our children with appropriate instruction, if they have not received adequate training themselves. Based on discussions of the Working Group with the Business Roundtable, a joint strategy with the National Alliance of Business will be developed to bring new emphasis to this topic.

GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE

Council Meeting
March 12-13, 1997

National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C.

AGENDA

NEW PATTERNS AND OPPORTUNITIES IN INDUSTRIAL RESEARCH FUNDING

Over the past several years major change has occurred inside industry, university, and federal research laboratories. Much has been written about major industrial research laboratories shifting away from investments in long-term basic research to more consumer-oriented, market-driven research and development. While this may be true in the traditional, large corporate research and development departments, there also are new forms and support for research endeavors emerging through industry, industry-state, and industry-federal consortia. In some industries, such as informatics and biotechnology, new flows of private capital are moving into the research component of the innovation system. These new investments of private capital may support both traditional industry laboratories and academic research performers as well as entirely new research organizations. Some argue that changes occurring in the research enterprise have left critical gaps in our nation's research enterprise, while others argue that the research enterprise is becoming more focused and responsive to societal needs.

Wednesday, March 12 (Members' Room)

5:30 Reception
6:00 Dinner and Keynote Address
The Honorable Gene Sperling
National Economic Advisor
The White House
9:00 Adjourn

Thursday, March 13 (Lecture Room)

8:00 Breakfast Session: *Congressional Perspectives*
Congressman Tom Sawyer (D-OH)
9:00 Morning Session: *Changing Patterns of Investments*
Dr. Andrew M. Odlyzko, Technology Leader, AT&T Labs Research
Dr. Dean Eastman, Director, Argonne National Laboratory
Mr. Terry Bibbens, Entrepreneur in Residence, Angel Capital Electronic Network, Office of Advocacy, U.S. Small Business Administration
11:40 Update on Working Groups
12:00 Adjourn

GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE
Council Meeting
July 8-9, 1997

National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C.

AGENDA

THE IMPACT OF LAW ON THE CONDUCT OF SCIENCE AND ENGINEERING RESEARCH

Tuesday, July 8 (Members' Room)

5:30 Reception

6:00 Dinner and Keynote Address

Speaker: Judge Louis Pollak, U.S. District Court for the Eastern District of Pennsylvania

9:00 Adjourn

Wednesday, July 9 (Lecture Room)

8:00 Morning Session

Moderator: Joe Cecil, Project Director, Scientific Evidence Project, Federal Judicial Center,

Speakers: Sheila Jasanoff, Professor of Science and Technology Studies,
Cornell University

Al MacLachlan, Senior Vice-President for R&D Dupont (retired), former
Deputy Undersecretary, Department of Energy

Lawrence Bogorad, Professor Emeritus of Biology,
Harvard University

Response: James Blumstein, Professor of Law, Vanderbilt University Law School

11:40 Update on Working Groups

12:00 Adjourn

GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE

Council Meeting
October 28-29, 1997
National Academy of Sciences
Ida and Cecil Green Building
(*Georgetown Facility*)
2001 Wisconsin Ave. N.W.
Washington, D.C.

**OPENNESS AND SECRECY IN SCIENCE:
CURRENT TRENDS IN SHARING RESEARCH IDEAS
AND RESEARCH METHODS**

• **Tuesday, 28 October**

5:00-6:45 pm Reception (*A dinner buffet will be served in the South Presfunction Area*)

7:00-9:00 pm Council Session (GR 104)

Biomedical Research: Trends in Openness and Exchange of Information
Presenter: Dr. David Blumenthal, Chief
Health Policies Research and Development
Massachusetts General Hospital

Discussant: Dr. Steven A. Rosenberg
National Cancer Institute
National Institutes of Health

Wednesday October 29 (GR 104)

7:45 am Continental Breakfast

8:00-9:00 am Breakfast Session

Environmental Case Study: The "Six Cities Study"

Presenter: Mr. Gary Guzy
Counsel to the Administrator
Environmental Protection Agency

Presenter: Dr. Roger McClellan
President
Chemical Industry Institute of Toxicology

Wednesday October 29 cont'd

9:00-11:00 am Morning Panel

Sharing Research Resources: Two Case Studies

Presenter: **Dr. Douglas Hanahan**
Professor of Biochemistry and Biophysiology
University of California-San Francisco

Presenter: **Dr. David Cox**
Professor of Genetics
Stanford University

Discussant: **Dr. Alan Williamson**
Vice President for Research Strategy
Merck & Co.

11:00 am-12:00 pm

Council Business Session

- Revisiting the structure and function of Roundtable Working Groups
- Status report - current activities
- Closing business

COUNCIL AND WORKING GROUP MEMBERS
Roundtable Council

Members

RICHARD F. CELESTE, *Roundtable Chairman (through 11/97)*, Former Governor, State of Ohio; and Partner, Celeste and Sabety, Ltd. (97)⁺

JOE B. WYATT, *Roundtable Interim Chairman (as of 12/97)* Chancellor, Vanderbilt University

BRUCE ALBERTS, *ex officio*, President, National Academy of Sciences

D. JAMES BAKER, Under Secretary for Oceans & Atmosphere, U.S. Department of Commerce

EVAN BAYH, Former Governor, Indiana, Law Firm of Baker and Daniels (00)[@]

ROBERT BERDAHL, Chancellor, University of California-Berkeley(00)[@]

JEAN BONNEY, Director of Education\Research Business, Digital Equipment Corporation (99)

CAROL M. BROWNER, Administrator, U.S. Environmental Protection Agency

LYNN CONWAY, Professor of Electrical Engineering and Computer Science; Director UMTV Demonstration Project, The University of Michigan (98)

MORTIMER L. DOWNEY, Deputy Secretary, U.S. Department of Transportation

ROBERT V. EDWARDS, Chairman, Computer Sciences and Engineering, Case Western Reserve University (99)

BRAN FERREN, Executive Vice President, Creative Technology, Walt Disney Imagineering (00)[@]

CHARLES GESCHKE, President, Adobe Systems Incorporated (00)[@]

JACK GIBBONS, President's Science Advisor, Director, Office of Science & Technology Policy, Executive Office of the President

DANIEL GOLDIN, Administrator, National Aeronautics and Space Administration

*Year in parentheses indicates end of term; [@]Took office during 1997; ⁺Left office during 1997;

I. MILEY GONZALEZ, Under Secretary for Research, Education and Economics, U.S. Department of Agriculture @

STEPHEN JAY GOULD, Professor of Geology and Zoology, Museum of Comparative Zoology, Harvard University (99)

FREEMAN A. HRABOWSKI, President, University of Maryland Baltimore County (99) @

ANITA K. JONES, Director, Defense Research and Engineering, Department of Defense

DEAN KAMEN, President, DEKA Research & Development Corporation (00)

RAY KAMMER, Director, National Institute of Standards and Technology, U.S. Department of Commerce @

MARTHA KREBS, Director, Office of Energy Research, U.S. Department of Energy

NEAL LANE, Director, National Science Foundation

JAMES MCGRODDY, Former Vice President, IBM @

MAYNARD V. OLSON, Professor, Department of Molecular Biotechnology, University of Washington (00)

ARATI PRABHAKAR, Director, National Institute of Standards and Technology, U.S. Department of Commerce *

KENNETH SHINE, *ex officio*, President, Institute of Medicine

GEORGE T. SINGLEY, III, Acting Director, Defense Research and Engineering, Office of the Secretary of Defense, U.S. Department of Defense @

WILLIAM J. SPENCER, President and Chief Executive Officer, Sematech (97) *

DANIEL VAPNEK, Senior Vice President, Research and Development, Amgen (97) *

HAROLD VARMUS, Director, National Institutes of Health

CATHERINE WOTEKI, Deputy Under Secretary for Research, Education and Economics, U.S. Department of Agriculture *

*Year in parentheses indicates end of term; @ Took office during 1997; *Left office during 1997

WM. A. WULF, *ex officio*, President, National Academy of Engineering

ED ZSCHAU, Senior Lecturer of Business Administration, Harvard University (98)

*Year in parentheses indicates end of term; @ Took office during 1997; *Left office during 1997

Associates

E. WILLIAM COLGLAZIER, Executive Office, National Academy of Sciences

KELLY S. COYNER, Acting Administrator, Research and Special Programs Administration, U.S. Department of Transportation [@]

JAMES F. DECKER, Deputy Director, Office of Energy Research, U.S. Department of Energy

KAREN HEIN, Executive Officer, Institute of Medicine

ROBERT J. HUGGETT, Assistant Administrator, Office of Research and Development, Environmental Protection Agency

RUTH KIRSCHSTEIN, Deputy Director, National Institutes of Health

SAMUEL KRAMER, Deputy Director, National Institutes of Standards and Technology, U.S. Department of Commerce

ALAN LADWIG, Associate Administrator for Policy & Plans, National Aeronautics and Space Administration

HENRY L. LONGEST II, Assistant Administrator, Office of Research and Development, Environmental Protection Agency

ERNEST MONIZ, Associate Director for Science, Office of Science and Technology Policy, Executive Office of the President

BOB ROBINSON, Administrator, Cooperative State Research, Education and Economics, U.S. Department of Agriculture

WILLIAM SALMON, Executive Officer, National Academy of Engineering

DHARMENDRA K. SHARMA, Administrator, Research and Special Programs Administration, Department of Transportation

ROBERT J. TREW, Director for Research, Defense Research & Engineering, Office of the Secretary of Defense, U.S. Department of Defense [@]

LEO YOUNG, Former Director (Retired), Resources and Laboratory Management, U.S. Department of Defense

^{*}Year in parentheses indicates end of term; [@]Took office during 1997 ^{*}Left office during 1997

OVERCOMING BARRIERS TO COLLABORATIVE RESEARCH
Guidance Group

CO-Chairs

JEAN BONNEY, Director of Education/Research Business, Digital Equipment Corporation

GERALD DINNEEN, Honeywell, Inc. (Retired)

Committee Members

ALICE AGOGINO, Professor, Mechanical Engineering, University of California

THOMAS CASKEY, Senior Vice President for Research, Merck & Co., Inc.

MARY GOOD, Managing Member, Venture Capitol Investors, LLC

PHILIP MAJERUS, Professor of Medicine, Biochemistry & Molecular Biophysics, Division of Hematology Oncology, Washington University School of Medicine

JAMES MCGRODDY, Advanced Network & Services, Inc.

WALTER PLOSILA, Vice President, Battelle Memorial Institute

WILLIAM J. SPENCER, President & Chief Executive Officer (Retired), Sematech

CAROLYN WOO, Dean, College of Business Administration

FEDERAL DEMONSTRATION PARTNERSHIP

The goal of the Federal Demonstration Partnership (FDP) is to improve research administration and thereby increase research productivity. Most of the work of the FDP is carried out by government and university representatives in task groups that design and assess demonstrations of new procedures for research administration. The FDP Steering Committee coordinates the task groups and represents the FDP to other bodies, including the Interagency Assessment Committee, which was established by the Office of Management and Budget to oversee the FDP.

Steering Committee (* denotes Member of the Executive Committee)

CAROLYN AUSTIN-DIGGS, Director, Asset Management Policy & Planning Division, Department of Treasury

ROBERT BARBRET, Financial Manager for Federal Sponsored Programs, University of Michigan

BARRY BEATY, Associate Dean for Research, College of Veterinary Medicine & Biomedical Sciences, Colorado State University

GENE D. BLOCK, Vice Provost for Research, University of Virginia

EDWARD BRESNICK, Vice Chancellor for Research, University of Massachusetts Medical Center

ANNE DATKO, Division Director, National Research Initiative, CSREES/NRI, U.S. Department of Agriculture

ROBERT S. DECKER, Associate Dean for Research and Graduate Studies and Professor, Departments of Medicine and Cell & Molecular Biology, Northwestern University

KATHI DELEHOY, Director, Preaward Services, Sponsored Programs, Colorado State University

JUDY EMERY, Director, Sponsored Research, Medical School, Dartmouth College

KARL ERB, Senior Science Advisor to the Director, National Science Foundation *

JERRY FIFE, Director, Contracts and Grants, University of North Carolina-Chapel Hill

JOHN C. FINI, Financial Director, Grants & Contracts, Massachusetts General Hospital (Hospital Corporation)

GREGORY FOXWORTH, Sponsored Research, Texas A&M University

NOLAN GOMM, Associate Director, Department of Contracts and Grants, University of Southern California

GEOFFREY GRANT, Director, Office of Policy for Extramural Research Administration, National Institutes of Health

JUDITH GREENBERG, Director, Genetics Program Branch, National Institute of General Medical Sciences, National Institutes of Health

HARRY R. HARALDSEN, Chief, Policy and Support Division, Air Force Office of Scientific Research

ROBERT HARDY, Acting Head of Policy, Office of Contracts and Grants, National Science Foundation

KATHLEEN HARGETT, Procurement Analyst, Army Medical Research & Material Command

SUSAN HILL, Procurement Officer, Army Research Office

WILLIAM HOGAN, Controller, Comptroller's Office, University of Chicago

EVELYN HU, Professor of Electronic & Computer Engineering, University of California, Santa Barbara

HEINRICH JAEGER, Associate Professor of Physics, University of Chicago

D. WAYNE JENNINGS, Director, Sponsored Programs, University of Virginia

M. THOMAS JONES, Vice Provost and Dean, Research and Graduate Studies, Kent State University

RICHARD KALL, Procurement Analyst, Contract Management Division, National Aeronautics and Space Administration

LEE M. KAPLAN, Medical Service, Massachusetts General Hospital (Hospital Corporation)

JOHN KAVANAGH, Director, Grants and Contracts, Dartmouth College

ROBIN J. LEACH, Associate Professor, Department of Cellular & Structural Biology, University of Texas Health Science Center at San Antonio

ANNE-MARIE MAZZA, Senior Program Officer, Government-University-Industry Research Roundtable, National Academy of Sciences

DAVID MEARS, Director, Office of Research Administration, University of California

RICHARD E. MILLER, Associate Director, Office of University Research, Texas A&M University

JILL MORTALI, Director, Sponsored Programs, University of Massachusetts Medical Center

RONALD NEWBOWER, Senior Vice President for Research & Technology, Massachusetts General Hospital (Hospital Corporation)

JULIE NORRIS, Director, Office of Sponsored Programs, Massachusetts Institute of Technology

CHARLES PAOLETTI, Director, University Business Affairs, Office of Naval Research

MARVIN G. PARNES, Director, Division of Research, Development and Administration, University of Michigan

OLIVIA H. POPE, Director, Contracts and Grants, Florida State University

JACK PUZAK, Program Staff, National Center for Environmental Research and Quality Assurance, ORD, Environmental Protection Agency

JAMES RANDOLPH, Senior Project Representative, Division of Research Development & Administration, University of Michigan

RICHARD J. RICHARDSON, Provost, University of North Carolina-Chapel Hill

MARSHA ROSNER, Professor, Ben May Institute for Cancer Research, University of Chicago

DAN E. SHACKELFORD, Procurement Analyst, U.S. Army Medical Research & Development Command

MARY ELLEN SHERIDAN, Assistant Vice President for Research, Director, University Research Administration, University of Chicago

JOHN L. SHOWMAN III, Senior Grants Specialist, Grants Operations Branch, Grants Administration Division, U.S. Environmental Protection Agency

BARBARA SIEGEL, Managing Director, Office of Research & Sponsored Programs, Northwestern University

JAMES C. SMITH, Robert O. Lawton Distinguished Professor, Professor of Psychology in Neuroscience, Florida State University

MARCI A. L. SMITH, Director, Research Affairs, Massachusetts General Hospital (Hospital Corporation)

RON SPLITTERBER, Director Research Services, Colorado State University

L. BRADLEY STANFORD, Director, Program Analysis, Office of Naval Research

ALAN STEISSL, Faculty, University of Michigan

GERALD STUCK, FDP Electronic Research Administration Coordinator, Logistics Management Institute

LARRY E. TRAVIS, Chief, Procurement Office, Army Research Office

JEAN VORHABEN, Director, Office of Sponsored Research, Rice University

ROBERT WALKER, Assistant Professor, Education Department, Oakwood College

JOHN E. WALSH, Associate Dean of the Faculty and Francis & Mildred Sears Professor of Physics, Dartmouth College

PAMELA WEBB, Manager, Sponsored Projects, Office of Research Administration, University of California, Santa Barbara

THOMAS WEBER, Director, Division of Material Research, National Science Foundation

MARIANNE WOODS, Office of Sponsored Projects, University of Texas-Dallas

NANCY WRAY, Associate Director, Grants and Contracts, Dartmouth College

ROSE M. YATES, Director, Grants and Contracts, Oakwood College

JANE A. YOUNGERS, Director, Office of Grants Management, University of Texas Health Science Center at San Antonio

ROUNDTABLE PUBLICATIONS⁺

⁺All publications available free of charge by writing the Roundtable.

Academic Research Enterprise

The Costs of Research: Examining Patterns of Expenditure Across Research Sectors - Report by Arthur Andersen, LLP, for The Government-University-Industry Research Roundtable. Arthur Andersen's analyses conclude that the pattern of expenditures incurred for research activities in federal laboratories, universities, and industry are strikingly similar, despite common perceptions that there are wide differences. (March 1996)

Richard Celeste and Roland Schmitt, Government and Higher Education: Renewing the Partnership - An OpEd article published by the National Academy OP-ED Service. These two prominent observers (Celeste the former Governor of Ohio and Schmitt the former president of Rensselaer Polytechnic Institute) of the links between research, the economy, and public policy, spell out how the next 50 years of university-based research can be as productive as the past 50 years. (August 1994)

Stresses on Research and Education at Colleges and Universities: Institutional and Sponsoring Agency Responses: Phase II - Report of the second phase of a collaborative inquiry conducted by the National Science Board and the Government-University-Industry Research Roundtable. (In Press)

Stresses on Research and Education at Colleges and Universities: Institutional and Sponsoring Agency Responses - Report of a collaborative inquiry conducted jointly by the National Science Board and the Government-University-Industry Research Roundtable. The purpose of this report is to contribute to discussions of the choices facing the U.S. academic enterprise as we approach the twenty-first century. (July 1994)

Stresses on Research and Education at Colleges and Universities: Preliminary Summary of Campus Reports - This is a preliminary summary of individual campus reports and recommendations for action prepared as a working document for the National Summary Meeting of a project sponsored jointly by the National Science Board and the Government-University-Industry Research Roundtable, December 7-8, 1993. (December 1993)

Fateful Choices: The Future of the U.S. Academic Research Enterprise - A discussion paper including an optimistic and challenging vision for the future of U.S. academic research; an analysis of the near-term decisions and longer-term options facing the enterprise if the positive vision is to be pursued; and a description of the changing environment for decision making. (March 1992)

The Future of the U.S. Academic Research Enterprise: A Report of a Conference -
A summary of a December 9-10, 1991, Roundtable conference held to address
critical issues confronting U.S. academic research and to explore the possibilities
for national consensus on the future directions of the research enterprise. (March
1992)

Science and Technology in the Academic Enterprise: Status, Trends and Issues -
A discussion paper on the status of the current academic research enterprise,
emerging trends affecting it, and major issues to be addressed regarding its future;
statistical information on financial, human resource, infrastructure, and
organizational trends in academic research. (October 1989)

Multidisciplinary Research and Education Programs in Universities: Making
Them Work - A paper by Robert L. Sproul, Harold H. Hall, and members of the
Working Group on Institutional Renewal, discussing how to organize, support,
and operate multidisciplinary programs in universities. (June 1987)

Examining the Impact of Information Technology on Science and Engineering
Research and Education. This is a brief summary of the March 1996 GUIRR
Council meeting on this subject, with references for further information. (June
1996)

New Alliances

Industry-University Research Collaborations: Report of a Workshop-Published
jointly with the Industrial Research Institute and the Council on Competitiveness.
(1997)

Intellectual Property Rights in Industry Sponsored University Research: A Guide
to Alternatives for Research Agreements - Published jointly with the Industrial
Research Institute. (August 1993)

Richard F. Celeste, "Who Benefits From High-Technology Partnerships?" - An
Op-ed article published by the National Academy of Science OP-ED Service
discussing the potential of partnerships between universities and business to spur
economic development, and a major obstacle to such partnerships--disputes over
how to use the ideas arising from joint projects. (December 12, 1993)

University-Industry-Federal Laboratory Partnerships: Expectations and
Effectiveness - Summary of Issues Raised at the October 1992 Roundtable
Council Meeting. (September 1993)

Richard F. Celeste, "A New Partnership in American Science and Technology," - An op-ed article published by the National Academy of Sciences OP-ED Service encouraging federal-state interactions in science and technology. (June 21, 1992)

Federal-State Cooperation in Science and Technology Programs - A discussion paper by the Federal-State Dialogue on Science and Technology. (February 1992)

Industrial Perspectives on Innovation and Interactions with Universities: Summary of Interviews with Senior Industrial Officials - Presents the views of 17 industrial officials on innovation processes in their firms, connections to universities, and national R&D policy. (February 1991)

"Survey to Assess the Usefulness of Two Model Agreements for University-Industry Cooperative Research" - Results of a survey of about 70 university and industry "users" of the model agreements published in 1988. (August 1990)

Simplified and Standardized Model Agreements for University-Industry Cooperative Research - Published jointly with the Industrial Research Institute. (1988)

"Commentary: University-Industry Alliances;" Dorothy Nelkin, Richard Nelson, and Casey Kiernan; Science, Technology and Human Values, Volume 12, Issue 1, pp. 65-74. (Winter 1987)

State Government Strategies for Self-Assessment of Science and Technology Programs for Economic Development - Proceedings of a workshop held April 10, 1987.

New Alliances and Partnerships in American Science and Engineering - Background materials for a conference held December 5, 1985 (issues paper and case studies) along with interpreted highlights of conference sessions.

International Context for Research

National Science and Technology Strategies in a Global Context: Report of an International Symposium - A report of a May 1997 symposium on national science and technology strategies. Participants included government, university, and industry representatives from China, Finland, France, Korea, Mexico, Poland, and the United States. (May 1998)

Formulating U.S. Research Policies Within An International Context: A Discussion Paper - The purpose of this paper is to provoke discussion among policy makers and the U.S. research community regarding the implications of changing international conditions for the purposes, goals, and capacity of the U.S. research enterprise. (Draft - January 1994)

Future National Research Policies Within the Industrialized Nations - A report of a February 1991 symposium on emerging national research policies and programs. Participants included senior government officials and leading scientists directly involved in formulating research and higher education policies in the United States, Japan, the Soviet Union, the United Kingdom, Germany, and the European Community. (February 1992)

The Academic Research Enterprise Within the Industrialized Nations: Comparative Perspectives - A report of a symposium on the research systems of the U.S., Japan, Soviet Union, Great Britain, Germany, and France. (March 1990)

Improving Research Administration

General:

The Management and Cost of Laboratory Waste Associated with the Conduct of Research: Report of Workshop - The purpose of this report is to contribute to discussions of the management and cost of laboratory waste associated with the conduct of research. (September 1994)

Scanley, D. A. and W. Sellers, "Making Things Better: A Summary of Past Recommendations for Improving the Management of Federally Sponsored Academic Research," Research Management Review, Volume 5 Number 1. (Spring 1991)

Reducing Bureaucratic Accretion in Government and University Procedures for Sponsored Research: New Approaches in Process and Additional Areas for Attention - Proceedings of a hearing held June 5, 1985. (full report and summary)

About the FDP:

"Federal Demonstration Project: Response to the National Performance Review," - A proposal for implementing recommendations of the National Performance Review. (March 1994)

"What is the Federal Demonstration Project?" - A description of a cooperative effort between universities and federal agencies to increase research productivity by eliminating unnecessary administrative procedures and by streamlining and standardizing needed controls. (August 1991)

"Summary of Interim Reports Submitted by Grantee Organizations Participating in the Federal Demonstration Project" - Describes the positive impacts of the FDP on principal investigators, universities, and the general research environment as well as problem areas that need to be addressed. (October 1990)

FDP Studies and Surveys:

"Government-University Partnership Review Directive, Response of the Federal Demonstration Partnership" - FDP ideas concerning "first principles" of the partnership between government and universities, areas for immediate enhancement of the efficiency and effectiveness of university-government interactions, and areas needing further study. (July 31, 1997)

"Direct Charging Space Costs," - Prepared by the Federal Demonstration Project Task Force on Direct Charging, the report examines the implications of developing and testing models to subject a greater portion of research costs to the peer review process by charging facilities costs directly to specific research grants and contracts. (October 1995)

"Federal Managers' Viewpoints on FDP Continuation Funding Pilot" - Prepared by the Federal Demonstration Project Task Group on Proposals/Applications, the report provides the results of a survey of federal agency views of the impact of the noncompeting renewal demonstration on the efficiency and efficacy of agency functions. (March 1992)

"Report on Equipment Screening Studies" - Prepared by the Federal Demonstration Project Task Group on Internal Systems, the report examines the cost effectiveness of equipment screening. (December 1991)

"The Impact of Noncompeting Continuation Applications within the Federal Demonstration Project" - Prepared by the Federal Demonstration Project Task Group on Productivity Assessment, the report provides the results of a survey of the time saved by principal investigators under the demonstration of new procedures for non-competing renewal applications. (Draft November 1991)

"The Impact of the Use of Expanded Authorities within the Federal Demonstration Project" - Prepared by the Federal Demonstration Project Task Group on Productivity Assessment, the report describes the results of a survey that assessed the amount of principal investigator time saved during the demonstration of research administration procedures that expand the authority of universities and principal investigators to manage grant funds. The survey also looks at how saved time was reinvested. (February 1991)

"Report on Survey of State Requirements Applicable to Externally Funded Research Activities" - Prepared by the Federal Demonstration Project Task Group on State/Grantee Relations, the report describes the results of a survey on administrative requirements states apply to university research. (November 1990)

"The Florida Demonstration Project: Observations on the Impacts of the Project" - Observations on the impacts of the Project based on information collected on the operation of the Project by the Roundtable in cooperation with the participating universities in Florida. (September 1987)

Priorities

Richard F. Celeste, Testimony before the Subcommittee on Science, Committee on Science, Space, and Technology, Regarding setting Priorities in Science. (April 28, 1992)

What Research Strategies Best Serve the National Interest in a Period of Budgetary Stress? - Interpreted highlights of the discussion at a conference held February 26 and 27, 1986.

Academic Research Facilities

Don I. Phillips, Testimony before the Subcommittee on Department Operations and Nutrition, Committee on Agriculture, United States House of Representatives; Statement of Don I. Phillips, Executive Director, Government-University-Industry Research Roundtable, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, regarding academic research facility financing. (June 17, 1993)

"Research Facility Financing: Near-Term Options" (Working Draft) - Intended as a vehicle for discussion, this document sketches the purposes, costs, impacts, tradeoffs, and political considerations associated with a variety of mechanisms for research facility funding. (February 1991)

James D. Ebert, Testimony before the Rules Committee of the United States Senate; Statement of James D. Ebert, Vice President, National Academy of Sciences, Regarding S. RES. 206-To establish a point of order against material that earmarks research monies for designated institutions without competitions. (June 21, 1990)

"Synthesis of Options for Academic Research Facility Financing" - A summary of three sector-specific workshops in which representatives of federal agencies, universities, and state governments each described alternative approaches their sectors can take to facility financing. The document describes the perspectives of each sector along with options for facility financing that each sector could take. (March 1990)

Perspectives on Financing Academic Research Facilities: A Resource for Policy Formulation - A resource for policy makers and a reference work, this discussion paper addresses objectives of facility funding, strengths and weaknesses of

financing mechanisms, facility needs and sources of support, roles of the sectors, and key policy issues. (October 1989)

Academic Research Facilities: Financing Strategies - Proceedings of a conference held July 22 - 23, 1985 (full report and summary)

"Federal Funding of Scientific Facilities" - A discussion of the issues arising from direct congressional funding of facilities. (February 2, 1985)

Science and Engineering Talent

Nurturing Science and Engineering Talent - A discussion paper on the broad outlook for science and engineering talent organized around three themes: the status of the science and engineering talent pool, the factors affecting career choice, and the effectiveness of special programs to encourage science and engineering talent. (July 1987)

Competitiveness

Richard F. Celeste, Testimony before the Subcommittee on Technology, Environment, and Aviation, Committee on Science, Space, and Technology, Regarding the National Competitiveness Act of 1993 and the Role of the States. (February 3, 1993)

"A Dialogue on Competitiveness," Ralph E. Gomory and Harold T. Shapiro, Issues in Science and Technology, Volume IV, Number 4, (Summer 1988)

Brochures

Examining the Impact of Information Technology on Science and Engineering Research and Education-A summary of the March 1996 Roundtable Council Meeting.

Communication and Understanding between Scientists and the Public-A summary of the June 1996 Roundtable Council Meeting.

Can We Develop Performance Standards and Outcome Measures for the Research Enterprise?-A summary of the October 1996 Roundtable Council Meeting.

The Changing Market for Technology - A Summary of The March 1997 Roundtable Council Meeting.

Tension Between Science and Law in a High-Tech Society-A summary of the July 1997 Roundtable Council Meeting.

Openness and Secrecy in Science: Current Trends in Sharing Research Ideas and Research Methods-A Summary of the October 1997 Roundtable Council Meeting.
(In press)

Annual Reports

Government-University-Industry Research Roundtable Annual Reports, 1985 - 1997.

The Government-University-Industry Research Roundtable

1998 Annual Report

**National Academy of Sciences
National Academy of Engineering
Institute of Medicine**

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Washington, D.C. 20418**

**Website: <http://www2.nas.edu/guirr>
Email address: guirr@nas.edu**

The Research Roundtable was created to foster strong American science through effective working relationships among government, universities and industry.

CHAIRMAN'S MESSAGE

I was honored to be appointed Chair of the Government-University-Industry Research Roundtable, succeeding Governor Richard Celeste, who was named U.S. Ambassador to India last year. The unique institutional role GUIRR plays in the vitality of the U.S. science and technology enterprise is a vivid part of my experience in serving on the Roundtable Council since 1995.

A number of initiatives in which I have been involved personally -- such as the 1996 study on the comparative costs of research in the three sectors, and the 1998 initiative on openness and secrecy in research -- could have been carried out only in the unique GUIRR environment. It alone allows the top federal research officials to work informally with their colleagues in industry and university leadership on crucial issues that challenge them all.

Major changes are unfolding in the environment for government-university-industry research cooperation. There are new expectations and opportunities for universities - in their individual communities, in the nation, and in the world. Governments are also finding new roles as creative facilitators or convening bodies, as opposed to their traditional management, funding, and regulating functions. Industry is demonstrating that there are areas in which it can best serve its shareholders as a partner with universities, government, or other companies, in contrast to those in which its obligation is to seek competitive global leadership. The Roundtable's unique status is critically important in this atmosphere of change. Chartered to allow informal dialogue among the leaders of the three major sectors active in research and education, it is able to open up new ideas, think creatively about otherwise intractable ideas, and look beyond the immediate horizon to catalyze action before events overtake us.

My goal as Chair is to be sure that we make optimal use of this special institution. I will appreciate advice as to the highest priority issues most appropriate for Roundtable attention. We will also seek opportunities to play a supportive role with other organizations, both in the National Academies and outside, in initiatives dedicated to the over-all goal of mobilizing science and technology resources for the public good.

Joe Wyatt, Chair
March, 1999

WHAT IS THE ROUNDTABLE?

Purpose and Structure

The Government-University-Industry Research Roundtable was created in 1984 to provide a unique forum for dialogue among top government, university, and industry leaders of the national science and technology enterprise. The purpose is to facilitate personal working relationships and exchange of ideas regarding issues, problems, and promising opportunities that are facing those charged with developing and deploying science and technology resources.

The Roundtable's Mission Statement, up-dated in 1995 following a tenth-year retreat, summarizes this goal:

To convene senior-most representatives from government, universities, and industry to define and explore critical issues related to the national science and technology agenda and its global context that are have shared interest; to frame the next critical question stemming from current debate and analysis; and to incubate activities of on-going value to the stakeholders.

This forum will be designed to facilitate candid dialogue among participants, to foster self-implementing activities, and, where appropriate, to carry awareness of consequences to the wider public.

The participation of the federal science and technology leadership in an open dialogue and informal exchange of ideas precludes making formal recommendations or offering specific advice to federal agencies. Instead, the Roundtable seeks to stimulate new approaches by active dissemination of its discussions to government, university, and industry leaders. It also relies on pro-active outreach to colleague organizations that may want to cooperate in follow-up or build on the idea base established in Roundtable activities.

The Roundtable is sponsored by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. It is guided by its Council which sets the Roundtable agenda, addresses some topics directly, and oversees the plans and activities of Working Groups that address additional topics. The members of the Council are listed at the conclusion of this Report. With the exception of the federal agency officials, who serve as long as they are in office, Roundtable Council members are appointed to staggered three-year terms.

Roundtable Chairman

Joe Wyatt, Chancellor of Vanderbilt University, succeeded Richard Celeste as Chair in 1998 when Governor Celeste was appointed United States Ambassador to India. Chancellor Wyatt has been a leader in building strong university-industry cooperation at Vanderbilt, and has also led national efforts in this area and in initiatives to improve K-12 education.

Mode of Operation:

Several features of the Roundtable's structure and operation are central to its effectiveness:

1. Neutral Setting. The sponsorship of the Roundtable by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine provides a neutral setting with credibility among all elements of the research community. Diverse points of view are presented in Roundtable deliberations. The Roundtable avoids becoming a proponent for the views of any one constituency of the national research enterprise.
2. Active Council Participation. The meetings are designed so that senior federal R&D officials, and senior state government leaders can be full and active participants on the Council along with industry representatives, university administrators, and faculty. Their contributions and leadership are essential to the accomplishments of the Roundtable.
3. Addressing Problems from both Policy and Operational Levels. The combination of study and analysis by operational-level representatives in the Working Groups, and discussion by policy-level representatives in the Council, produces an environment that leads to the introduction of new ideas and new procedures into the research system.
4. Long-term vs. Short-term Issues. The Roundtable strives for a workable balance between attention to broad, ongoing concerns of the research community (for example, an examination of the current status and future prospects for the academic research enterprise and the international context for national research policies) and to the search for solutions to near-term problems (for example, streamlining administrative procedures for government-sponsored university research and for university-industry cooperative research).
5. The Special Role of the Roundtable. The Roundtable is most effective as a mechanism to frame and incubate issues, allowing it to play two distinctive roles within the Academy Complex and in the science and technology community as a whole. One is to initiate analyses of frontier issues that have not been explored elsewhere. The other is to help convey the results of major analytic efforts to an active leadership group and wider public, in recognition that the national science and technology enterprise is driven by the combined efforts of diverse individuals, organizations of many sizes and types, as well as the support of the public as a whole.
6. Implementation of Roundtable Initiatives. The legal context in which informal dialogue can take place among top federal government, industry, and university officials precludes the Roundtable from making formal recommendations to federal agencies. Nonetheless, because many of the perspectives of each sector on research questions are not well understood by the others, the added insight that comes from multi-sectoral discussion of them can lead to ideas that enable participants to return to their individual sectors and take new and innovative actions. Additionally, the attention of the Roundtable leaders to key issues can stimulate other groups to take constructive actions in their own spheres.

7. Working Groups. The Council appoints Working Groups to examine selected topics in depth. The groups elucidate issues, identify problems and opportunities, and consider options for dealing with them. Both near- and long-term goals are pursued. As progress in understanding a particular issue is made, the results are brought before the Council for its deliberation. When an area of concern is believed ready for public discussion, a means of stimulating discourse among all the interested constituencies is devised. These include large by-invitation events, workshops, and targeted distribution of discussion papers. Follow-up activities are organized within and beyond the Roundtable to pursue suggestions for specific policies, procedures, or programs.

8. Flexible Financial Support. Support for the Roundtable is provided by federal agencies, industry, universities, and occasionally state agencies or foundations. The majority of this funding is provided as general support for the Roundtable, enabling it to respond quickly to problems and opportunities as they arise, and to address issues in flexible, diverse, and innovative ways.

9. Personal Interaction. The Roundtable is foremost a process--a process for bringing together creative individuals from the diverse constituencies concerned with the research enterprise. The ability of the Roundtable to stimulate constructive change in the system depends on its ability to transcend ordinary bureaucratic and organizational thinking, and bring innovative approaches to issues that are typically complex, controversial, sensitive, or beyond conventional strategy horizons.

The effectiveness of the Roundtable is based on its ability to get the right people together at the right time, supported by appropriate background material and analytical information. In this environment, it is possible to introduce and test new ideas or deeper understanding into the policies and strategies of the nation's research system. The Roundtable sometimes convenes additional groups or establishes connections with other organizations to take and shape action as supplementary approaches to its own activities. To that end, the Roundtable makes an effort to maintain communication and working relationships with many education organizations, scientific societies, federal agencies, congressional offices, the states, and industry groups.

Financial Support of the Roundtable

An especially important accomplishment of the Roundtable during the past several years has been the broadening of its base of financial support to include all the major research sectors participating in the Roundtable. Core support is provided by the major federal R&D agencies: Department of Commerce/ National Institute of Standards and Technology, Department of Defense, Department of Energy, National Aeronautics and Space Administration, National Institutes of Health, National Science Foundation, Department of Agriculture, and Department of Transportation.

The Roundtable has also established University-Industry Partnerships as a component of its funding, as well as to enhance its ability to sense and respond to key issues arising in these relationships. The number of these partnerships is currently fourteen:

Hewlett-Packard/Stanford

- AMGEN/UCLA
- Monsanto/Washington University
- Motorola/University of Illinois at Urbana-Champaign
- Procter and Gamble/University of Wisconsin
- Battelle Pacific Northwest/University of Washington
- IBM/Florida State University
- Honda/Ohio State University
- Semiconductor Research/University of Texas at Austin
- Upjohn/Northwestern University
- C.R. Bard, Inc./Massachusetts Institute of Technology
- QUALCOMM, Inc.-SAIC/University of California, San Diego
- Texas Instruments/Texas A&M University
- Lord Corporation/ North Carolina State University

Roundtable Staff:

Thomas Arrison, Senior Program Officer
Susanne Bachtel, Visiting Project Associate
Anne-Marie Mazza, Senior Program Officer
Thomas Moss, Executive Director
Jocelyn Sands, Administrative Associate
Bianca Taylor, Project Assistant

WHAT DOES THE ROUNDTABLE DO?

The Roundtable provides a place for candor among national leaders to address divisive or emerging issues, and it contributes to national policy by illuminating issues and by injecting imaginative thought into policy deliberations. It often seeks to catalyze activity by both governmental and non-governmental entities to further develop or test ideas originating in its discussions.

As a forum for national leaders, the Roundtable has unique strengths. The senior science and technology appointees in the Executive Branch of the federal government are members of the Roundtable Council. The full federal contingent, combined with the increased industrial participation achieved since 1992, and the continuing participation of university representatives, bring to the table a solid representation of the nation's key decision-makers on issues of science and technology.

Council Activities, Current Major Projects, and Follow-up Planning, 1998

The Roundtable's Council meets as a whole three times per year. It also directs, through its Working Groups, a few projects that evolve from ideas generated in preceding Council meetings. This section outlines the thrusts of the 1998 Council meetings, and also indicates the status and plans in the major project areas.

Council Meeting Topics in 1998 (*Meeting Agendas, pages 15-17*)

The February 1998 Council Dialogue, "Managing the Regulatory Burden Imposed on the Research Laboratory", reflected concern that scarce research resources are being drained by the mounting expense of a regulatory framework that is often inappropriately applied to research settings. Participants felt that there were opportunities for enhancing the effectiveness of this framework in the laboratory setting without jeopardizing safety or environmental protection. As follow-up to its Council dialogue, GUIRR provided experts, through both its University-Industry Partners and affiliated Federal Demonstration Partnership, to work with NIH-organized task groups in five key regulatory domains identified for potential streamlining approaches.

The June 1998 Council Dialogue, "New Currents in the Science and Engineering Workforce" highlighted the need for models of training to integrate knowledge across discipline and departmental boundaries, and to recognize the international dimension of the science and engineering manpower pool. Follow-up strategies may involve a survey to identify model approaches, as well as supporting other NRC units in designing studies to quantify the role of international S&E manpower movement in filling U.S. needs. The Roundtable also provided the background of its discussions to a Sloan Foundation group examining models of new professional masters degrees, and will continue to cooperate with this and other efforts seeking innovations in training models to meet the workplace needs of the contemporary global economy and research community.

In October 1998, the Council Dialogue addressed "University Stewardship: New Responsibilities and Opportunities" This session made vivid the wide variety of viewpoints on

expectations and strategies of universities in carrying out the many roles given by society as a whole to them. Specific attention was given to opportunities to improve Bayh-Dole technology transfer practices. GUIRR will publish parts of the dialogue, including the ideas of several current or past university presidents who were guests of the Council on this occasion, and of the OSTP Associate Director for Science, Arthur Bienenstock. This and further work in this area will provide continuing development of ideas generated in a 1997 National Academies' Woods Hole Governing Board Symposium and available from GUIRR as "*A Dialogue on Research University Futures.*"

Council Meeting Plans for 1999

In August 1998 the GUIRR Executive Committee reviewed options for Council meeting focus in the 1998-99 period, and chose the subjects of moving research results from the social and behavioral sciences into application in government and industry, and models of building local and state stakeholding as topics for the February and June 1999 meetings. The subject of industry and university views of knowledge needs for understanding global climate change (with the NRC Board on Sustainable Development) is under further development as a possible future Council meeting topic.

The Roundtable will also continue to use variations of its traditional Council meeting format to provide opportunities for synergy with activities of its federal agency sponsors or University-Industry Partners. This approach was exemplified by the special DOD briefing, accompanying the February 1998 Council meeting, on their new university-industry program, as well as the special Lord Corporation-North Carolina State meeting of the University-Industry Partners in June 1998.

Other Roundtable Activities

Working with outside groups, cooperative activities include:

1. working with the State University of New York to organize the January 1998 "Triple Helix" conference on international patterns of partnerships among universities, industry, and government.
2. presentation of GUIRR activities and ideas as featured parts of programs addressing improving the effectiveness of university-industry research cooperation, at national meetings of the Society of Research Administrators, of the National Council of University Research Administrators, and of the National Association of State Universities and Land Grant Colleges.
3. leading a segment of a state of Connecticut symposium on approaches to building "cluster economic development" around university, industry, and state government partnerships.

4. hosting a national task force of the imaging industry seeking to re-define the management of intellectual property as a component of industry-university cooperation, and provided input to a Council on Competitiveness group working in related areas.
5. taking an active support and host role with the national "Kaleidoscope" group, aimed at disseminating effective practices in using university research capabilities to improve undergraduate education.

Major Project Status and Planning

Stresses on Research and Education at Colleges and Universities: Phase II

The summary report on the second national "Stresses in Research at Colleges and Universities" process is now available by request or at the GUIRR website, along with individual reports of participating campuses. The campus-based preparatory meetings and National Convocation that formed the basis of this report were sponsored by the Roundtable and the National Science Board. Issues highlighted include (1) developing effective incentives for interdisciplinary research, (2) building synergies between research and teaching, and (3) the challenge of financing mounting cost sharing requirements for research activities. The report's concerns have become a part of the current Presidential Review Directive (PRD) process on relations between federal agencies and research universities, and the summary report has served as a platform for local action in some of the participating universities.

The project was based on observations that the appropriate scope and balance of activities of colleges and universities, and of the roles and responsibilities of faculty and administrators at those institutions, are increasingly subject to societal scrutiny. This is despite the fact that the vitality and the diversity of American higher education and academic research have been acknowledged as great national assets. The juxtaposition of these points of view -- along with pressures related to changes in the local, national, and international research environments, and the increasing demand for limited research resources -- have undermined morale on many campuses. Controversy about which changes are necessary to alleviate these pressures, about how best to go about implementing change, and about the relative costs and benefits to society of proposed new approaches, has generated heated debate in public forums and in university governance bodies across the country.

In the first phase of this project, in 1993, thirteen academic institutions convened structured sessions to identify key areas of stress in the research and teaching environments on their campuses. Each session included a balance of senior and junior faculty, along with administrators responsible for research. This grass roots inquiry was aimed at identifying the most significant sources of stress affecting academe, and ideas to remedy those concerns. At the 1994 National Convocation that culminated this series of campus dialogues discussion underscored rising tensions -- resulting from an array of new pressures and changes, including new constituencies and an increasingly complex set of objectives and responsibilities -- exacerbating divisions among faculty and administrators, and undermining the trust that once marked the partnership between government and universities, as well as public support for university research.

A second phase of the project was launched in 1996, using the same grass roots, campus-based approach that was the foundation of prior work. The objectives of this second phase of study were to catalyze discussions and needed change on campuses, to encourage national dialogue among all parties with interests in the vitality of the academic enterprise; and to begin movement to renew or recast the compact between the federal government and universities. Officials at each of the participating institutions organized discussions among faculty and administrators, separately and jointly, on a set of questions agreed on by the project's Guidance Group. Each campus developed a report summarizing those discussions, and describing constructive programs and activities underway on their campuses. Participants and their reports from both the initial and second phase participating groups pooled their experiences and ideas in a second National Convocation held in Washington in February 1997. The synthesis work in preparation and following this Convocation became the basis of the summary report.

Representatives of the "Stresses" initiative were also invited to brief the task force of the President's Office of Science and Technology Policy that is conducting, under a Presidential Review Directive, an inter-agency review of the impact of federal policies and programs on academic institutions. As resources or opportunities allow, a short series of focused workshops, each addressing one of the top issues identified during the campus discussions, and explored at the National Convocation, may be convened in 1999.

Removing Barriers to Industry-University Research Collaboration

Collaborative partnerships between universities, industry, and government have multiplied and diversified enormously in recent decades. Universities have been confronted by diminishing growth in federal funding for research, and industry has faced increasing pressure to draw on wider research resources than can be supported internally. A report entitled "Industry-University Research Collaborations," issued in 1996 by GUIRR, the Industrial Research Institute and the Council on Competitiveness, notes that a new paradigm of research partnerships is emerging. This new paradigm is based on the collaboration, rather than the independence, of key performers of research.

As the value of research partnerships has become clear, so have some of the barriers to optimal partnering. Although many organizations have learned how to structure and manage collaboration effectively, other academic institutions and companies are less savvy, and even experienced institutions sometimes encounter stumbling blocks. These include:

- intellectual property and "background" rights;
- publication, copyright, and confidentiality concerns;
- regulation, liability, and tax law issues;
- various worries regarding foreign access;
- matters of graduate student involvement; and
- infrastructure impediments to inter-disciplinary and departmental research.

GUIRR, in cooperation with the NAS Committee on Science, Engineering, and Public Policy, organized a workshop March 23-24, 1998 aimed at exploring and disseminating the constructive approaches to overcoming barriers that have been devised in specific cases and settings. The workshop featured individuals with extensive experience in formulating and

managing collaborative relationships across research sectors. In addition to focusing attention on the primary trouble spots that emerge in the course of collaboration -- summarized loosely as issues of intellectual property, of institutional leadership, and of goal alignment and cultural disparity across sectors -- a primary goal of the workshop was to identify effective approaches to working through these stumbling blocks. This activity is supported by the Departments of Commerce, Defense, and the National Science Foundation. The report will be completed in 1999 and disseminated widely.

Federal Demonstration Partnership

The need to reduce growing tension between government and universities over procedures for administering federally-sponsored research was part of the original basis for creation of the Research Roundtable. This concern was institutionalized through the role of the Roundtable as coordinator for the Federal Demonstration Partnership (FDP). The FDP, a cooperative effort among sixty-five universities or research institutes and eleven federal agencies, is designed to improve the management of federally-funded research. The goal is to enhance research productivity without compromising the stewardship of public funds, by eliminating unnecessary administrative procedures and by streamlining those necessary to ensure accountability. The federal agencies and research institutions that constitute the FDP work together to design, test, and evaluate procedures aimed at improving the efficiency of sponsored research management. They also cooperate in efforts to clarify current changes to federal government-wide policies issued by the OMB.

This past year has been exceptionally active for the Federal Demonstration Partnership with member participation at an all time high. (At the December 1998 Committee of the Whole Meeting, 180 individuals participated in the two-day meeting.) Both OMB and OSTP have dramatically increased their engagement with the FDP this past year.

The FDP is currently focused on the following activities:

- Electronic Commerce
- Terms and Conditions
- Cost-sharing/cost-shifting/effort reporting
- Presidential Review Directive on Government-University Relations
- Faculty Involvement.

Electronic Commerce: For a substantial part of 1998, the FDP agencies committed support to fund an electronic research administration (ERA) coordinator for their efforts. Jerry Stuck, on detail from NSF, worked closely with FDP ERA working groups and was FDP's liaison to all federal ERA groups relevant to grant-making agencies. This special emphasis was stimulated by FDP participants' strong sense of need for standardization of approaches to be used in federal grants administration. Though Mr. Stuck had to return to his home agency, his contribution in this area was significant and he will remain involved in the FDP as co-chair of a newly constituted Electronic Research Administration Committee and as liaison to the Federal Electronic Commerce Committee. Procedures are also being put in place to prepare the FDP to act as a testbed for federal agency electronic commerce initiatives.

Terms and Conditions: In a recent survey of FDP members, standardization of terms and conditions for administering research grants was the most commonly cited concern, rivaled only by issues related to cost-sharing. This led to reactivating the Terms and Conditions Working Group as a full FDP Standing Committee, which now will include institutional as well as federal members. The Working Group was originally established at the beginning of FDP, trying to develop a standardized set of terms and conditions for research awards from the various federal agencies. In its contemporary form, this Committee will undertake a detailed review of the FDP terms and conditions to ensure that each article is a model implementation of OMB Circular 110. They will work to make the set standardized across all federal agencies.

Cost-sharing, Cost-shifting, and Effort Reporting: At the September 1998 Steering Committee Meeting, Mr. Woody Jackson, Deputy Controller of the Office of Financial Management of the U.S. Office of Management and Budget, engaged the FDP group in a discussion of new ideas to rationalize the often-chaotic federal agency practices in requiring university cost-sharing in research projects. He expressed a belief that a way to deal with these concerns may be through a formal new demonstration. It would be designed to elucidate real understanding of the ways that various research and educational activities interact with each other, but without exposing participants to risks under the traditionally strict separation of these for accounting purposes.

Working closely with OMB, the FDP is currently designing a potential cost-sharing demonstration project. The project proposal is expected to be presented to the membership at its March 1999 Steering Committee Meeting.

Presidential Review Directive on Government-University Relations: In 1997, the FDP provided to the PRD group an extensive set of ideas that its members felt could increase the efficiency and effectiveness of the administration of federally-supported research. FDP leadership continued in 1998 to provide consultation to the PRD Task Force of the NSTC Committee on Science (COS) on three areas of emphasis: (1) recommendations for a set of guiding principles for the university-government research partnership, (2) operating guidelines that should form the basis for OMB Circulars A-110, A-21, etc., and (3) recommendations for follow-up studies of these and other relevant policies. OSTP has asked the FDP to jointly convene a special meeting with its Committee on Science when the PRD report is formally issued, to discuss issues identified in the report, as well as the feasibility of recommended FDP follow-up projects. It is expected that this meeting will take place in mid-1999.

Faculty Involvement: A special FDP emphasis in 1998 was to sharply increase the participation of active researchers, in addition to campus research administrators. The resulting increased faculty involvement has strengthened the FDP's grounding in practical problems in the laboratory setting.

Formulating U.S. Research Policies Within an International Context

In 1994, the Roundtable began a project entitled "Formulating U.S. Research Policies Within an International Context." The purpose of this project was to examine shifts occurring within the worldwide research enterprise and to raise for discussion possible changes that may be

appropriate for U.S. research policies. During 1996, the Roundtable continued a series of focus groups, inviting members of the congressional leadership and congressional staff, as well as representatives from government, academia, and industry, to discuss their views regarding domestic and international changes affecting the research enterprise. All focus group sessions were organized around current international issues confronting the global research community and the broader implications for U.S. research policies.

As a follow-up to these discussions, an international colloquium was held in May 1997 to consider options for maintaining a world-class research enterprise. Representatives of a number of countries shared perspectives on their policy environments and strategies. A particular focus was the trend toward internationalization of industrial research and development efforts, and what this may mean to the conventional policy considerations of bolstering "domestic" industry in competition with "foreign" competitors. Similarly, much emphasis was placed on the emerging phenomenon of human capital mobility, in which students who are trained in one part of the world may wind up living and working in entirely different countries. The report of this meeting was released in May 1998.

Activities of Roundtable Working Groups

The Roundtable has carried out a considerable portion of its activities in formal and informal Working Groups. This allows ideas that are stimulated in the major Council meetings to be examined in detail, along with consideration of follow-up strategies to be undertaken by the Working Group itself, or through cooperation with other units in the Academy complex, or with outside groups with synergistic interests.

Working Group on Public Understanding of Science and Technology:

This Working Group has emphasized approaches to improving the manner in which science and technology is portrayed in the media. In November 1998, IOM President and Working Group Chair Ken Shine, along with Dr. Marcia McNutt, Monterey Bay Aquarium Research Institute, Ms. Donna Gerardi, NAS Office of Public Understanding of Science, and Dr. Anne-Marie Mazza, GUIRR met with National Broadcasting Corporation staff to discuss opportunities for collaboration in this area. NBC staff indicated interest in the following:

- 1.) Arranging a meeting for NBC staff to hear the career stories of scientists/engineers and learn more about their research. They were strongly interested in the Academies' Frontiers of Science and Frontiers of Engineering Programs, which are designed to bring together an interdisciplinary cross-section of some of the most creative young scientists and engineers under the age of 45 for three days of active exchanges of science and ideas.
- 2.) Establishing opportunities for NBC staff to interact with scientists/engineers for review of the scientific content of scripts, and to generate story ideas that reflect new knowledge generated at the frontiers of science and engineering.
- 3.) Developing a link to the NAS web page.

These activities will be coordinated through the NAS's Office of Public Understanding of Science, with strong cooperation and continued interest and support from GUIRR.

Working Group on Human Resources for Science and Engineering

In late 1996 Norman Augustine, chair of the Education Task Force of the Business Roundtable, suggested a joint activity on K-12 education with the GUIRR Human Resources Working Group, chaired by Ernie Moniz, formerly Associate Director for Science at OSTP. The two organizations initially decided that the issue of professional development of K-12 teachers of science and mathematics would be the most productive area for collaboration. Further discussions with Business Roundtable staff eventually led to agreement that the National Alliance of Business (NAB), with its focus on education, would be the appropriate organization to cooperate with GUIRR in this activity.

In March of 1998, Bruce Alberts, the new Chair of the Working Group, hosted a meeting of NAB and NAS-NRC staff leadership (GUIRR and CSMEE --the Center for Science, Mathematics, and Engineering Education) to define specific priority areas for possible collaboration in this area.

Three subsequent meetings were held between staff of NAS-NRC, NAB, and interested industry groups (Council on Competitiveness, Industrial Research Institute, Biotechnology Industry Organization and NASDAQ, Inc.). The collaboration has evolved to a plan for an 18-month NRC study that will illustrate effective strategies that business can use to improve teaching and learning partnerships with educators.

The specific project goals are:

- 1.) to collect and synthesize information on the degree of alignment of math and science education standards with industrial skill standards;
- 2.) to collect and study evidence of effectiveness of current business-education programs designed to improve student achievement in science, mathematics, and technology and from that data to formulate recommendations for implementing effective programs; and
- 3.) to highlight best practices in business-led efforts through concrete examples.

The primary audience will be business and business-led coalitions. The growing and increasingly diverse audience that is interested in business involvement in education will be the secondary audience: K-12 educators, community college educators, curriculum developers, recruiters and trainers of entry-level employees, and others.

The primary partners will be the NRC and the NAB. The NAB will also leverage the expertise of other national business organizations, including the Business Roundtable, the Council on Competitiveness, and other partners of the Business Coalition for Education Reform (BCER), a coalition managed by NAB which is dedicated to strengthening U.S. schools. At the NRC, the CSMEE will manage the project and convene the study committee. GUIRR and the Academy Industry Program will co-sponsor an initial convocation, assist in convening regional meetings, and sponsor dissemination events.

Government-University-Industry Research Roundtable
National Academy of Sciences/National Academy of Engineering/Institute of Medicine

Council Meeting

February 24-25, 1998

National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C.

AGENDA

Managing the Regulatory Burden Imposed on the Research Laboratory

Tuesday Evening: February 24 (Rotunda/Member's Room)

5:30 **Cocktail Reception**

6:00 **Welcome: Council Chairman Joe Wyatt**

Dinner and Keynote Address: Perception of the Problem

Speaker: The Honorable John E. Porter, Congressman, 10th District, Illinois
Current Regulatory Requirements: Are there Burdens that can be Reduced? A Viewpoint from Congress

Discussant: Dr. Marcel LaFollette, Research Professor,
George Washington University
Factors Affecting the Environment for Regulation

Wednesday Morning: February 25 (Lecture Room)

8:00 **Breakfast Session: Industrial Laboratories: Scope of the Problem and Approaches to Solutions**

Speakers: Mr. John B. Carberry, Director, Environmental Technology
E. I. du Pont Corporation
A Viewpoint from Industry

Dr. Bernard Schwetz, Interim Chief Scientist
Food and Drug Administration
Pathways to a More Effective Regulatory Framework

9:30 **Morning Session: Academic/Government Laboratories: Scope of the Problem and Approaches to Solutions**

Speakers: Dr. Hermann Grunder, Director
Thomas Jefferson National Accelerator Facility
Experiences in Meeting Goals at Cost and On Time

Dr. Robert R. Rich, Vice president and Dean of Research
Baylor College of Medicine
Experiences in University Health Science Research Laboratories

Dr. Barry Barish, Professor and Director Laser Interferometer
Gravitational-Wave Observatory (LIGO) Project
California Institute of Technology
Experiences in University Physical Science Research Laboratories

11:30 **Discussion Summary and Council Members ideas on Follow-up Strategies to Identify and Test
Improved Models to Meet Regulatory Requirements**
Council Chairman Joe Wyatt

12:00 **Other Roundtable Business**

12:30 **Adjournment to Informal Lunch Discussion**

Government-University-Industry Research Roundtable
National Academy of Sciences/National Academy of Engineering/Institute of Medicine
Council Meeting
June 23-24, 1998
National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C.

AGENDA

Tuesday Evening: June 23 (Roundtable/Member's Room)

5:30 Cocktail Reception, Special Recognition of Neal Lane,
in honor of his nomination as Science Advisor to the President

6:00 Welcome: Council Chairman Joe Wyatt

Dinner and Keynote Address: **Perceptions of the Issue**

Speaker: Dan Goldin, Administrator, National Aeronautics and Space Administration
"The Issue Today, and the Thirty Year Horizon"

Discussant: Daniel Sullivan, Sr. Vice President, QUALCOMM, Inc. (invited)

Open Discussion

Wednesday Morning: June 24 (Lecture Room)

8:00 Breakfast Session: **Pressures Seen in Congress**

Speaker: Honorable James P. Moran, U.S. House of Representatives

8:30 Open Discussion

9:00 Morning Session: **Creating New Opportunities for Workforce Enhancement**

Speakers: Henry E. Riggs, President, Keck Graduate Institute
"The Claremont Experiment: New Ways of Teaching and Learning"

Robert Galvin, Chairman, Motorola
"What We Have Learned Through Motorola University"

10:00 Break

10:15 Morning Session Continued **Ways to Strengthen Our Human Resources Pool**

Erich Bloch, Chairman on Competitiveness
"Ideas from the National Innovation Summit"

Open Discussion

11:30 Discussion Summary, and Council Members' Ideas on Follow-up Strategies to Build Workforce Vitality
Council Chairman, Joe Wyatt

12:00 Other Roundtable Business
Council Chairman Joe Wyatt

12:30 Adjournment to Informal Lunch Discussion

Government-University-Industry Research Roundtable
National Academy of Sciences/National Academy of Engineering/Institute of Medicine
Council Meeting
October 27-28, 1998
National Academy of Sciences, Washington, D.C.

Tuesday Evening: October 27 (Rotunda/Member's Room)

5:30 Cocktail Reception

6:00 Welcome: Council Chairman Joe Wyatt

Dinner and Keynote Address: **National Perceptions of the Issue**
Speaker: Arthur Bienenstock, Associate Director for Science
Office of Science and Technology Policy
Executive Office of the President
"Government, Industry, and Public Expectations of the Research University"

Open Discussion

8:30 Adjourn

Wednesday Morning: October 28 (Lecture Room)

7:30 Continental Breakfast

8:00 Breakfast Session: **US/Japan Comparisons, Defining Industry and University Research Roles: The Harvard/Kennedy School Project**
Speaker: Professor Richard Florida, Heinz School of Public Policy and Management, Carnegie Mellon University

8:30 Open Discussion

9:00 Morning Session, foresight: **New Opportunities and Risks in University Financial Strategies**

Panel: **Private Universities:**

George Rupp, President, Columbia University
Malcolm Gillis, President, Rice University
David Litster, Vice President for Research, MIT

Public Universities:

Robert Berdahl, Chancellor, University of California, Berkeley
James Duderstadt, President Emeritus, University of Michigan

10:45 Break

11:00 Morning Session, current reality: **How Can We Optimize Performance under the Bayh-Dole Act?**
(AUTM)
Karen Hersey, President, Association of University Technology Managers

Frank Knoll, Dow Chemical

**Recognition of Danish Academy of Technical Sciences Delegation
Studying U.S. Technology Transfer Systems**

11:45 Discussion summary, and Council Member Ideas on Follow-up Strategies
Council Chairman Joe Wyatt

12:15 Roundtable Up-dates, Other Business
Council Chairman Joe Wyatt

12:30 Adjournment of full Council to Informal Lunch Meeting of U-I's

GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE

Council Members

CHAIR

Joe B. Wyatt
Chancellor
Vanderbilt University

Bruce Alberts
President
National Academy of Sciences

D. James Baker
Under Secretary for Oceans & Atmosphere
U.S. Department of Commerce/NOAA

Evan Bayh
Former Governor, Indiana
Law Firm of Baker and Daniels

Robert Berdahl
Chancellor
University of California-Berkeley

Jean Bonney
Concord Consulting Group

Carol M. Browner
Administrator
U.S. Environmental Protection Agency

Rita Colwell
Director
National Science Foundation

Lynn Conway
Professor of Electrical Engineering &
Computer Science
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Visiting Professor, Princeton University

ROUNDTABLE PUBLICATIONS

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Academic Research Enterprise

Stresses on Research and Education at Colleges and Universities: Phase II. Of a Grass Roots Inquiry. - Report of the second phase of a collaborative inquiry conducted by the National Science Board and the Government-University-Industry Research Roundtable. Highlights-- continuing areas of stress in the research and teaching functions in higher education, especially disincentives to interdisciplinary efforts, and tensions concerning cost-sharing. (December 1998)

Actions Are Needed to Promote Research Sharing - Statement of the Presidents of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, with transmittal letter by Joe Wyatt, Chancellor, Vanderbilt University, Chair, Government-University-Industry Research Roundtable. This statement and a series of follow-up actions with colleague science and engineering societies and industry groups were based on response to the October 1997 Roundtable Dialogue, *Openness and Secrecy in Research*. (December 1998)

A Dialogue on Research University Futures - Proceedings of the 1997 Symposium, National Research Council Governing Board, Woods Hole. This symposium brought together leaders from both inside academia and from other sectors, to examine new and growing societal expectations of research universities, and unfolding responses to these. OMB Director Franklin Raines delivered the challenging keynote for the event. (April 1998)

The Costs of Research: Examining Patterns of Expenditure Across Research Sectors Report by Arthur Andersen, LLP, for The Government-University-Industry Research Roundtable. Arthur Andersen's analyses conclude that the pattern of expenditures incurred for research activities in federal laboratories, universities, and industry are strikingly similar, despite common perceptions that there are wide differences. (March 1996)

Government and Higher Education: Renewing the Partnership - by Richard Celeste and Roland Schmitt - An op-ed article published by the National Academy Op-Ed Service. These two prominent observers (Celeste the former Governor of Ohio and Schmitt the former president of Rensselaer Polytechnic Institute) of the links between research, the economy, and public policy, spell out how the next 50 years of university-based research can be as productive as the past 50 years. (August 1994)

Stresses on Research and Education at Colleges and Universities: Institutional and Sponsoring Agency Responses. - Report of a collaborative inquiry conducted jointly by the National Science Board and the Government-University-Industry Research Roundtable. The purpose of this report is to contribute to discussions of the choices facing the U.S. academic enterprise as we approach the twenty-first century. (July 1994)

Stresses on Research and Education at Colleges and Universities: Preliminary Summary of Campus Reports. - This is a preliminary summary of individual campus reports and recommendations for action prepared as a working document for the National Summary Meeting of a project sponsored jointly by the National Science Board and the Government-University-Industry Research Roundtable, December 7-8, 1993. (December 1993)

Fateful Choices: The Future of the U.S. Academic Research Enterprise - A discussion paper including an optimistic and challenging vision for the future of U.S. academic research; an analysis of the near-term decisions and longer-term options facing the enterprise if the positive vision is to be pursued; and a description of the changing environment for decision making. (March 1992)

The Future of the U.S. Academic Research Enterprise: A Report of a Conference - A summary of a December 9-10, 1991, Roundtable conference held to address critical issues confronting U.S. academic research and to explore the possibilities for national consensus on the future directions of the research enterprise. (March 1992)

Science and Technology in the Academic Enterprise: Status, Trends and Issues - A discussion paper on the status of the current academic research enterprise, emerging trends affecting it, and major issues to be addressed regarding its future; statistical information on financial, human resource, infrastructure, and organizational trends in academic research. (October 1989)

Multidisciplinary Research and Education Programs in Universities: Making Them Work
A paper by Robert L. Sproul, Harold H. Hall, and members of the Working Group on Institutional Renewal, discussing how to organize, support, and operate multidisciplinary programs in universities. (June 1987)

Examining the Impact of Information Technology on Science and Engineering Research and Education. - This is a brief summary of the March 1996 GUIRR Council meeting on this subject, with references for further information. (June 1996)

New Alliances

Reducing Barriers to Industry-University Research Collaboration: Report of a Workshop
A report of a 1998 practitioner workshop highlighting effective practices in bridging the different needs of participants in industry-university research partnerships. (in preparation - 1999)

Industry-University Research Collaborations: Report of a Workshop - A report of several case histories of major industry-university collaborations, stressing especially the comparison of actual outcomes and original expectations. Published jointly with the Industrial Research Institute and the Council on Competitiveness. (1997)

Intellectual Property Rights in Industry Sponsored University Research: A Guide to Alternatives for Research Agreements - Published jointly with the Industrial Research Institute. (August 1993)

Richard F. Celeste, "Who Benefits From High-Technology Partnerships?" - An op-ed article published by the National Academy of Science Op-Ed Service discussing the potential of partnerships between universities and business to spur economic development, and a major obstacle to such partnerships--disputes over how to use the ideas arising from joint projects. (December 12, 1993)

University-Industry-Federal Laboratory Partnerships: Expectations and Effectiveness Summary of Issues Raised at the October 1992 Roundtable Council Meeting. (September 1993)

Richard F. Celeste, "A New Partnership in American Science and Technology," - An op-ed article published by the National Academy of Sciences Op-Ed Service encouraging federal-state interactions in science and technology. (June 21, 1992)

Federal-State Cooperation in Science and Technology Programs - A discussion paper by the Federal-State Dialogue on Science and Technology. (February 1992)

Industrial Perspectives on Innovation and Interactions with Universities: Summary of Interviews with Senior Industrial Officials - Presents the views of 17 industrial officials on innovation processes in their firms, connections to universities, and national R&D policy. (February 1991)

"Survey to Assess the Usefulness of Two Model Agreements for University-Industry Cooperative Research" - Results of a survey of about 70 university and industry "users" of the model agreements published in 1988. (August 1990)

Simplified and Standardized Model Agreements for University-Industry Cooperative Research - Published jointly with the Industrial Research Institute. (1988)

"Commentary: University-Industry Alliances;" Dorothy Nelkin, Richard Nelson, and Casey Kiernan; Science, Technology and Human Values, Volume 12, Issue 1, pp. 65-74. (Winter 1987)

State Government Strategies for Self-Assessment of Science and Technology Programs for Economic Development - Proceedings of a workshop held April 10, 1987.

New Alliances and Partnerships in American Science and Engineering - Background materials for a conference held December 5, 1985 (issues paper and case studies) along with interpreted highlights of conference sessions.

International Context for Research

National Science and Technology Strategies in a Global Context: Report of an International Symposium - The symposium brought together leaders of leading technologically-based economies, to look at common issues they face in relating national S&T investment strategies to the pressures and opportunities in a global marketplace. (May 1998)

Formulating U.S. Research Policies Within An International Context: A Discussion Paper - The purpose of this paper is to provoke discussion among policy makers and the U.S. research community regarding the implications of changing international conditions for the purposes, goals, and capacity of the U.S. research enterprise. (January 1994)

Future National Research Policies Within the Industrialized Nations - A report of a February 1991 symposium on emerging national research policies and programs. Participants included senior government officials and leading scientists directly involved in formulating research and higher education policies in the United States, Japan, the Soviet Union, the United Kingdom, Germany, and the European Community. (February 1992)

The Academic Research Enterprise Within the Industrialized Nations: Comparative Perspectives - A report of a symposium on the research systems of the U.S., Japan, Soviet Union, Great Britain, Germany, and France. (March 1990)

Improving Research Administration

General:

The Management and Cost of Laboratory Waste Associated with the Conduct of Research: Report of Workshop - The purpose of this report is to contribute to discussions of the management and cost of laboratory waste associated with the conduct of research. (September 1994)

Scanley, D. A. and W. Sellers, "Making Things Better: A Summary of Past Recommendations for Improving the Management of Federally Sponsored Academic Research," Research Management Review, Volume 5 Number 1. (Spring 1991)

Reducing Bureaucratic Accretion in Government and University Procedures for Sponsored Research: New Approaches in Process and Additional Areas for Attention Proceedings of a hearing held June 5, 1985. (full report and summary)

About the FDP:

"Federal Demonstration Project: Response to the National Performance Review," - A proposal for implementing recommendations of the National Performance Review. (March 1994)

"What is the Federal Demonstration Project?" - A description of a cooperative effort between universities and federal agencies to increase research productivity by eliminating unnecessary administrative procedures and by streamlining and standardizing needed controls. (August 1991)

"Summary of Interim Reports Submitted by Grantee Organizations Participating in the Federal Demonstration Project" - Describes the positive impacts of the FDP on principal investigators, universities, and the general research environment as well as problem areas that need to be addressed. (October 1990)

FDP Studies and Surveys:

"Government-University Partnership Review Directive, Response of the Federal Demonstration Partnership" - FDP ideas concerning "first principles" of the partnership between government and universities, areas for immediate enhancement of the efficiency and effectiveness of university-government interactions, and areas needing further study. (July 31, 1997)

"Direct Charging Space Costs," - Prepared by the Federal Demonstration Project Task Force on Direct Charging, the report examines the implications of developing and testing models to subject a greater portion of research costs to the peer review process by charging facilities costs directly to specific research grants and contracts. (October 1995)

"Federal Managers' Viewpoints on FDP Continuation Funding Pilot" - Prepared by the Federal Demonstration Project Task Group on Proposals/Applications, the report provides the results of a survey of federal agency views of the impact of the noncompeting renewal demonstration on the efficiency and efficacy of agency functions. (March 1992)

"Report on Equipment Screening Studies" - Prepared by the Federal Demonstration Project Task Group on Internal Systems, the report examines the cost effectiveness of equipment screening. (December 1991)

"The Impact of Noncompeting Continuation Applications within the Federal Demonstration Project" - Prepared by the Federal Demonstration Project Task Group on Productivity Assessment, the report provides the results of a survey of the time saved by principal investigators under the demonstration of new procedures for non-competing renewal applications. (November 1991)

"The Impact of the Use of Expanded Authorities within the Federal Demonstration Project" - Prepared by the Federal Demonstration Project Task Group on Productivity Assessment, the report describes the results of a survey that assessed the amount of principal investigator time saved during the demonstration of research administration

procedures that expand the authority of universities and principal investigators to manage grant funds. The survey also looks at how saved time was reinvested. (February 1991)

"Report on Survey of State Requirements Applicable to Externally Funded Research Activities" - Prepared by the Federal Demonstration Project Task Group on State/Grantee Relations, the report describes the results of a survey on administrative requirements states apply to university research. (November 1990)

"The Florida Demonstration Project: Observations on the Impacts of the Project" - Observations on the impacts of the Project based on information collected on the operation of the Project by the Roundtable in cooperation with the participating universities in Florida. (September 1987)

Priorities

Richard F. Celeste, Testimony before the Subcommittee on Science, Committee on Science, Space, and Technology, Regarding setting Priorities in Science. (April 28, 1992)

What Research Strategies Best Serve the National Interest in a Period of Budgetary Stress? - Interpreted highlights of the discussion at a conference held February 26 and 27, 1986.

Academic Research Facilities

Don I. Phillips, Testimony before the Subcommittee on Department Operations and Nutrition, Committee on Agriculture, United States House of Representatives; Statement of Don I. Phillips, Executive Director, Government-University-Industry Research Roundtable, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, regarding academic research facility financing. (June 17, 1993)

"Research Facility Financing: Near-Term Options" - Intended as a vehicle for discussion, this document sketches the purposes, costs, impacts, tradeoffs, and political considerations associated with a variety of mechanisms for research facility funding. (February 1991)

James D. Ebert, Testimony before the Rules Committee of the United States Senate; Statement of James D. Ebert, Vice President, National Academy of Sciences, Regarding S. RES. 206-To establish a point of order against material that earmarks research monies for designated institutions without competitions. (June 21, 1990)

"Synthesis of Options for Academic Research Facility Financing" - A summary of three sector-specific workshops in which representatives of federal agencies, universities, and state governments each described alternative approaches their sectors can take to facility financing. The document describes the perspectives of each sector along with options for facility financing that each sector could take. (March 1990)

Perspectives on Financing Academic Research Facilities: A Resource for Policy Formulation - A resource for policy makers and a reference work, this discussion paper addresses objectives of facility funding, strengths and weaknesses of financing mechanisms, facility needs and sources of support, roles of the sectors, and key policy issues. (October 1989)

Academic Research Facilities: Financing Strategies - Proceedings of a conference held July 22 - 23, 1985 (full report and summary)

"Federal Funding of Scientific Facilities" - A discussion of the issues arising from direct congressional funding of facilities. (February 2, 1985)

Science and Engineering Talent

Nurturing Science and Engineering Talent - A discussion paper on the broad outlook for science and engineering talent organized around three themes: the status of the science and engineering talent pool, the factors affecting career choice, and the effectiveness of special programs to encourage science and engineering talent. (July 1987)

Competitiveness

Richard F. Celeste, Testimony before the Subcommittee on Technology, Environment, and Aviation, Committee on Science, Space, and Technology, Regarding the National Competitiveness Act of 1993 and the Role of the States. (February 3, 1993)

"A Dialogue on Competitiveness," Ralph E. Gomory and Harold T. Shapiro, **Issues in Science and Technology**, Volume IV, Number 4, (Summer 1988)

Brochures

University Stewardship: New Responsibilities and Opportunities - A summary of the October 1998 Roundtable Council Meeting (in press)

New Currents in Science and Engineering Workforce Issues - A summary of the June 1998 Roundtable Council Meeting (in press)

Managing the Regulatory Burden on the Research Laboratory - A summary of the February 1998 Roundtable Council Meeting (in press)

Openness and Secrecy in Research: Preserving Openness in a Competitive World - A summary of the October 1997 Roundtable Council Meeting.

Tensions Between Science and Law in a High-Tech Society - A summary of the June 1997 Roundtable Council Meeting.

Examining the Impact of Information Technology on Science and Engineering Research and Education - A summary of the March 1996 Roundtable Council Meeting.

Communication and Understanding between Scientists and the Public - A summary of the June 1996 Roundtable Council Meeting.

Can We Develop Performance Standards and Outcome Measures for the Research Enterprise? - A summary of the October 1996 Roundtable Council Meeting.

The Changing Market for Technology - A Summary of the March 1997 Roundtable Council Meeting.

Annual Reports

Government-University-Industry Research Roundtable Annual Reports, 1985 - 1998.

The Government-University-Industry Research Roundtable

1999 Annual Report

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The Research Roundtable was created in 1984 to foster strong American science through effective working relationships among government, universities, and industry. It is sponsored by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

Message From the Co-Chairs

1999 marked the first year that the Government-University-Industry Research Roundtable has had formal dual university-industry leadership. The two of us have welcomed the opportunity to pioneer this approach as Co-Chairs. Working with our Council and University-Industry Partner colleagues, we look forward to building a lasting tradition.

We want the dual leadership to convey more than fashionable symbolism. The structure and dynamics of American science and engineering have changed. In 1997, industrial research and development investment was double that of the federal government. All over the world, privatizing economies have made industrial research strategies crucial to the development of science and engineering frontiers. Thus, when our unique national Roundtable gathers to assess research opportunities and issues, it is more important than ever before that industry be present in a true leadership role.

On the other hand, industrial leaders are as aware as anyone that research efforts and knowledge often cannot be neatly categorized and controlled in predictable detail. By its nature, research takes us into the unknown, and its potential can only be realized if there is always a broad sense of common striving, and common benefit, as it unfolds. That is why our Roundtable colleagues from Sematech, or from the several long-standing University-Industry Partnership groups, provide such vital perspectives to our dialogues. They have developed approaches to government-university-industry partnership that indeed advance the individual goals of the Partners, but also allow open research to flourish, and bring benefits to the public as a whole. The Partners look to research for their individual purposes, but recognize the crucial past and future role of public investment in building the foundation for new breakthroughs. They recognize that the American research university system is a unique resource for both industry and government – but only to the extent that is not “controlled” by either.

Finding ways to maintain the needed balance in research partnerships, while taking full advantage of opportunities to put the research results to work, is what the Roundtable is all about. As the economic and knowledge environment changes rapidly and dramatically, Roundtable-style dialogues among research leaders are needed more than ever.

As we move into the new decade, soon with a new federal administration and a new group of federal agency leaders, we look forward to serving our three constituencies and welcome advice and ideas from colleagues. We want also to express deep thanks to retiring Council members Evan Bayh, Lynn Conway, Edward Zschau, Maynard Olson, and Steven J. Gould, as well as to the federal agency heads that have served on the Roundtable during this Administration.

William Joyce

Joe Wyatt

Roundtable Co-Chairs

WHAT IS THE ROUNDTABLE?

Purpose and Structure

The Government-University-Industry Research Roundtable was created in 1984 to provide a unique forum for dialogue among top government, university, and industry leaders of the national science and technology enterprise. The purpose is to facilitate personal working relationships and exchange of ideas regarding issues, problems, and promising opportunities that are facing those charged with developing and deploying science and technology resources.

The Roundtable's Mission Statement, up-dated in 1995 following a tenth-year retreat, summarizes this goal:

To convene senior-most representatives from government, universities, and industry to define and explore critical issues related to the national science and technology agenda and its global context that are of shared interest; to frame the next critical question stemming from current debate and analysis; and to incubate activities of on-going value to the stakeholders.

This forum will be designed to facilitate candid dialogue among participants, to foster self-implementing activities, and, where appropriate, to carry awareness of consequences to the wider public.

The participation of the federal science and technology leadership in an open dialogue and informal exchange of ideas precludes making formal recommendations or offering specific advice to federal agencies. Instead, the Roundtable seeks to stimulate new approaches by active dissemination of its discussions to government, university, and industry leaders. It also relies on pro-active outreach to colleague organizations that may want to cooperate in follow-up, or build on the idea base established in Roundtable activities.

The Roundtable is sponsored by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. It is guided by its Council which sets the Roundtable agenda, addresses some topics directly, and oversees the plans and activities of working groups that address additional topics. The members of the Council are listed at the conclusion of this Report. With the exception of the federal agency officials, who serve as long as they are in office, Roundtable Council members are appointed to staggered three-year terms.

Roundtable Co-Chairmen

Joe Wyatt, Chancellor of Vanderbilt University, succeeded Richard Celeste as Chair in 1998 when Governor Celeste was appointed United States Ambassador to India. Chancellor Wyatt has been a leader in building strong university-industry cooperation at Vanderbilt, and has also led national efforts in this area. He also led national and local initiatives to improve K-12 education.

Chancellor Wyatt led discussion within the National Academies of the importance of formalizing full industry partnership in the leadership of the Roundtable. This culminated in the June 1999 appointment as GUIRR Co-chair, by Academies' President Bruce Alberts, of William H. Joyce, Chairman and Chief Executive Officer of Union Carbide Corporation. Dr. Joyce, with a distinguished research and business career in the chemical industry, is also a member of the National Academy of Engineering.

Mode of Operation:

Several features of the Roundtable's structure and operation are central to its effectiveness:

1. Neutral Setting. The sponsorship of the Roundtable by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine provides a neutral setting with credibility among all elements of the research community in the three sectors. Diverse points of view are presented in Roundtable deliberations. The Roundtable avoids becoming a proponent for the views of any one constituency.
2. Active Council Participation. The meetings are designed so that senior federal R&D officials, top industry officers, and senior state officials can be full and active participants on the Council along with university administrators and faculty. Their contributions and leadership are essential to the accomplishments of the Roundtable.
3. Addressing Problems from both Policy and Operational Levels. The combination of study and analysis by operational-level representatives in the working groups, and discussion by policy-level representatives in the Council, produces an environment that leads to the introduction of new ideas and new procedures into the research system.
4. Long-term vs. Short-term Issues. The Roundtable strives for a workable balance between attention to broad, ongoing concerns of the research community (for example, an examination of the current status and future prospects for the academic research enterprise and the international context for national research policies) and to the search for solutions to immediate problems (for example, streamlining administrative procedures for government-sponsored university research and for university-industry cooperative research).
5. The Special Role of the Roundtable. The Roundtable is most effective as a mechanism to frame and incubate issues, allowing it to play several distinctive roles within the Academies and in the science and technology community as a whole. One is to initiate analyses of frontier issues that have not been explored elsewhere. The other is to help convey the results of major analytic efforts to an active leadership group and wider public, in recognition that the national science and technology enterprise is driven by the combined efforts of diverse individuals, organizations of many sizes and types, as well as the support of the public as a whole. Another is to act as a catalyst for concerted action on major opportunities or problems, by appropriate bodies within the Academies or outside.

6. Implementation of Roundtable Initiatives. The legal context in which informal dialogue can take place among top federal government, industry, and university officials restricts the ability of the Roundtable to make formal recommendations to federal agencies. Nonetheless, because many of the perspectives of each sector on research questions are not well understood by the others, the added insight that comes from multi-sectoral discussion of them can lead to ideas that enable participants to return to their individual sectors and take new and innovative actions. Additionally, the attention of the Roundtable leaders to key issues can stimulate other groups to take constructive actions in their own spheres.

7. Working Groups. The Council sometimes creates ad-hoc working groups to develop or follow-up on topics related to the meeting discussions. These groups may elucidate issues, identify problems and opportunities, and consider options for dealing with them. Both near- and long-term goals can be pursued in this manner. As progress in understanding a particular issue is made, the results are brought before the Council for its deliberation. When progress in an area of opportunity or concern can be furthered by broad public discussion, a means of stimulating discourse among all the interested constituencies is devised. These may include large by-invitation events, workshops, and targeted distribution of discussion papers.

8. Flexible Financial Support. Support for the Roundtable is provided by federal agencies, industry, universities, and occasionally state agencies or foundations. The majority of this funding is provided as core support for the Roundtable, enabling it to do long-range planning and look over the horizon at emerging issues, as well as to respond quickly to problems and opportunities as they arise. Working largely from core instead of project support, it can address issues in flexible, diverse, and innovative ways.

9. Personal Interaction. The Roundtable is foremost a process--a process for bringing together creative individuals from the diverse constituencies concerned with the research enterprise. The ability of the Roundtable to stimulate constructive change in the system depends on its ability to transcend ordinary bureaucratic and organizational thinking, and bring innovative approaches to issues that are typically complex, controversial, sensitive, or beyond conventional strategy horizons.

The effectiveness of the Roundtable is based on its ability to get the right people together at the right time, supported by appropriate background material and analytical information. In this environment, it is possible to introduce new ideas or deeper understanding into the policies and strategies of the nation's research system. In appropriate circumstances the Roundtable also cooperates in convening additional groups, or establishes working relationships with other organizations. This enables it to catalyze or shape action as a supplement to its own direct activities. For this reason, the Roundtable makes an effort to maintain communication and working relationships with many education organizations, scientific societies, federal agencies, congressional offices, the states, and industry groups.

Financial Support of the Roundtable

An especially important accomplishment of the Roundtable during the past several years has been the broadening of its base of financial support to include all the major research sectors participating in the Roundtable. Core support is provided by the major federal R&D agencies: Department of Commerce/ National Institute of Standards and Technology, Department of Defense, Department of Energy, National Aeronautics and Space Administration, National Institutes of Health, National Science Foundation, Department of Agriculture, and Department of Transportation and the Environmental Protection Agency.

The Roundtable has also established University-Industry Partnerships as a component of its funding base, and to enhance its ability to sense and respond to key issues arising in these relationships. The 1999 Partnerships were:

- Florida State University/ IBM
- Massachusetts Institute of Technology/ C.R. Bard, Inc.
- North Carolina State University/ Lord Corporation
- Ohio State University/ Honda
- Stanford/ Hewlett-Packard
- Texas A&M University/ Texaco
- University of California, Los Angeles / AMGEN
- University of California, San Diego/ QUALCOMM, Inc./ SAIC
- University of Illinois at Urbana-Champaign/Partner Pending
- University of Texas at Austin/ Semiconductor Research Corp.
- University of Utah/ Sun Microsystems
- University of Washington/ Battelle Pacific Northwest
- University of Wisconsin/ Procter and Gamble
- Washington University/ Monsanto

1999 Roundtable Staff:

Thomas Arrison, Associate Director
Reginald Cunningham, Project Assistant
Ray Fornes, Visiting Senior Scientist
Nina Kaull, Program Officer
Thomas Moss, Executive Director
Jocelyn Sands, Administrator

WHAT DOES THE ROUNDTABLE DO?

The Roundtable provides a place for candor among national leaders to address divisive or emerging issues, and it contributes to national policy by illuminating issues and by injecting imaginative thought into policy deliberations. It often seeks to catalyze activity by both governmental and non-governmental entities to further develop or test ideas originating in its discussions.

As a forum for national leaders, the Roundtable has unique strengths. The senior science and technology appointees in the Executive Branch of the federal government are members of the Roundtable Council. The full federal contingent, combined with the increased industrial participation achieved since 1992, and the continuing participation of university representatives, bring to the table a solid representation of the nation's key decision-makers on issues of science and technology.

Council Activities, Current Major Projects, and Follow-up Planning, 1999

The Roundtable's Council meets as a whole three times per year. It also oversees, through its working groups, a few projects that evolve from ideas generated in preceding Council meetings. This section outlines the thrusts of the 1999 Council meetings, and also indicates the status and plans in the major project areas.

Council Meeting Topics in 1999 *(Meeting Agendas are on pages 15-18)*

The February 1999 Council Dialogue, "Moving Social and Behavioral Sciences Knowledge Across Government-University-Industry Boundaries," explored how research in fields such as psychology, sociology, economics, and political science might be better used to address societal needs. Council and invited guest discussion indicated that cross-sector transfer of social and behavioral sciences research has been more widespread than is generally recognized, especially in areas such as user-friendly product engineering, collection and analysis of data on social trends, and transportation safety. Nevertheless, participants highlighted the potential to do much more. Discussion centered on areas where high pay-off seemed possible through more effective mechanisms to move research progress into application. A key focus was on the need for more effective incentives within universities to expand interdisciplinary research that addresses both government and industry needs. The Roundtable is exploring follow up activity aimed at highlighting effective and innovative practices in this area.

The June 1999 Council Meeting, "Building Community Stakeholding in Regional Innovation Systems," held in San Diego, was the first-ever Roundtable Council meeting outside of Washington D.C. The location allowed first-hand interaction with the leadership of one of the nation's most creative regional technology development communities and with a set of industrial leaders working at the cutting edge of science and engineering-driven business. Leaders from other regions contributed by presenting a comparative perspective. By co-scheduling with the National Academies' Industry Partner group, the Roundtable Council was able to interact with an

additional group of technology-oriented business leaders, as well as with members of the National Academies located in the region.

Arthur Bienenstock, Associate Director for Science of the White House Office of Science and Technology Policy, led off the meeting discussions by stressing the importance of the recent Presidential Review of federal-university relations. He emphasized that the health of that relationship was crucial to the role of the research university as a resource for local and regional economic vitality. Strengthening K-12 education, and particularly building broader societal participation in science and mathematics preparation, was highlighted as a foundation for any other strategies. Council members and invited guests cited from their own experience a number of innovative industry and university partnerships with local, state, and federal government to improve the schools. As one follow-up step to this meeting, the Roundtable will be working with the Academies' Center for Science, Mathematics and Engineering Education, and the National Alliance for Business, to develop a study on effective practices in such partnerships.

The November 1999 Council Dialogue, "How Can the U.S. Research Enterprise Seize New Opportunities to Address Global Challenges?" examined priority opportunities for the U.S. research enterprise--government, universities, and industry--to play a leadership role in identifying and addressing opportunities for science and engineering solutions to pervasive global problems. Specific attention was given to "institutional innovations" that might facilitate the use of contemporary break-through developments in science and engineering to mitigate hunger and disease in the developing world. The meeting also examined emerging global research-related challenges faced by each of the three sectors, and new approaches being taken to meet them. Participants raised a number of ideas for possible follow up that will be pursued, such as a series of Roundtable-style outreach meetings involving U.S. research leaders and government-university-industry counterparts in several targeted countries, aimed primarily at building better cooperation between sectors.

Council Meeting Plans for 2000

In June through August 1999 the GUIRR Executive Committee reviewed options for Council meeting focus in the 1999-00 period. The March 14-15 Council meeting, "University and Industry as Intertwined Institutions: What are the Limits?" will tackle the difficult question of workable degrees of "intimacy" between these partners. Primary focus will be on the long-term "mega-relationships" that may link whole university departments or schools to a company, and can involve shared facilities, overlapping governance, and many other couplings that go far beyond normal research project agreements. Key issues will be on assessment of long-term institutional impacts, workable safeguards to allow partners to retain their core identities and values, and the desirable degree of government encouragement of such "intimacy" to enhance the vitality of the national research and education enterprise.

The June 21 and 22 Council meeting will have an unusual "retreat" approach. As the federal elections approach, Council members feel it is timely to reflect, with transitioning senior federal colleagues, on Roundtable strategies for the next decade. The stress will be on consideration of ways to utilize this unique institution for maximum value to the national science and engineering enterprise. This includes not only consideration of the highest priority issues for

Roundtable attention, but also of the most effective modes of Roundtable activity and organization.

The Roundtable will also continue to use variations of its traditional Council meeting format to provide opportunities for synergy with activities of its federal agency sponsors or University-Industry Partners. This approach was exemplified by U/I Partner leadership in planning the June meeting at the University of California at San Diego. The format and planning of the meeting built on the success of the June 1998 Council meeting, in which Lord Corporation-North Carolina State hosted University-Industry Partners in comparing notes on needs and approaches to build local partnerships.

Other Roundtable Activities

In appropriate circumstances, the Roundtable is able to leverage its effectiveness and impact by working cooperatively with outside groups in areas of mutual concern. This allows the ideas of the Roundtable to propagate much more widely than would otherwise be possible, and provides important input to Roundtable planning on priority issues to address. In 1999, cooperative activities included:

1. Hosting and assisting in publicizing activities of Project Kaleidoscope, a network of university faculty and administrators working to create effective innovations in undergraduate science and mathematics teaching, and to stimulate interest among all students, those seeking science and engineering careers, as well as those with career pathways in other areas.
2. Working with the National Academies' Center for Science, Mathematics, and Engineering Education, the National Alliance of Business (NAB), and the National Science Resource Center to develop a study of effective practice criteria for industry and university efforts in working with the K-12 education system.
3. Hosting and participating in a national task force involving leaders in the imaging industry and the Council on Competitiveness, seeking to develop holistic, integrated strategies for intellectual property development in industry-university cooperation, as opposed to focus on only components of the innovation process.
4. Presentation of GUIRR approaches and ideas in leadership retreats addressing improvement of university-industry research cooperation of the Society of Research Administrators, the directors of the NSF Industry-University Cooperative Research Centers, the Board of the National Educational Knowledge Industry Association, and the Federal Laboratory Consortium.
5. Working with a task force of the Business-Higher Education Forum of the American Associated Universities (AAU) to build consciousness in universities of approaches to improve industry-university research relationships.

6. Involvement with the NIH Task Force on streamlining the laboratory regulatory burden, including seeking out expert participants and publicizing processes and results.
7. Invited presentations at the "Triple Helix" international meeting on industry-university-government research cooperation, in Rio de Janeiro, Brazil.

Major Project Status and Planning

Stresses on Research and Education at Colleges and Universities: Phase II

The summary report on the second national "Stresses in Research at Colleges and Universities" process is now available by request or at the GUIRR website, along with individual reports of participating campuses. The campus-based preparatory meetings and National Convocation that formed the basis of this report were sponsored by the Roundtable and the National Science Board. Issues highlighted include (1) developing effective incentives for interdisciplinary research, (2) building synergies between research and teaching, and (3) the challenge of financing mounting cost sharing requirements for research activities.

These and other key issues were entered into the current Presidential Review Directive (PRD) process on relations between federal agencies and research universities through a written response and formal briefing to the National Science and Technology Council. When the PRD draft "First Principles" of the federal-university research relations were released in the summer of 1999, copies of "Stresses" were conveyed to a large number of research university presidents by National Academy of Sciences President Bruce Alberts and Federal Demonstration Partnership Chair Barbara Siegel. This was part of an FDP effort to encouraging campus discussion and response to the draft Office of Science and Technology Policy ideas. The Summary "Stresses" Report has also served as a platform for local action at a number of the participating universities.

The "Stresses" project has been based on observations that the appropriate scope and balance of activities of colleges and universities and of the roles and responsibilities of faculty and administrators at those institutions are increasingly subject to societal scrutiny. This is despite the fact that the vitality and the diversity of American higher education and academic research have been acknowledged as great national assets. The juxtaposition of these points of view -- along with pressures related to changes in the local, national, and international research environments, and the increasing demand for limited research resources -- have undermined morale on many campuses. Controversy about which changes are necessary to alleviate these pressures, about how best to go about implementing change, and about the relative costs and benefits to society of proposed new approaches, has generated heated debate in public forums and in university governance bodies across the country.

In the first phase of this project, in 1993, thirteen academic institutions convened structured sessions to identify key areas of stress in the research and teaching environments on their campuses. Each session included a balance of senior and junior faculty, along with administrators responsible for research. This grass roots inquiry was aimed at identifying the most significant sources of stress affecting academe, and ideas to remedy those concerns. At the

1994 National Convocation that culminated this series of campus dialogues, discussion underscored rising tensions that were exacerbating divisions among faculty and administrators, and undermining the trust that once marked the partnership between government and universities, along with public support for university research.

A second phase of the project was launched in 1996, using the same grass roots, campus-based approach that was the foundation of prior work. The objectives of this second phase of study were to catalyze continuing discussions of needed change on campuses, to encourage national dialogue among all parties with interests in the vitality of the academic enterprise; and to begin movement to renew or recast the compact between the federal government and universities. Officials at each of the participating institutions organized discussions among faculty and administrators, separately and jointly, on a set of questions agreed on by the project's Guidance Group. Each campus developed a report summarizing those discussions, and describing constructive programs and activities underway on their campuses. Participants and their reports from both the initial and second phase participating groups pooled their experiences and ideas in a second National Convocation held in Washington in February 1997. The synthesis work preceding and following this Convocation became the basis of the Summary Report.

When the draft "First Principles" of the federal-university research relations were released in the summer of 1999 as part of the PRD referenced above, copies of "Stresses" were conveyed to a large number of research university presidents by National Academy of Sciences President Bruce Alberts and FDP Chair Barbara Siegel. This was part of a Federal Demonstration Partnership mailing encouraging campus discussion and response to the draft OSTP ideas.

Removing Barriers to Industry-University Research Collaboration

Collaborative partnerships between universities, industry, and government have multiplied and diversified enormously in recent decades. Universities have confronted increasing competition for federal funding for research, and industry has faced increasing pressure to draw on wider research resources than can be supported internally. A report entitled "Industry-University Research Collaborations," issued in 1996 by GUIRR, the Industrial Research Institute and the Council on Competitiveness, notes that a new paradigm of research partnerships is emerging. This new paradigm is based on the collaboration, rather than the independence, of key performers of research.

As the value of research partnerships has become clear, so have some of the barriers to optimal partnering. Although many organizations have learned how to structure and manage collaboration effectively, other academic institutions and companies are less savvy, and even experienced institutions sometimes encounter stumbling blocks. These include:

- intellectual property and "background" rights;
- publication, copyright, and confidentiality concerns;
- regulation, liability, and tax law issues;
- various worries regarding foreign access;
- matters of graduate student involvement; and
- infrastructure impediments to inter-disciplinary and departmental research.

GUIRR, in cooperation with the NAS Committee on Science, Engineering, and Public Policy, organized a workshop March 23-24, 1998 aimed at exploring and disseminating the constructive approaches to overcoming barriers that have been devised in specific cases and settings. The workshop featured individuals with extensive experience in formulating and managing collaborative relationships across research sectors. In addition to focusing attention on the primary trouble spots that emerge in the course of collaboration -- summarized loosely as issues of intellectual property, of institutional leadership, and of goal alignment and cultural disparity across sectors -- a primary goal of the workshop was to identify effective approaches to working through these stumbling blocks.

The report of this project, "**Overcoming Barriers to Collaborative Research**" was released in December 1999. It highlighted practices for resolving specific recurring tensions in industry-university collaborative research and highlighted effective Several hundred copies of the report were mailed to workshop participants, Roundtable constituents (Council Members and Associates; University-Industry Partners), and others interested in building more effective university-industry ties. The report is also available in full at the website of the National Academy Press.

As part of dissemination of the Report, and to stimulate wider discussion and activity, the Roundtable also organized a luncheon seminar on December 17, 1999 in Washington, D.C. on the subject of "**University-Industry Collaboration: Trends and Issues**". The seminar was led by Karen Hersey, Senior Intellectual Property Counsel at Massachusetts Institute of Technology, and Edward Pagani, Manager, Research and Development Operations and External Technology Investment at Pfizer, Inc. Michael Champness, Director of the Research Collaboration Initiative now underway at the Business-Higher Education Forum, was a respondent. The seminar was well attended by experts from government agencies, universities, and industry.

The project was supported by the U.S. Department of Commerce, U.S. Department of Defense, and the National Science Foundation. Requests for copies of the report and ideas for further dissemination or follow-up can be directed to Tom Garrison (tel.) 202/334-3755; email tarrison@nas.edu.

Federal Demonstration Partnership

The need to reduce growing tension between government and universities over procedures for administering federally-sponsored research was part of the original basis for creation of the Research Roundtable. This concern was institutionalized through the role of the Roundtable as the convening body for the Federal Demonstration Partnership (FDP). The FDP, a cooperative effort among sixty-five universities or research institutes and eleven federal agencies, is designed to improve the management of federally-funded research. The goal is to enhance research productivity without compromising the stewardship of public funds, by eliminating unnecessary administrative procedures and by streamlining those necessary to ensure accountability. The federal agencies and research institutions that constitute the FDP work together to design, test, and evaluate procedures aimed at improving the efficiency of sponsored research management.

They also cooperate in efforts to clarify current changes to federal government-wide policies issued by the OMB.

Major FDP activities currently include:

- Facilitating electronic commerce for federal grants administration
- Developing workable and consistent terms and conditions for research awards
- Monitoring and streamlining required documentation for cost-sharing and effort reporting
- Facilitating university participation and input to the Presidential Review Directive process on Government-Research University Relations
- Formal steps to enhance faculty involvement in the FDP.

Cost Sharing, and Effort Reporting has received special attention. Previous FDP efforts led to an invitation from Mr. Woody Jackson, Deputy Controller of the Office of Financial Management of the U.S. Office of Management and Budget, to engage the FDP group in a discussion of new ideas to rationalize the often-chaotic federal agency practices in requiring university cost-sharing in research projects. This led to selection of the FDP as host and organizer of a major regional meeting on this subject in San Francisco in December 1999. This was part of its close cooperation with the White House/National Science and Technology Council (NSTC) Presidential Review Process: Renewing the Government University Research Partnership in the 21st Century". That cooperation will continue with a lead FDP/GUIRR role in compiling research community input to the PRD, and sponsorship of a June 5, 2000 national convocation on the results of the PRD effort.

Working closely with OMB, the FDP is currently designing a potential cost-sharing demonstration project. The project proposal was first presented to the membership at its March 1999 Steering Committee Meeting, and went through refinement throughout the year.

Faculty Involvement: A continuing FDP emphasis in 1999 was to sharply increase the participation of active researchers, in addition to campus research administrators. The resulting increased faculty involvement has strengthened the FDP's grounding in practical problems in the laboratory setting.

Formulating U.S. Research Policies Within an International Context

In 1994, the Roundtable began a project entitled "Formulating U.S. Research Policies Within an International Context." The purpose of this project was to examine shifts occurring within the worldwide research enterprise and to raise for discussion possible changes that may be appropriate for U.S. research strategies. During 1996, the Roundtable continued a series of focus groups, inviting members of the congressional leadership and congressional staff, as well as representatives from government, academia, and industry, to discuss their views regarding domestic and international changes affecting the research enterprise. All focus group sessions were organized around current international issues confronting the global research community and the broader implications for U.S. research policies.

As a follow-up to these discussions, an international colloquium was held in May 1997 to consider options for maintaining a world-class research enterprise. Representatives of a number of countries shared perspectives on their policy environments and strategies. A particular focus was the trend toward internationalization of industrial research and development efforts, and what this may mean to the conventional policy considerations of bolstering "domestic" industry in competition with "foreign" competitors. Similarly, much emphasis was placed on the emerging phenomenon of human capital mobility, in which students who are trained in one part of the world may wind up living and working in entirely different countries. The report of this meeting was released in May 1998.

Impact of the Information Revolution on the Future of Research Universities

The National Academies' Presidents have approved an exploratory study on the "Impact of Information Technology on the Future of the Research University". National Academy of Engineering President William A. Wulf, and University of Michigan President Emeritus James J. Duderstadt, will co-chair a Steering Committee consisting of national leaders in the field. This study, which will begin formally in February 2000, builds on the 1997 Academies Symposium "A Dialogue on Research Universities Futures" held as a principal activity of the Academies' Governing Board at their annual Woods Hole retreat.

The current project will examine a few key scenarios of information technology-driven change, including impacts on industry-university relationships, and will complement the interest and contributions of a number of other NRC units involved in areas of research university transformation.

The project will be housed in the National Academies Policy Division, with GUIRR providing primary support for it. Dr. Ray Fornes, who will be on sabbatical leave from North Carolina State University during the next year, will serve as senior staff officer for the project during this period, and will work directly with the Executive Director of GUIRR. The input of the Roundtables University-Industry Partners, with their diverse locations and institutional structures, has also formed part of the foundation of this study. The project outline is available directly from GUIRR or on the Academies' website.

Activities of Roundtable Working Groups

The Roundtable has carried out a considerable portion of its activities in formal and informal working groups. This allows ideas that are stimulated in the major Council meetings to be examined in detail, along with consideration of follow-up strategies to be undertaken by the working group itself, or through cooperation with other units in the Academy complex, or with outside groups with synergistic interests.

Working Group on Public Understanding of Science and Technology:

This working group has emphasized approaches to improving the manner in which science and technology is portrayed in the media. In November 1998, IOM President and

working group Chair Kenneth Shine, along with Dr. Marcia McNutt, Monterey Bay Aquarium Research Institute, Ms. Donna Gerardi, NAS Office of Public Understanding of Science, and Dr. Anne-Marie Mazza, GUIRR met with National Broadcasting Corporation staff to discuss opportunities for collaboration in this area.

Future activities in this area will be coordinated through the NAS's Office of Public Understanding of Science, with strong cooperation and continued interest and support from GUIRR.

Working Group on Human Resources for Science and Engineering

In late 1996 Norman Augustine, chair of the Education Task Force of the Business Roundtable, suggested a joint activity on K-12 education with the GUIRR Human Resources working group, chaired by Ernie Moniz, formerly Associate Director for Science at OSTP. The two organizations initially decided that the issue of professional development of K-12 teachers of science and mathematics would be the most productive area for collaboration. Further discussions with Business Roundtable staff eventually led to agreement that the National Alliance of Business (NAB), with its focus on education, would be the appropriate organization to cooperate with GUIRR in this activity.

In March of 1998, Bruce Alberts, the new Chair of the working group, hosted a meeting of NAB and NAS-NRC staff leadership (GUIRR and CSMEE –the Center for Science, Mathematics, and Engineering Education) to define specific priority areas for possible collaboration in this area.

Three subsequent meetings were held between staff of NAS-NRC, NAB, and interested industry groups (Council on Competitiveness, Industrial Research Institute, Biotechnology Industry Organization and NASDAQ, Inc.). The collaboration has evolved to a plan for a possible NRC study that will illustrate effective strategies that business can use to improve teaching and learning partnerships with educators.

The specific project goals would be:

- 1.) to collect and synthesize information on the degree of alignment of math and science education standards with industrial skill standards;
- 2.) to collect and study evidence of effectiveness of current business-education programs designed to improve student achievement in science, mathematics, and technology and from that data to formulate recommendations for implementing effective programs; and
- 3.) to highlight best practices in business-led efforts through concrete examples.

The primary audience will be business and business-led coalitions. The growing and increasingly diverse audience that is interested in business involvement in education will be the secondary audience: K-12 educators, community college educators, curriculum developers, recruiters and trainers of entry-level employees, and others.

The primary partners would be the NRC and the NAB. The NAB would also leverage the expertise of other national business organizations, including the Business Roundtable, the Council on Competitiveness, and other partners of the Business Coalition for Education Reform (BCER), a

coalition managed by NAB which is dedicated to strengthening U.S. schools. At the NRC, the CSMEE would manage the project and convene the study committee. GUIRR and the Academy Industry Program discussed collaborating in an initial convocation, assisting in convening regional meetings, and sponsoring dissemination events.

Government-University-Industry Research Roundtable
National Academy of Sciences/National Academy of Engineering/Institute of Medicine
Council Meeting Agenda
February 23-24, 1999
Washington, D.C.

"Moving Social and Behavioral Sciences Knowledge Across G-U-I Boundaries"

Tuesday Evening: February 23, Rotunda/Member's Room

5:30 PM Cocktail Reception

6:00 Welcome and Dinner: Council Chairman Joe Wyatt

Paradox of the Social Scientist: Badly Needed by Industry, But Industry Doesn't Know It
Donald A. Norman, Co-Founder, Nielsen Norman Group

8:30 Adjourn

Wednesday Morning: February 24, Lecture Room

7:30 AM Continental Breakfast

8:00 Challenges in Moving Social Sciences Knowledge into Practice
Kenneth Prewitt, Director, U.S. Bureau of the Census

8:20 Open Discussion

8:45 Social and Behavioral Science Links in Neuroscience
Lee Limbird, Associate Vice Chancellor for Research, Vanderbilt University

9:00 Open Discussion

9:15 Lessons from Moving Behavioral Sciences Knowledge into Engineering
David Woods, Director, Cognitive Systems Engineering Lab, Ohio State University
Clay Foushee, Vice President, Regulatory Affairs, Northwest Airlines
Eugene Farber, Manager, IVHS Safety and Regulation, Ford Motor Company

10:00 Open Discussion

10:30 Break

10:45 Strategies for Linking Social and Behavioral Sciences Research with Agency Missions
Mortimer Downey, Deputy Secretary, Department of Transportation

11:00 Other Agency Perspectives, Discussion Summary, and Council Member Ideas on Follow-up
Strategies

Noon Roundtable Updates

University-Industry Partners, Planning for June Council Meeting

Government-University-Industry Research Roundtable
National Academy of Sciences/National Academy of Engineering/Institute of Medicine
Council Meeting Agenda
University of California, San Diego, June 23-24, 1999

“Building Community Stakeholding in Regional Innovation Systems”

Wednesday Evening, June 23, U.C. San Diego University House

5:30 PM **Cocktail Reception**

6:00 **Welcome: Robert Dynes, Chancellor, U.C. San Diego**
Introductions: Joe Wyatt, Chair, GUIRR
Dinner dialogue: Principles of Partnership Needed to Support Regional Innovation Initiatives
Arthur Bienenstock, Associate Director for Science, Office of Science and Technology Policy,
Executive Office of the President
Discussant: Bruce Alberts, President, National Academy of Sciences

Thursday, June 24, U.C. San Diego Faculty Club

8:00 **Breakfast Session: Innovative Regional Partnerships to Meet the Emerging Needs in Workforce Education and Training**
Moderator and Chair, Alan Bersin, Superintendent, San Diego City Schools
“Preuss School: University-Based, Pre-Collegiate Education for Disadvantaged Students”
Robert Dynes, U.C. San Diego Chancellor
“Business-Community Collaboration in Educational Innovation”
Larry Rosenstock, Principal, High Tech High
Discussant: Peter Preuss, Regent, University of California

9:30 **Morning Session: Bioinformatics, Emerging Technology and Emerging Needs for Innovation in Education and Training**
Moderator and Chair: John Wooley, Deputy Associate Director, Office of Biological and Environmental Research, Department of Energy
“Partnerships for Interdisciplinary Approaches to Education and Training in Informatics”,
Bernard Paulsson, U.C. San Diego
“The U. C. Biostar Program: Leveraging Corporate, University and Government Resources for Workforce Needs in Bioinformatics”
Suzanne Huttner, Executive Director, U.C. Cooperative Research Program in Bioinformatics

Discussants: Gregory Critchfield, Myriad Genetics, Salt Lake City, Utah
Stephen Dahms, Executive Director, Cal. State University System Program in Biotechnology

11:30 **Morning Session: New Frontiers in Communication and Information Technology, Sustaining Sources of Intellectual Capital**

Moderator and Chair, Bob Conn, Dean, Irwin and Joan Jacobs School of Engineering

"California's Collaborative Investment in Education and Training for the Information and Communication Industry"

Dan Sullivan, Senior Vice President, QUALCOMM Inc.

"Worker Shortages in Information Technology",

Kelly Carnes, Deputy Assistant Secretary for Information Technology
U.S. Department of Commerce

"Barriers Facing Women and Minorities in High-Tech Careers"

Anita Borg, Information Technology Officer, Xerox Park

Discussant, Stephen Rockwood, Senior Vice "President, SAIC

2:00PM

Luncheon Session, Meeting Keynote Address and Discussion

"Partnerships for the 21st Century Economy"

Julie Meier Wright, President, San Diego Regional Economic Development Corporation

"Perspectives from other Clusters"

Professor William Little, University of North Carolina; Walt Plosilla, Battelle Research Institute

Open discussion

Government-University-Industry Research Roundtable
National Academy of Sciences/National Academy of Engineering/Institute of Medicine
Council Meeting Agenda
November 1-2, 1999
Washington, D.C.

"How Can the U.S. Research Enterprise Seize New Opportunities to Address Global Challenges?"

Monday Evening: November 1, Rotunda/Member's Room, National Academy of Sciences Building

5:30 PM **Cocktail Reception**

6:00 **Welcome to New Council Members and Dinner: Council Co-Chairman Joe Wyatt**

Mobilizing Science and Technology to Help the World's Poorest
Jeffrey Sachs, Director, Center for International Development, Harvard University

8:30 **Adjourn**

Tuesday Morning: November 2, Room 130, Green Building, 2001 Wisconsin Avenue, N.W.

7:30 AM **Continental Breakfast**

8:00 **International Health and Environment R&D Partnerships in the Chemical Industry**
John Akitt, Executive Vice President, Exxon Chemical Company (retired)

8:15 **Discussion**

8:30 **Harnessing Science and Technology for Enhanced Global Food Security**
Alexander McCalla, Director of Rural Development, The World Bank
Calestous Juma, Special Advisor, Ctr. for International Development, Harvard University

9:00 **Discussion, Lead-Off Comments by I. Miley Gonzalez, Under Secretary for Research, Education, and Economics, USDA**

9:30 **Break**

9:45 **New Approaches to Increasing Science, Technology, and Health Expertise in U.S. Foreign Policymaking: Perspectives from the New NRC Study**
Roland W. Schmitt, President Emeritus, Rensselaer Polytechnic Institute

10:00 **Discussion**

10:30 **New Partnerships to Improve Health and Health Care in Developing Countries**
R. Gordon Douglas, President, Merck Vaccines (retired)
Ruth Nussenzweig, New York University Medical Center

11:00 **Discussion, Lead-Off Comments by Ruth Kirschstein, Deputy Director, NIH**

11:30 **Open discussion; Next Steps for GUIRR and Others**

GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE
Council Members

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Vanderbilt University

William H. Joyce
Chairman, President, CEO
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ROUNDTABLE PUBLICATIONS

All publications available free of charge by writing the Roundtable.

Annual Reports

Government-University-Industry Research Roundtable Annual Reports, 1985 - 1998.

Brochure Summaries of Council Meetings

Mobilizing Science and Technology to Solve Global Problems A summary of the November 1999 Roundtable Council Meeting (in press)

Building Community Stakeholding in Regional Innovation Systems A summary of the June 1999 Roundtable Council Meeting (in press)

Can Knowledge of Human Behavior Be a Competitive Advantage? A summary of the February 1999 Roundtable Council Meeting.

University Stewardship: New Responsibilities and Opportunities - A summary of the October 1998 Roundtable Council Meeting

New Currents in Science and Engineering Workforce Issues - A summary of the June 1998 Roundtable Council Meeting (in press)

Managing the Regulatory Burden on the Research Laboratory - A summary of the February 1998 Roundtable Council Meeting (in press)

Openness and Secrecy in Research: Preserving Openness in a Competitive World - A summary of the October 1997 Roundtable Council Meeting.

Tensions Between Science and Law in a High-Tech Society - A summary of the June 1997 Roundtable Council Meeting.

The Changing Market for Technology - A summary of the March 1997 Roundtable Council Meeting.

Can We Develop Performance Standards and Outcome Measures for the Research Enterprise? - A summary of the October 1996 Roundtable Council Meeting.

Communication and Understanding between Scientists and the Public - A summary of the June 1996 Roundtable Council Meeting.

Examining the Impact of Information Technology on Science and Engineering Research and Education - A summary of the March 1996 Roundtable Council Meeting.

Reports of Projects

Academic Research Enterprise:

Stresses on Research and Education at Colleges and Universities: Phase II. of a Grass Roots Inquiry - Report of the second phase of a collaborative inquiry conducted by the National Science Board and the Government-University-Industry Research Roundtable. Highlights-- continuing areas of stress in the research and teaching functions in higher education, especially disincentives to interdisciplinary efforts, and tensions concerning cost-sharing. (December 1998)

Actions Are Needed to Promote Research Sharing - Statement of the Presidents of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, with transmittal letter by Joe Wyatt, Chancellor, Vanderbilt University, Chair, Government-University-Industry Research Roundtable. This statement and a series of follow-up actions with colleague science and engineering societies and industry groups were based on response to the October 1997 Roundtable Dialogue, *Openness and Secrecy in Research*. (December 1998)

A Dialogue on Research University Futures - Proceedings of the 1997 Symposium, National Research Council Governing Board, Woods Hole. This symposium brought together leaders from both inside academia and from other sectors, to examine new and growing societal expectations of research universities, and unfolding responses to these. OMB Director Franklin Raines delivered the challenging keynote for the event. (April 1998)

The Costs of Research: Examining Patterns of Expenditure Across Research Sectors Report by Arthur Andersen, LLP, for The Government-University-Industry Research Roundtable. Arthur Andersen's analyses conclude that the pattern of expenditures incurred for research activities in federal laboratories, universities, and industry are strikingly similar, despite common perceptions that there are wide differences. (March 1996)

Government and Higher Education: Renewing the Partnership - by Richard Celeste and Roland Schmitt - An op-ed article published by the National Academy Op-Ed Service. These two prominent observers (Celeste the former Governor of Ohio and Schmitt the former president of Rensselaer Polytechnic Institute) of the links between research, the economy, and public policy, spell out how the next 50 years of university-based research can be as productive as the past 50 years. (August 1994)

Stresses on Research and Education at Colleges and Universities: Institutional and Sponsoring Agency Responses - Report of a collaborative inquiry conducted jointly by the National Science Board and the Government-University-Industry Research Roundtable.

The purpose of this report is to contribute to discussions of the choices facing the U.S. academic enterprise as we approach the twenty-first century. (July 1994)

Stresses on Research and Education at Colleges and Universities: Preliminary Summary of Campus Reports - This is a preliminary summary of individual campus reports and recommendations for action prepared as a working document for the National Summary Meeting of a project sponsored jointly by the National Science Board and the Government-University-Industry Research Roundtable, December 7-8, 1993. (December 1993)

Fateful Choices: The Future of the U.S. Academic Research Enterprise - A discussion paper including an optimistic and challenging vision for the future of U.S. academic research; an analysis of the near-term decisions and longer-term options facing the enterprise if the positive vision is to be pursued; and a description of the changing environment for decision making. (March 1992)

The Future of the U.S. Academic Research Enterprise: A Report of a Conference - A summary of a December 9-10, 1991, Roundtable conference held to address critical issues confronting U.S. academic research and to explore the possibilities for national consensus on the future directions of the research enterprise. (March 1992)

Science and Technology in the Academic Enterprise: Status, Trends and Issues - A discussion paper on the status of the current academic research enterprise, emerging trends affecting it, and major issues to be addressed regarding its future; statistical information on financial, human resource, infrastructure, and organizational trends in academic research. (October 1989)

Multidisciplinary Research and Education Programs in Universities: Making Them Work
A paper by Robert L. Sproul, Harold H. Hall, and members of the Working Group on Institutional Renewal, discussing how to organize, support, and operate multidisciplinary programs in universities. (June 1987)

Examining the Impact of Information Technology on Science and Engineering Research and Education - This is a brief summary of the March 1996 GUIRR Council meeting on this subject, with references for further information. (June 1996)

New Alliances:

Overcoming Barriers to Industry-University Research Collaboration: Report of a Workshop - A report of a 1998 practitioner workshop highlighting effective practices in bridging the different needs of participants in industry-university research partnerships. (December 1999)

Industry-University Research Collaborations: Report of a Workshop - A report of several case histories of major industry-university collaborations, stressing especially the

comparison of actual outcomes and original expectations. Published jointly with the Industrial Research Institute and the Council on Competitiveness. (1997)

Intellectual Property Rights in Industry Sponsored University Research: A Guide to Alternatives for Research Agreements - Published jointly with the Industrial Research Institute. (August 1993)

Richard F. Celeste, Who Benefits From High-Technology Partnerships? - An op-ed article published by the National Academy of Science Op-Ed Service discussing the potential of partnerships between universities and business to spur economic development, and a major obstacle to such partnerships--disputes over how to use the ideas arising from joint projects. (December 12, 1993)

University-Industry-Federal Laboratory Partnerships: Expectations and Effectiveness Summary of Issues Raised at the October 1992 Roundtable Council Meeting. (September 1993)

Richard F. Celeste, A New Partnership in American Science and Technology - An op-ed article published by the National Academy of Sciences Op-Ed Service encouraging federal-state interactions in science and technology. (June 21, 1992)

Federal-State Cooperation in Science and Technology Programs - A discussion paper by the Federal-State Dialogue on Science and Technology. (February 1992)

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