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**Folder Title:**  
President's Council of Advisors for Science and Technology: Meetings - 5/2/91-5/3/91 [1 of 2]

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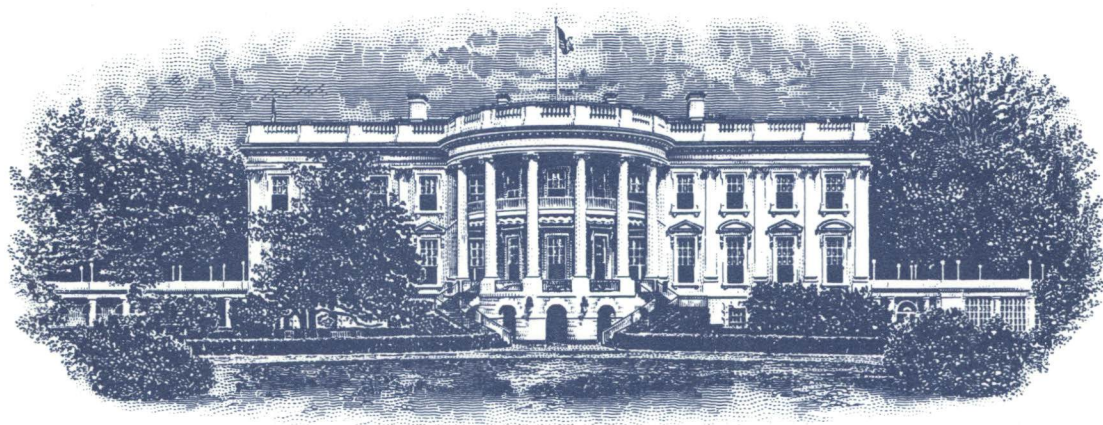
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**PRESIDENT'S COUNCIL OF ADVISORS  
ON  
SCIENCE AND TECHNOLOGY**



**J. THOMAS RATCHFORD**

**MAY 2-3, 1991  
JULY 10-11, 1991**

**MEETING OF THE  
PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY**

**MAY 2-3, 1991**



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**PRESIDENT'S COUNCIL OF ADVISORS  
ON  
SCIENCE AND TECHNOLOGY**

## MAY 2-3, 1991 AGENDA

THURSDAY, MAY 2, 1991

**OPEN SESSION 9:00 AM - 11:00 AM  
CONFERENCE ROOM  
COUNCIL ON ENVIRONMENTAL QUALITY  
722 JACKSON PLACE, NW**

**8:30 - 9:00**      **ARRIVAL AND COFFEE**

**9:00 - 9:30**                      **OPENING REMARKS**

**DR. BROMLEY**

**9:30 - 10:30 THE DECADE OF THE BRAIN**

DR. PORTER

**10:30 - 11:00      DISCUSSION**

**11:00 - CLOSING REMARKS**

**DR. BROMLEY**

**THURSDAY, MAY 2, 1991 Continued...**

**CLOSED SESSION 11:00 - 2:45 PM  
COUNCIL ON ENVIRONMENTAL QUALITY  
CONFERENCE ROOM**

|                        |                                                                               |                              |
|------------------------|-------------------------------------------------------------------------------|------------------------------|
| 11:15 - 11:30          | PREPARATION FOR THIS AFTERNOON                                                | DR. BROMLEY                  |
| 11:45 - 12:00          | NATIONAL SECURITY AND<br>TECHNOLOGY PANEL<br>- A PROGRESS REPORT              | DR. BUCHSBAUM                |
|                        | HIGH PERFORMANCE COMPUTING<br>AND COMMUNICATIONS PANEL<br>- A PROGRESS REPORT | DR. BUCHSBAUM                |
| 12:15 - 1:00           | LUNCH                                                                         |                              |
| 1:00 - 1:30            | GLOBAL ENVIRONMENT AND NATURAL<br>RESOURCES PANEL<br>- A PROGRESS REPORT      | DR. LOVEJOY                  |
| <del>1:30 - 2:00</del> | PANEL ON MEGAPROJECTS IN THE<br>SCIENCES<br>- A PROGRESS REPORT               | DR. McTAGUE<br>DR. RATCHFORD |
| 2:00 - 2:30            | BIOSCIENCE AND BIOTECHNOLOGY<br>PANEL<br>- A PROGRESS REPORT                  | DR. NATHANS                  |
| 2:30 - 2:45            | DISCUSSION                                                                    |                              |
| 2:45 - 3:00            | MOVE TO THE ROOSEVELT ROOM                                                    |                              |

**CLOSED SESSION  
ROOSEVELT ROOM  
WEST WING  
THE WHITE HOUSE**

|             |                                                            |             |
|-------------|------------------------------------------------------------|-------------|
| 3:00 - 4:00 | OTHER BUSINESS                                             |             |
| 4:00 - 4:30 | DISCUSSION OF JULY AGENDA<br>AND CLOSING REMARKS           | DR. BROMLEY |
| 6:30 -      | COCKTAILS AND DINNER<br>EXECUTIVE ROOM<br>WHITE HOUSE MESS |             |

**FRIDAY, MAY 3, 1991**

**CLOSED SESSION 9:00 AM - 12:00 NOON  
ROOSEVELT ROOM  
WEST WING  
WHITE HOUSE**

|               |                                                                                                            |                           |
|---------------|------------------------------------------------------------------------------------------------------------|---------------------------|
| 8:30 - 8:50   | ARRIVAL AND COFFEE<br><u>(DR. BROMLEY'S OFFICE, ROOM 358, OEOB)</u>                                        |                           |
| 8:50 - 9:00   | MOVE TO ROOSEVELT ROOM                                                                                     |                           |
| 9:00 - 9:15   | OPENING REMARKS                                                                                            | DR. BROMLEY               |
| 9:15 - 9:30   | EDUCATION AND HUMAN RESOURCES<br>PANEL<br>- A PROGRESS REPORT                                              | DR. LIKINS                |
| 9:30 - 10:00  | APPROVAL OF TERMS OF REFERENCE<br>AND MEMBERS FOR PCAST PANEL ON<br>INTERNATIONAL ECONOMIC COMPETITIVENESS | DR. GOMORY<br>DR. SHAPIRO |
| 10:00 - 11:15 | DISCUSSION                                                                                                 | DR. BROMLEY               |
| 11:15 - 12:00 | OTHER BUSINESS AND<br>CLOSING REMARKS                                                                      | DR. BROMLEY               |



## PRESS PEOPLE INVITED

|                                       |                                |
|---------------------------------------|--------------------------------|
| Wil Lepkowski                         | Chemical and Engineering News  |
| Colleen Cordes                        | Chronicle of Higher Education  |
| Bruce Agnew                           | Journal of NIH Research        |
| Ed Chen                               | Los Angeles Times              |
| Chris Anderson or<br>Barbara Culliton | Nature                         |
| Chris Joyce                           | New Scientist                  |
| Richard McCormack                     | New Technology Week            |
| Warren Leary                          | New York Times                 |
| Michael Miller                        | Performance Materials Magazine |
| Irwin Goodwin                         | Physics Today                  |
| Dan Greenberg                         | Science and Government Report  |
| Elliot Marshall                       | Science Magazine               |
| Arthur Kranish                        | Science Trends                 |
| Tim Beardsley                         | Scientific American            |
| Jeffrey Mervis                        | The Scientist                  |
| Dick Thompson                         | Time-Warner                    |
| Georgia Persinos                      | Washington Insight             |
| William Booth                         | Washington Post                |

## PCAST MEMBERS EXPECTED

| <u>Name</u> | <u>Thursday</u>                          | <u>Thursday Dinner</u> | <u>Friday</u> |
|-------------|------------------------------------------|------------------------|---------------|
| Borlaug     | Yes                                      | Yes                    | Yes           |
| Buchsbaum   | Yes                                      | Yes                    | Yes           |
| Drake       | Yes<br>(arrives on Wednesday evening)    | Yes                    | Yes           |
| Gomory      | Yes                                      | Yes                    | Yes           |
| Healy       | Yes                                      | Yes                    | Yes           |
| Likins      | No<br>(Arrives 8:00 PM on Thursday)      | No                     | Yes           |
| Lovejoy     | Yes                                      | Yes                    | Yes           |
| Massey      | Yes                                      | Yes                    | Yes           |
| McTague     | Yes                                      | Yes                    | Yes           |
| Nathans     | Yes                                      | No                     | Yes           |
| Packard     | Yes<br>(arrives at 4:00 PM on Wednesday) | Yes                    | Yes           |
| Shapiro     | No                                       | No                     | Yes           |

THE WHITE HOUSE  
WASHINGTON

March 27, 1991

MEMORANDUM FOR SOLOMON J. BUCHSBAUM, PRESIDENT'S COUNCIL OF  
ADVISORS ON SCIENCE AND TECHNOLOGY (PCAST) AND  
JOHN S. FOSTER, CHAIRMAN, DEFENSE SCIENCE BOARD

FROM: D. ALLAN BROMLEY *Alan*  
SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
TECHNOLOGY AND NATIONAL SECURITY

You are requested to establish a PCAST Panel on Technology and National Security.

The purpose of this Panel is to enable the PCAST to advise the President on selected policy issues related to technology and the national security interests and objectives of the United States.

In his "National Security Strategy of the United States", the President has put forth the enduring elements of our national strategy and the broad agenda needed to satisfy the goals of that strategy. The President's report also addressed future opportunities and uncertainties and stated his policy for political, economic and defense initiatives. In his report, the President acknowledged that the economic and military strength of the United States rests on technological superiority.

The President, in his national security strategy report said: "Broadly and properly understood, our national security is shaped by the totality of the domestic and international environment- an environment that is today dramatically changing." It is because of these dramatic changes that I believe there may be a need for national level guidance on the expenditure of federal funds supporting technology. As we prepare this guidance, the advice of PCAST would be most helpful.

The "U.S. Technology Policy" of the White House Office of Science and Technology Policy responds to the President's national security strategy. The paper presents a strategy to implement technology policy and recognizes the role of the private sector, and state and Federal governments in implementing this policy. Among Federal responsibilities, the paper requires the maintenance of "... a strong Defense technology base to provide options for future weapons systems development and to help avoid technological surprises by potential adversaries." The paper notes that "Special emphasis needs to be placed on shortening the time required for transferring R&D results to production and on using commercial products."

The Department of Defense has published statements of its technology policy, for example, the Secretary of Defense's Annual Report to the Congress. Over the years, this report has consistently stressed the importance of U.S. technological superiority as a goal. The technology policy and strategy of DoD is also guided by the work of its Defense Science Board and particular note is made of the DSB's report of its 1990



Summer Study: "Research and Development Strategies for the 1990's." Also of note is the current "Defense Technology Strategy and Action Plan" of the Office of the Director, Defense Research and Engineering, Department of Defense. Finally, administration technology policy development benefits extensively from private sector efforts.

I would like the Panel on Technology and National Security to define and discuss:

- o the role technology is expected to play vis-a-vis national security during the decade of the 1990's; and
- o how well the Government is carrying out that role; identifying gaps or deficiencies in activities being conducted or sponsored by the Government; and identifying alternate mechanisms if appropriate.

The Panel should base its deliberations primarily on prior work of others. I expect the Panel to consider technology programs, present or planned, in all Government agencies and departments directly or indirectly responsible for key aspects of national security. Thus, the Panel will look beyond Department of Defense and Department of Energy military programs.

The Panel shall submit a preliminary report to the PCAST within 3 months and a final report 6 months after the Panel's first meeting.

The Office of the Assistant Director for National Security, Office of Science and Technology Policy will sponsor this Panel. Dr. Solomon J. Buchsbaum and Dr. John S. Foster will serve as Co-Chairmen. Ms. Michelle Van Cleave will serve as Executive Secretary and Mr. William Snyder will be the PCAST Secretariat representative.

Approved:



D. Allan Bromley  
Assistant to the President

for Science and Technology  
Chairman, President's Council of Advisors on Science and Technology

March 28, 1991  
Date



THE WHITE HOUSE  
WASHINGTON

MEMORANDUM FOR SOLOMON J. BUCHSBAUM  
President's Council of Advisers on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY  
Chairman, PCAST

SUBJECT: Terms of Reference for the PCAST Panel on  
High Performance Computing and Communications

You are requested to chair a PCAST Panel on High Performance Computing and Communications.

The purpose of this Panel is to enable PCAST to advise the President on issues related to high performance computing and communications that have a bearing on long-range national goals, government regulation, the transition of Federal programs to industry, participation of the States, and foreign access.

The U.S.'s technological leadership in computing, communications, and applications is critical to its ability to compete effectively in world trade. Maintaining a strong national defense capability is also directly related to the advancement and application of computing and digital communications technology. There is a five-year history of development for a Federal initiative in high performance computing supported by reports authored by participants from academia, industry, the National Academy of Sciences, the National Research Council, the White House Science Council, the Office of Technology Assessment, and professional societies, that include the Institute of Electrical and Electronics Engineers and the Society for Industrial and Applied Mathematics. The Office of Science and Technology Policy (OSTP) and the Federal Coordinating Council for Science, Engineering and Technology (FCCSET) have issued six reports that have led to plans for such an initiative. Federal science agencies, including DOD, NSF, DOE, and NASA, have created major programs that support the initiative. Congress has shown growing interest as well: three pieces of legislation are active, and a fourth is under development. The goal is to maintain and extend U.S. leadership, encourage additional U.S. sources of production, quicken the pace of innovation by diffusing the technology into the research and education communities, and increase U.S. productivity and competitiveness through networked computing in analysis, design and manufacturing. Finally, the OSTP report, The Federal High Performance Computing Program, issued on September 8, 1989, calls for an advisory panel consisting of eminent individuals from industry and academia.

The Panel on High Performance Computing and Communications shall:

1. Conduct a one-time review of and advise on the goals and strategies proposed in The Federal High Performance Computing Program report of September 8, 1989.
2. Advise on an effective transition strategy to evolve the NREN (National Research and Education Network) into a commercial, high performance, general purpose national communications network serving the S&T community, business, educational institutions, and eventually the general public.
3. Advise on general societal needs that can be served by high performance computing suitably connected through digital networks, and identify means for a broad diffusion of the benefits of the High Performance Computing Program.
4. Identify major issues and decisions of a non-technical or semi-technical nature (e.g. standards, foreign participation, and regulatory issues) that will have a significant impact upon the ability of the private sector to remain viable and competitive.
5. Advise on ways of coping with, even exploiting, the various contrasting objectives in computational education. These include: theory vs. systems; scientific computing vs. business computing; research personnel vs. practicing professionals; production of Ph.Ds vs. other goals of higher education.

The Panel will submit its first report by December 31, 1990.

#### Administrative Provisions

- (a) This PCAST Panel on High Performance Computing and Communications shall satisfy the requirement of The Federal High Performance Computing Program's private sector panel to advise on issues related to long-range national goals, government regulation, transition of Federal programs to industry, participation of the States in the national program, and issues of foreign access.
- (b) Ad hoc working groups with participation not limited to the Panel members may be formed to assist the Panel in its work.

#### Duration

The Panel's activities and the continuing need for the Panel shall be reviewed annually by the Chairman of the PCAST.



### Chairman

The Panel Chairman shall convene meetings of the Panel at times and locations of the Chairman's choice in consultation with the Chairman of the PCAST.

### Vice Chairman

The Vice Chairman shall act in the stead of the Chairman at his request.

### Compensation

Private sector members of the Panel shall receive no compensation for their service. Their travel expenses and per diem subsistence shall be reimbursed in accordance with regulations which apply to persons serving intermittently in government service.

Temporary supporting staff of the Panel who are not Federal employees may be reimbursed in accordance with contracts developed by the OSTP in accordance with regulations which apply to temporary employees of the Executive Office of the President.

### Determination

I hereby determine that the formation of the PCAST Panel on High Performance Computing and Communications is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on High Performance Computing and Communications include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:

  
D. Allan Bromley

  
Date

**DRAFT**

THE WHITE HOUSE  
WASHINGTON

April 29, 1991

**MEMORANDUM FOR THOMAS E. LOVEJOY**

President's Council of Advisors on Science and Technology  
(PCAST)

**FROM: D. ALLAN BROMLEY**

**SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
GLOBAL ENVIRONMENT AND NATURAL RESOURCES**

You are requested to establish a PCAST Panel on Global Environment and Natural Resources.

The purpose of the Panel is to enable PCAST to advise the President on issues related to natural resources and environmental sciences that have bearing on long range national goals, government regulation, the transition of Federal R&D findings to industry and academia, areas of potential collaboration with industry participation, of the States in the national program, and foreign access.

World leaders are paying increasing attention to global environmental and natural resource issues. The economic and social consequences of global environmental changes, both natural and human induced, are complex, substantial and only partially clear. Programs to address such changes require policy decisions based on adequate scientific knowledge. For example, the behavior of the linked ocean, atmosphere, land system and their biotic components are at best only roughly understood. Recent reports developed by the National Research Council/ National Academy of Sciences (NAS), the International Geosphere-Biosphere Program (IGBP), and the Intergovernmental Panel on Climate Change (IPCC) all indicate the need for additional research to provide a predictive understanding of the Earth System. The Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) has issued five reports that have provided the framework of the U.S. Global Change Research Program. Federal agencies, including the Departments of Agriculture, Commerce, Defense, Energy, and Interior, the Environmental Protection Agency, the National Atmospheric and Space Administration, the National Science Foundation, and the Smithsonian Institution have major programs coordinated through the FCCSET in support of this Program. An additional report will address research on mitigation and adaptation in response to global change.

The increasing pressure of human population on biological resources and ecosystems is resulting in unprecedented erosion of biological diversity (species of plants and animals). These represent important resources as genetic resources, sources of information about living systems, and environmental indicators. In addition, as biological communities (ecosystems), particularly as forecasts, they perform important functions in biogeochemical cycles and watershed maintenance.

**DRAFT**



**DRAFT**

The Panel on Global Environment and Natural Resources shall:

1. Using the document "Our Changing Planet: The FY 1991 Research Plan", identify areas of potential interaction and collaboration with the private sector in particular to help provide a predictive understanding of the Earth system and illuminate the Nation's ability to mitigate or adapt to global environmental change.
2. Advise on general societal needs that can be served by natural resources, earth and environmental sciences, and identify means for a broad diffusion of the benefits of the U.S. Global Change Research Program.
3. Advise on research needed to protect biological diversity and the impact of human population upon it.

The Panel will submit a preliminary report to the PCAST within 3 months and a final report 6 months after the Panel's first meeting.

The Office of the Assistant Director for the Environment, Office of Science and Technology Policy will sponsor this Panel. Dr. Thomas E. Lovejoy will serve as Chairman. Dr. Nancy Maynard will serve as Executive Secretary and Mr. William Snyder will represent the PCAST Executive Director.

#### Determination

I hereby determine that the formation of the PCAST Panel on Global Environment and Natural Resources is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on Global Environment and Natural Resources include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:

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D. Allan Bromley  
Assistant to the President  
for  
Science and Technology

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Date

[ ]

**DRAFT**

THE WHITE HOUSE

WASHINGTON

May 1, 1991

**MEMORANDUM FOR JOHN McTAGUE**

**President's Council of Advisors on Science and Technology  
(PCAST)**

**FROM: D. ALLAN BROMLEY**

**SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
MEGAPROJECTS IN THE SCIENCES**

You are requested to establish a PCAST Panel on Megaprojects in the Sciences.

The purpose of the Panel is to develop information and policy options to provide a base for PCAST advice to the President on national and international policy issues related to the planning, financing and organization of large scale projects in the sciences, otherwise known as megaprojects.

Megaprojects in the sciences are unique in character and are so costly that it is becoming increasingly difficult for one country to fully finance them. Even when the burden of costs are borne by one country, the benefits are often shared by many nations. They require long lead time for planning and construction. They affect scientists in many nations, either via distributed research projects or widespread use of central facilities. Thus, they are inherently international in nature even when totally financed by one country.

This topic is particularly timely. It's importance was discussed recently at the Informal Meeting of Science Advisors to Heads of Government at Mount Kisco, New York and at the first meeting of the U.S.-European Commission (EC) Joint Consultative Group in Washington in February, when it was agreed to establish a U.S.-E.C. task group to discuss megaprojects in preparation for the Spring 1992 Organisation for Economic Co-operation and Development (OECD) Ministerial Meeting, at which megaprojects will be a major topic.

PCAST advice is also important because of increased pressures on funding for individual principal investigators in the face of constrained budgets. Thus, escalating costs of scientific instrumentation and facilities, couple with these budgetary constraints, point to a need to consider international cooperation in funding megaprojects.

A subcommittee of the Committee on International Science, Engineering, and Technology (CISET) of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) is currently examining this issue. It is expected that the PCAST Panel will utilize studies prepared for the CISET deliberations on megaprojects.

**DRAFT**



**DRAFT**

The Panel on Megaprojects in the Sciences shall:

1. Address an relative roles between megaprojects and smaller investigator-initiated science projects.
2. Characterize the role of the scientific community in terms of the proposal and planning of megaprojects.
3. Advise on an appropriate approach to the planning and coordination of such projects domestically. This might include identification of lead agency responsibilities and consideration of whether megaprojects should be handled all together or considered individually.
4. Advise whether a comprehensive international framework for coordination and cooperation is desirable, and how countries could cooperate to ensure that the cost and benefits of big science projects are shared equitably.
5. Suggest the most appropriate international fora, governmental and scientific, in which such cooperation could be further discussed and coordinated [for example, OECD, United Nations, International Council of Scientific Unions (ICSU), group of seven summit countries (G-7)]. The U.S. is currently developing a position regarding megaprojects for the Spring 1992 OECD Ministerial Meeting.
6. Examine mechanisms and criteria for country participation. How can country participation in planning and organization be ensured without jeopardizing the design and organization of the projects? Some observations of how administrative/executive arrangements relating to past or current international megaprojects have succeeded or failed would be useful.
7. Consider ways to increase continuity of commitment and sustained life-of-project funding by the United States. Many countries are reluctant to cooperate with the United States on large scale projects due to U.S. difficulties in ensuring funding over a long term, even after we have Presidential commitment. Consideration of highly credible arrangements, like a treaty would be examined.

#### Duration

The Panel will be established on a temporary basis and will complete its charge in six to nine months. In addition to providing the advice on the specific items listed above, the Panel will serve as a sounding board on related topics/issues in the interim and possibly after its charge is complete.

The Panel will submit a preliminary report to the PCAST within 3 months and a final report 6 months after the Panel's first meeting.

The Office of the Associate Director for Policy and International Affairs, Office of Science and Technology Policy will sponsor the Panel. Dr. John McTague will serve as Chairman of the Panel. Ms. Jennifer Bond will serve as Executive Secretary. Mr. William Snyder will serve as the representative for the PCAST Executive Director.

**DRAFT**



**DRAFT**

**Determination**

I hereby determine that the formation of the PCAST Panel on Megaprojects in the Sciences is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on Megaprojects in the Sciences include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:

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**D. Allan Bromley**  
**Assistant to the President**  
**for**  
**Science and Technology**

---

Date

**DRAFT**

**DRAFT**

THE WHITE HOUSE  
WASHINGTON

April 29, 1991

MEMORANDUM FOR DAN NATHANS

President's Council of Advisors on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY

SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
BIOSCIENCE AND BIOTECHNOLOGY

You are requested to establish a PCAST Panel on Bioscience and Biotechnology.

The purpose of the Panel is to enable PCAST to advise the President on national policy issues related to the health of the American people and the international competitiveness of the nation's biotechnology industries. The principal focus of the panel will be on the role of bioscience and biotechnology in promoting these national goals.

Since the post-World War II period the United States has been the leading contributor to knowledge in the life sciences, due largely to federal support of research and training. The returns on this investment include major improvements in the health of the American people and United States leadership in the biotechnology and pharmaceutical industries. We are in a golden age of the biosciences in which basic discoveries are made at a rapid rate, many with direct relevance to human health, food production, and the environment. To maintain our leadership we need to coordinate the role of the Federal Government with those of industry, universities, and others in order to optimize the development and application of new knowledge. The challenge for the Panel is to define these roles, especially the Federal role, in terms of specific policy recommendations. In doing so the Panel should take advantage of the recent reports on these issues, particularly those of the President's Council on Competitiveness, the Federal Coordinating Council for Science, Engineering, and Technology, the National Science Foundation, the National Institutes of Health, and others.

The Panel on Bioscience and Biotechnology shall:

- o Identify particularly promising opportunities in bioscience and biotechnology relevant to health.
- o Examine the Federal commitment to research in bioscience and biotechnology in relation to the conclusions drawn from item 1 above.
- o Evaluate human resource needs in bioscience and biotechnology and recommend ways by which the Federal Government can help meet those needs.

**DRAFT**

DRAFT

- o Make recommendations concerning governmental policies that will enhance basic research in the life sciences and long term research and development by the biotechnology industry.
- o Identify regulatory barriers to innovation, and recommend measures that would minimize such barriers consistent with protection of the health and safety of the public.
- o Evaluate current policies related to the transfer of biotechnology from federally supported laboratories to American industry and recommend ways to enhance the transfer process.

The Panel shall submit a preliminary report to the PCAST within 3 months and a final report within 6 months after the Panel's first meeting.

The Office of the Associate Director for Life Sciences, Office of Science and Technology Policy, will sponsor this Panel. Dr. Dan Nathans will serve as Chairman. Mr. William Snyder will represent the PCAST Executive Director.

#### Determination

I hereby determine that the formation of the PCAST Panel on Bioscience and Biotechnology is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on Bioscience and Biotechnology include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:

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D. Allan Bromley  
Assistant to the President  
for  
Science and Technology

---

Date

DRAFT



# DRAFT

THE WHITE HOUSE  
WASHINGTON

April 29, 1991

## MEMORANDUM FOR PETER LIKINS

President's Council of Advisors on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY

SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON EDUCATION  
AND HUMAN RESOURCES

You are requested to establish a PCAST Panel on Education and Human Resources.

The purpose of this Panel is to enable PCAST to advise the President on issues related to education and human resources in the fields of science, technology, engineering, and mathematics.

The agenda for the Panel includes two kinds of tasks: (1) Keeping abreast of the work of others in the field, including the corresponding committee of FCCSET, and providing an extragovernmental perspective on the work of governmental agencies and interagency groups; and (2) Undertaking specific studies of potential interest to the President.

An example of the second kind is the PCAST evaluation of strategies for meeting the National Goals for Education, as reported orally to the President in December of 1990.

The specific study next on the agenda focuses on the education of those extraordinary members of the population who have the capacity to reach the highest levels of achievement in science and engineering, with particular attention to those who teach such key contributors from childhood through doctoral studies. Unless our most talented citizens achieve their full potential in science and technology, the desired improvements in mass education in these fields will not be sufficient to assure the competitiveness of our nation in the global economy.

I would like the Panel on Education and Human Resources to discuss issues such as:

- o Is the education in science and mathematics most appropriate in childhood for students of high potential different in any way from that appropriate for other students? If so, can such high potential students be identified in childhood, even in the presence of such obscuring factors as poverty or deficiencies in family or community support?
- o What is the influence of early teachers and teacher behavior on the development of children of high potential in science and mathematics? How can teachers discover and develop such talents, particularly among girls and children of minority groups under-represented in these fields?

# DRAFT

- o What are the effects of accelerated or enriched study on the development of high potential students in science and mathematics? What are the roles of parents, elementary and secondary school teachers, and adult mentors such as college professors, scientists and engineers?
- o Are undergraduate enrollments in engineering and the sciences an appropriate reflection of society's needs and the talents of the population? In particular, are these enrollments appropriate for women and under-represented minorities? If in any case inappropriate, can enrollments be altered? How? Can teachers make a difference?
- o Are graduate student enrollments in engineering and the sciences an appropriate reflection of society's needs and the talents of the population? Is the participation of U.S. citizens and permanent residents appropriate? If in any case inappropriate, can graduate enrollments be altered? How? Can teachers make a difference?
- o Are Ph.D. recipients likely to be available in sufficient numbers and quality to meet the demands for faculty in engineering and the sciences in the decade of the nineties? Is the current reliance on foreign-born faculty appropriate? Are women and currently under-represented minorities likely to be available in adequate numbers and quality to meet any special requirements in this area? If any of these questions suggests a negative response, what strategies can be devised to correct the anticipated deficiencies? Can teachers make a difference?

Additional questions will arise in the course of the study.

The Panel shall submit a preliminary report to the PCAST within 3 months and a final report within 6 months after the Panel's first meeting.

The Office of the Associate Director for Policy and International Affairs, Office of Science and Technology Policy, will sponsor this Panel. Dr. Peter Likins will serve as Chairman and Dr. Charles Drake will serve as Co-Chairman. Mr. William Snyder will represent the PCAST Executive Director.

#### Determination

I hereby determine that the formation of the PCAST Panel on Education and Human Resources is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on Education and Human Resources include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

DRAFT

Approved:

---

D. Allan Bromley  
Assistant to the President  
for  
Science and Technology

---

Date

DRAFT



**DRAFT**

THE WHITE HOUSE

WASHINGTON

April 29, 1991

MEMORANDUM FOR RALPH GOMORY  
President's Council of Advisors on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY

SUBJECT: TERMS OF REFERENCE FOR PCAST PANEL ON  
INTERNATIONAL ECONOMIC COMPETITIVENESS

You are requested to establish a PCAST Panel on International Economic Competitiveness.

The Purpose of this Panel is to enable PCAST to advise the President on issues in science and technology that affect U.S. economic competitiveness.

The private sector today is facing severe competition from abroad where vastly improved industries are emerging even in the most advanced technical areas, and where the more traditional industries have shown great ability to improve their manufacturing process and development technologies. Industry abroad is also making effective use of the high skill level of some of the competitive work forces.

In addition there are foreign government policies closely supportive of emerging and strategic technologies and designated industries.

While product competitiveness is largely the result of the internal actions of individual firms, firms are also influenced by their surroundings. Familiar examples of this from the economic arena are cost of capital and tax structure.

But there are other and more technically oriented aspects of the surroundings as well.

1- First there is the availability of new scientific and engineering knowledge. This is the kind of knowledge that historically has launched whole new industries, radically different materials, or provided new sensors to make possible new instruments, etc. It is a longstanding Federal role to contribute here and many government agencies have focused on this.

The National Critical Technologies Report selected 22 technologies deemed critical to national economic prosperity and to our military security. The department of Defense, in its "Critical Technologies Plan" presents dual-purpose technologies which are adaptable to enhancing the economic competitiveness of the private sector. The Department of Commerce has issued its "Emerging Technologies Report" which identifies 12 emerging technologies.

**DRAFT**

# DRAFT

Of these technologies President Bush stated: "If America is to maintain and strengthen our competitive position, we must continue not only to create new technologies, but to learn to more effectively translate those technologies in commercial products."

2- In addition to new technologies there is a second aspect in the need for improvement of existing product. This includes research on existing process and manufacturing, or improved materials. Sometimes the availability of special and extreme instrumentation is useful. Sometimes it is the support of long range projects beyond a single firm's economic time horizon. Federal examples include Sematech and Brookhaven synchrotron radiation.

3- A third competitiveness element is the availability of a technical labor force. This means vocational training as well as the training of scientists and engineers. To the extent that other panels do not deal with some aspects of this, I would like this to be included in the work of his committee.

In these three areas I would like the Panel to define, discuss and report on:

- o Additional programs to improve competitiveness
- o Procedures to ensure government and private sector cooperation in assessing and arriving at new undertakings and in benefitting from existing activities.

The Panel shall submit a preliminary report to the PCAST within 3 months and a final report within 6 months after the Panel's first meeting.

The Office of the Associate Director for Industrial Technology, Office of Science and Technology Policy, will sponsor the Panel. Dr. Ralph Gomory will serve as Chairman and Dr. Harold Shapiro will serve as Vice Chairman. Mr. William Snyder will serve as the PCAST Secretariat Representative.

## Determination

I hereby determine that the formation of the PCAST Panel on International Economic Competitiveness is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on International Economic Competitiveness include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:

---

D. Allan Bromley  
Assistant to the President  
for  
Science and Technology

\_\_\_\_\_  
Date

# DRAFT

DRAFT

As of May 1, 1991

PRESIDENT'S COUNCIL OF ADVISORS  
ON  
SCIENCE AND TECHNOLOGY

JULY 11-12, 1991  
AGENDA

THURSDAY, JULY 11, 1991

OPEN SESSION 9:00 AM - 11:00 AM  
CONFERENCE ROOM  
COUNCIL ON ENVIRONMENTAL QUALITY  
722 JACKSON PLACE, NW

|               |                                                                           |                     |
|---------------|---------------------------------------------------------------------------|---------------------|
| 8:30 - 9:00   | ARRIVAL AND COFFEE                                                        |                     |
| 9:00 - 9:30   | OPENING REMARKS                                                           | DR. BROMLEY         |
| 9:30 - 10:30  | THE HUMAN GENOME PROJECT<br>- The Social and Commercial<br>Implications   | DR. JAMES<br>WATSON |
| 10:30 - 11:00 | DISCUSSION                                                                |                     |
| 11:00 -       | CLOSING REMARKS<br>AND MOVE TO ROOM 248,<br>OLD EXECUTIVE OFFICE BUILDING | DR. BROMLEY         |



DRAFT

THURSDAY, JULY 11, 1991 Continued...

CLOSED SESSION 11:00 - 4:30 PM  
OMB DIRECTOR'S CONFERENCE ROOM  
ROOM 248  
OLD EXECUTIVE OFFICE BUILDING

|               |                                                                               |                              |
|---------------|-------------------------------------------------------------------------------|------------------------------|
| 11:15 - 11:45 | NATIONAL SECURITY AND<br>TECHNOLOGY PANEL<br>- A PROGRESS REPORT              | DR. BUCHSBAUM                |
| 11:45 - 12:15 | HIGH PERFORMANCE COMPUTING<br>AND COMMUNICATIONS PANEL<br>- A PROGRESS REPORT | DR. BUCHSBAUM                |
| 12:15 - 1:00  | LUNCH                                                                         |                              |
| 1:00 - 1:30   | GLOBAL ENVIRONMENT AND NATURAL<br>RESOURCES PANEL<br>- A PROGRESS REPORT      | DR. LOVEJOY                  |
| 1:30 - 2:00   | PANEL ON MEGAPROJECTS IN THE<br>SCIENCES<br>- A PROGRESS REPORT               | DR. McTAGUE<br>DR. RATCHFORD |
| 2:00 - 2:30   | BIOSCIENCE AND BIOTECHNOLOGY<br>PANEL<br>- A PROGRESS REPORT                  | DR. NATHANS                  |
| 2:30 - 3:00   | THE NATIONAL INSTITUTES OF HEALTH                                             | DR. HEALY                    |
| 3:00 - 3:15   | BREAK                                                                         |                              |
| 3:15 - 3:45   | COMPETITIVENESS AND S&T                                                       | SECRETARY<br>BRADY           |
| 3:45 - 4:00   | DISCUSSION                                                                    |                              |
| 4:00 - 4:30   | THE NATIONAL SCIENCE FOUNDATION                                               | DR. MASSEY                   |
| 4:30 - 5:00   | DISCUSSION OF AUGUST AGENDA<br>AND CLOSING REMARKS                            | DR. BROMLEY                  |

DRAFT

FRIDAY, JULY 12, 1991

CLOSED SESSION 9:00 AM - 12:00 NOON  
ROOSEVELT ROOM  
WEST WING  
WHITE HOUSE

|               |                                                                           |                           |
|---------------|---------------------------------------------------------------------------|---------------------------|
| 8:30 - 8:50   | ARRIVAL AND COFFEE<br><u>(DR. BROMLEY'S OFFICE, ROOM 358, OEOB)</u>       |                           |
| 8:50 - 9:00   | MOVE TO ROOSEVELT ROOM                                                    |                           |
| 9:00 - 9:15   | PREPARATION FOR THIS MORNING                                              | DR. BROMLEY               |
| 9:15 - 9:30   | EDUCATION AND HUMAN RESOURCES<br>PANEL<br>- A PROGRESS REPORT             | DR. LIKINS                |
| 9:30 - 10:00  | PANEL ON INTERNATIONAL ECONOMIC<br>COMPETITIVENESS<br>- A PROGRESS REPORT | DR. GOMORY<br>DR. SHAPIRO |
| 10:00 - 10:30 | OTHER BUSINESS                                                            |                           |
| 10:30 - 11:15 | DISCUSSION                                                                | DR. BROMLEY               |
| 11:15 - 12:00 | OTHER BUSINESS AND<br>CLOSING REMARKS                                     | DR. BROMLEY               |

PCAST PANEL ACTIONS  
(April 30, 1991)

|                                         | Sol, Ralph                             | Ralph, Harold                             | Dan                           | Peter, Chuck                      | Sol, Johnny<br>Foster                | Tom, David,<br>Norman                | John                                                 |
|-----------------------------------------|----------------------------------------|-------------------------------------------|-------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|------------------------------------------------------|
|                                         | High Perfor.<br>Computing<br>& Commun. | International<br>Economic<br>Competitive. | Bioscience<br>and<br>Biotech. | Education<br>& Human<br>Resources | Technology<br>& National<br>Security | Global<br>Environ. &<br>Natural Res. | Int'l Framework<br>For Basic Science<br>Megaprojects |
| Information<br>Briefing on Topic        | MAR '90                                | MAY '90<br>JUL '90                        | APR '90                       | APR '90                           | FEB '91                              | MAY '90<br>JUL '90<br>FEB '91        | FEB '91                                              |
| Issues & Panel<br>Members Discussed     | MAR '90                                | APR '91                                   | MAY '90<br>MAR '91            | JUL '90<br>SEP '90<br>MAR '91     | FEB '91<br>MAR '91                   | FEB '91                              | FEB '91<br>MAR '91<br>APR '91                        |
| Terms of Reference,<br>Members Approved | APR '90                                | MAY '91                                   | MAY '91                       | MAY '91                           | APR '91                              | MAY '91                              | MAY '91                                              |
| Progress<br>Report #1                   | JUL '90                                |                                           |                               |                                   | MAY '91                              |                                      |                                                      |
| Progress<br>Report #N                   | APR '91<br>MAY '91                     |                                           |                               |                                   |                                      |                                      |                                                      |
| PCAST Briefed                           |                                        |                                           |                               |                                   |                                      |                                      |                                                      |
| PCAST Position<br>Taken                 |                                        |                                           |                               |                                   |                                      |                                      |                                                      |
| Meet With<br>President                  |                                        |                                           |                               |                                   |                                      |                                      |                                                      |
| Status<br>Review                        |                                        |                                           |                               |                                   |                                      |                                      |                                                      |



PCAST MEETING CALENDAR  
AND EXPECTED PCAST ATTENDANCE

1991

| Member    | May 2-3  | July 11-12 | Aug. 1-2 | Sep. 12-13 | Oct. 10-11 | Nov. 14-15 | Dec. 12-13 |
|-----------|----------|------------|----------|------------|------------|------------|------------|
| Borlaug   | Yes      | Yes        | Yes      | Yes        | Yes        | Yes        | Yes        |
| Buchsbaum | Yes      | Yes        | Yes      | Yes        | Yes        | No         | Yes        |
| Drake     | Yes      | Yes        | Yes      | Yes        | Yes        | Yes        | Yes        |
| Gomory    | Yes      | Yes        | Yes      | N 12, Y 13 | Yes        | N 14, Y 15 | Yes        |
| Likins    | N 2, Y 3 | N 11, Y 12 | Yes      | Yes        | No         | No         | No         |
| Lovejoy   | Yes      | Yes        | Yes      | Yes        | Yes        | Yes        | Yes        |
| McTague   | Yes      | Yes        | Yes      | Yes        | Yes        | Yes        | No         |
| Nathans   | Yes      | Yes        | No       | Yes        | No         | Yes        | No         |
| Packard   | Yes      | Yes        | No       | Yes        | Yes        | Yes        | No         |
| Shapiro   | Yes      | N 11, Y 12 | Yes      | Yes        | N 10, Y 11 | No         | Y 12, N 13 |

1992

| Member    | Jan. 9-10 | Feb. 6-7 | Mar. 5-6 | Apr. 2-3 | May 7-8 | June 4-5 | July 9-10 | Aug. 6-7 | Sep. 10-11 | Oct. 15-16 | Nov. 5-6 | Dec. 3-4 |
|-----------|-----------|----------|----------|----------|---------|----------|-----------|----------|------------|------------|----------|----------|
| Borlaug   | Yes       | Yes      | Yes      | Yes      | Yes     | Yes      | Yes       | Yes      | Yes        | Yes        | Yes      | Yes      |
| Buchsbaum | Yes       | Yes      | Yes      | Yes      | Yes     | Yes      | Yes       | Yes      | Yes        | Yes        | Yes      | Yes      |
| Drake     | Yes       | Yes      | Yes      | Yes      | Yes     | Yes      | Yes       | Yes      | Yes        | Yes        | No       | Yes      |
| Gomory    | N 9, Y 10 | Yes      | Yes      | Yes      | Yes     | Yes      | N 9, Y 10 | Yes      | N 10, Y 11 | Yes        | No       | Yes      |
| Likins    | Yes       | Yes      | Yes      | Y 2, N 3 | Yes     | Y 4, N 5 | Yes       | Yes      | Yes        | Y 15, N 16 | Yes      | Yes      |
| Lovejoy   | Yes       | Yes      | Yes      | Yes      | Yes     | Yes      | Yes       | Yes      | Yes        | Yes        | Yes      | Yes      |
| McTague   | Yes       | Yes      | Yes      | Yes      | Yes     | Yes      | Yes       | Yes      | Yes        | Yes        | Yes      | Yes      |
| Nathans   | Yes       | Yes      | Yes      | Yes      | Yes     | Yes      | Yes       | Yes      | Yes        | Yes        | Yes      | Yes      |
| Packard   | Yes       | Yes      | Yes      | Yes      | Yes     | Yes      | Yes       | Yes      | Yes        | Yes        | Yes      | Yes      |
| Shapiro   | N 9, Y 10 | Yes      | Yes      | Yes      | Yes     | No       | N 9, Y 10 | Yes      | N 10, Y 11 | Yes        | Yes      | Yes      |

Roger J. Porter, M.D.  
Deputy Director, National Institute of Neurological Disorders and Stroke

Born: April 4, 1942, Pittsburgh, PA

EDUCATION: B.S., Eckerd College, St. Petersburg, FL, 1964; M.D., Duke University School of Medicine, Durham, NC, 1968; University of California, San Diego, Straight Medical Internship, 1969; University of California, San Francisco, Resident in Neurology, 1971-1973; University of California, San Francisco, Chief Resident in Neurology, 1973-1974.

PROFESSIONAL HISTORY: Deputy Director, NINDS, 1987-present; Chairman, Subcommittee on Brain and Behavioral Research, OSTP, 1990-present; Chief, Medical Neurology Branch, and Chief, Clinical Epilepsy Section, NINCDS, 1984-1987; Clinical Epilepsy Section, NINCDS, 1980-1984; Acting Chief, Epilepsy Branch, Neurological Disorders Program, and Acting Chief, Clinical Epilepsy Section, NINCDS, 1979-1980; Assistant Chief, Epilepsy Branch, Neurological Disorders Program, NINCDS, 1978-1979; Senior Research Associate, Epilepsy Branch, Neurological Disorders Program, NINCDS, 1974-1978; Medical Officer, Commissioned Corps, PHS (Medical Director) 1974-present; Investigator, Diphenylhydantoin pharmacology project, University of California, San Francisco, 1972-1973; Staff Associate, Section on Epilepsy, NINCDS, 1969-1971; Fellow, Research Training Program, Duke University School of Medicine, 1966-1967 (9 months); Research Assistant, Department of Pathology, Metropolitan General Hospital, Cleveland, OH, 1965 (summer); Consultant-Lecturer in Neurology, National Naval Medical Center, Bethesda, MD, 1978-present; Clinical Professor of Neurology, Uniformed Services University of the Health Sciences, Bethesda, MD, 1980-present; Adjunct Professor of Pharmacology, Uniformed Services University of the Health Sciences, Bethesda, MD, 1982-present.

PROFESSIONAL ORGANIZATIONS: American Academy of Neurology, American Electroencephalographic Society, American Epilepsy Society (past president), American Neurological Association, American Society for Clinical Pharmacology and Therapeutics, American Society for Neurologic Investigation (Honorary Member), International League Against Epilepsy (Secretary-General), Society for Neuroscience.

HONORS, AWARDS: U.S. Public Health Service Commendation Medal, 1977; MacArthur Outstanding Alumnus Award, Eckerd College, 1977; Fulbright Distinguished Professor Award, 1985; President, Assembly of Scientists, NIMH-NINCDS, 1985-1986, U.S. Public Health Service Meritorious Service Medal, 1986; Letter of Commendation, Commanding Officer, National Naval Medical Center, 1987; Letter of Commendation, Surgeon General C. Everett Koop, M.D., USPHS, 1988; Department of Defense Meritorious Service Medal, 1989; Distinguished Alumnus Award, Duke University Medical Center, 1989; United States Navy Commendation Medal, 1991.

PUBLICATIONS: Books--9; Articles and Chapters--139; Abstracts--90



**MEETING OF THE  
PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY**

**JULY 10-11, 1991**



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| James Watson                                                |                   |

PRESIDENT'S COUNCIL OF ADVISORS  
ON  
SCIENCE AND TECHNOLOGY

JULY 10-11, 1991  
AGENDA

WEDNESDAY, JULY 10, 1991

CLOSED SESSION 1:00 PM - 5:00 PM  
ROOSEVELT ROOM  
WEST WING  
WHITE HOUSE

|             |                                                                                                                                          |             |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1:00 - 1:15 | ARRIVAL AND COFFEE<br><u>(DR. BROMLEY'S OFFICE, ROOM 358, OEOB)</u>                                                                      |             |
| 1:15 - 1:30 | -- Move to Roosevelt Room --                                                                                                             |             |
| 1:30 - 1:45 | OPENING REMARKS                                                                                                                          | DR. BROMLEY |
| 1:45 - 2:00 | PREPARATION FOR THIS AFTERNOON                                                                                                           | DR. BROMLEY |
| 2:00 - 2:30 | EDUCATION AND HUMAN RESOURCES<br>PANEL<br>- A Progress Report                                                                            | DR. LIKINS  |
| 2:30 - 3:00 | THE FEDERAL COORDINATING COUNCIL FOR<br>SCIENCE, ENGINEERING, AND TECHNOLOGY<br>- An Update on Budget Crosscuts<br>and Other Initiatives | MS. BACH    |
| 3:00 - 3:30 | DISCUSSION                                                                                                                               |             |
| 3:30 - 3:45 | BREAK                                                                                                                                    |             |
| 3:45 - 4:30 | OTHER BUSINESS                                                                                                                           | DR. BROMLEY |
| 4:30 - 5:00 | CLOSING REMARKS                                                                                                                          | DR. BROMLEY |

**THURSDAY, JULY 11, 1991**

**OPEN SESSION 9:00 AM - 11:15 AM  
CONFERENCE ROOM  
COUNCIL ON ENVIRONMENTAL QUALITY  
722 JACKSON PLACE, NW**

**8:30 - 9:00**      **ARRIVAL AND COFFEE**

**9:00 - 9:15**                      **OPENING REMARKS**

**DR. BROMLEY**

**9:15 - 10:00 THE HUMAN GENOME PROJECT**

**DR. WATSON**

**10:00 - 10:15      DISCUSSION**

**10:15 - 10:45**      **CRADAs - COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS**  
**- An Overview**

MR. ALLEN

**10:45 - 11:00      DISCUSSION**

11:00 - **CLOSING REMARKS  
AND MOVE TO INDIAN TREATY ROOM,  
ROOM 474, OLD EXECUTIVE OFFICE BUILDING**

**DR. BROMLEY**

**Note: Please use the Pennsylvania Avenue Entrance to the OEOP.**



**THURSDAY, JULY 11, 1991 Continued...**

**CLOSED SESSION 11:00 - 1:00 PM  
INDIAN TREATY ROOM  
ROOM 474  
OLD EXECUTIVE OFFICE BUILDING**

|               |                                                                               |               |
|---------------|-------------------------------------------------------------------------------|---------------|
| 11:15 - 12:00 | NATIONAL SECURITY AND<br>TECHNOLOGY PANEL<br>- A Progress Report              | DR. BUCHSBAUM |
|               | HIGH PERFORMANCE COMPUTING<br>AND COMMUNICATIONS PANEL<br>- A Progress Report | DR. BUCHSBAUM |
| 12:00 - 12:15 | BREAK FOR LUNCH SETUP                                                         |               |
| 12:15 - 1:00  | LUNCH                                                                         |               |

**CLOSED SESSION 1:00 - 5:00 PM  
ROOM 476  
OLD EXECUTIVE OFFICE BUILDING**

|             |                                                                           |                              |
|-------------|---------------------------------------------------------------------------|------------------------------|
| 1:00 - 1:30 | GLOBAL ENVIRONMENT AND NATURAL<br>RESOURCES PANEL<br>- A Progress Report  | DR. LOVEJOY                  |
| 1:30 - 2:00 | THE S&T BUDGET<br>- FY 1992<br>- FY 1993                                  | MR. GRADY                    |
| 2:00 - 2:30 | BIOSCIENCE AND BIOTECHNOLOGY<br>PANEL<br>- A Progress Report              | DR. NATHANS                  |
| 2:30 - 3:00 | PCAST PANEL PROCEDURES<br>- Legal Considerations                          | MS. VAN CLEAVE               |
| 3:00 - 3:15 | BREAK                                                                     |                              |
| 3:15 - 3:45 | PANEL ON MEGAPROJECTS IN THE<br>SCIENCES<br>- A Progress Report           | DR. McTAGUE<br>DR. RATCHFORD |
| 3:45 - 4:00 | DISCUSSION                                                                |                              |
| 4:00 - 4:15 | PANEL ON INTERNATIONAL ECONOMIC<br>COMPETITIVENESS<br>- A Progress Report | DR. PHILLIPS                 |
| 4:15 - 4:30 | UPDATE ON OMB CIRCULAR A-21                                               | DR. HENDERSON                |
| 4:30 - 5:00 | OTHER BUSINESS<br>AND CLOSING REMARKS                                     | DR. BROMLEY                  |

## PRESS PEOPLE INVITED

|                                       |                                |
|---------------------------------------|--------------------------------|
| Wil Lepkowski                         | Chemical and Engineering News  |
| Colleen Cordes                        | Chronicle of Higher Education  |
| Bruce Agnew                           | Journal of NIH Research        |
| Ed Chen                               | Los Angeles Times              |
| Chris Anderson or<br>Barbara Culliton | Nature                         |
| Chris Joyce                           | New Scientist                  |
| Richard McCormack                     | New Technology Week            |
| Warren Leary                          | New York Times                 |
| Michael Miller                        | Performance Materials Magazine |
| Irwin Goodwin                         | Physics Today                  |
| Dan Greenberg                         | Science and Government Report  |
| Elliot Marshall                       | Science Magazine               |
| Arthur Kranish                        | Science Trends                 |
| Tim Beardsley                         | Scientific American            |
| Jeffrey Mervis                        | The Scientist                  |
| Dick Thompson                         | Time-Warner                    |
| Georgia Persinos                      | Washington Insight             |
| William Booth                         | Washington Post                |

# PCAST MEMBERS EXPECTED

| <u>NAME</u> | <u>Wednesday</u> | <u>Wed. Dinner</u> | <u>Thursday</u> |
|-------------|------------------|--------------------|-----------------|
| Borlaug     | Yes              | Yes                | Yes             |
| Buchsbaum   | Yes              | Yes                | Yes             |
| Drake       | Yes              | Yes                | Yes             |
| Gomory      | No               | No                 | No              |
| Likins      | Yes              | Yes                | No              |
| Lovejoy     | Yes              | Yes                | Yes             |
| McTague     | Yes              | Yes                | Yes             |
| Nathans     | Yes              | Yes                | Yes             |
| Packard     | No               | No                 | No              |
| Shapiro     | No               | No                 | No              |
| *****       |                  |                    |                 |
| Healy       | Yes              | Yes                | Yes             |
| Massey      | Yes              | Yes                | Yes             |



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# PCAST

## Memoranda for the President

*Follow-through on S&T Budget*  
*Federal Funding of R&D - Draft*  
*Critical Technologies Report - Draft*  
*Megaprojects - Draft*

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THE WHITE HOUSE  
WASHINGTON

June 4, 1991

MEMORANDUM FOR THE PRESIDENT

FROM: JOHN McTAGUE, ON BEHALF OF PCAST

SUBJECT: Investing in the Future - Follow Through With Congress

The Council reiterates its support for the important investment in the future proposed in your FY 1992 Budget submission, particularly in the areas of research and development. At the March PCAST meeting you noted the lack of a natural political constituency for research, especially individual investigator efforts. This makes all the more important strong Administration follow-up with the Congress, particularly as consideration moves to the appropriation process.

From the authorization hearings and budget resolutions to date, it is becoming increasingly clear that sustaining your R&D priorities will require your personal and visible participation. If a White House meeting were called together, with both Republican and bipartisan Congressional leaders to highlight the priority this investment has for the nation, it would be particularly effective. The Council recommends such an action, realizing the many demands on your time and political capital.

# DRAFT

July 10, 1991

## DRAFT PCAST MEMORANDUM

FROM: DAVID PACKARD, ON BEHALF OF PCAST  
SUBJECT: Federal Funding of University Research

Mr. President, there has recently been much debate on the topic of Federal funding of university research. In particular, the debate has focused on concerns raised over the use of Federal funding to cover indirect costs of university research. However, Mr. President, the Council feels that there is a deeper and more compelling issue at the heart of this debate. That is, whether the Federal government should bear its full share of the cost of the university research it supports. The answer, we strongly believe, is yes.

The reasons for this are several. First, the Council believes there may be no issue before the Administration that is more important than determining how America can maintain its position of world wide leadership in technology that has been achieved since World War II. Second, the Council believes the preservation and enhancement of the government -- university -- industry research partnership offers our nation one of the best hopes for success in an increasingly competitive global environment.

Following World War II a remarkable national policy decision was made based on advice from Dr. Vannevar Bush: It was decided that the Federal government should invest heavily in scientific research, and most Federally sponsored research should be done in our nation's universities. This policy was unique in world history, and it has elevated scientific research in America to the highest standards on the globe. Other nations (most notably the Soviet Union, but also Japan) separate teaching institutions (the universities) from research institutions (government or industry laboratories), and lose the opportunity for the synergy that characterizes our system. Largely as a result of this policy, American universities have become intellectual beacons throughout the world, attracting graduate students, visiting scholars and permanent faculty from the international community.

Largely as a result of this decision, the United States is today the leader of the world in Technology. We have made great progress in the war against disease. We have created vast new industries, and our brilliant military victory, Desert Storm, was assured because our distinguished military leaders and our highly skilled, brave and dedicated men and women in uniform had the best weapons in the world.

The question has now become: How can this research and development endeavor, which has served our country so well, be continued with equal or greater success in the future.

One step in this direction would be the implementation of the recommendations put forth by the 1986 Report of the White House Science Council Panel on the Health of U.S. Colleges and Universities which was chaired by Dr. Bromley and myself. The Report specifies 19 principal recommendations on improving the university/government research partnership. Possibly until now, the public concern has not been significant enough to warrant change.

In its advisory role and upon your direction, Mr. President, the Council would be delighted to discuss these topics with you in further detail.



# DRAFT

July 10, 1991

## DRAFT PCAST MEMORANDUM

FROM: SOLOMON BUCHSBAUM, ON BEHALF OF PCAST  
SUBJECT: Report of the National Critical Technologies Panel

Mr. President, you have long supported active participation of the Federal Government with the private sector in forging precompetitive, generic technologies. National security and industrial competitiveness benefit thereby.

The recent Report of the National Critical Technologies Panel is an important step in support of that thrust. The Panel identified some 22 critical technologies, culled out of a much longer list, that undergird manufacturing; information and communications; biotechnology and life sciences; aeronautics and surface transportation; energy and environment; and new and improved materials. The report describes each technology, assesses the state of its evolution on a global scale and, most importantly, discusses the reasons for the inclusion of the technology on the list.

The PCAST believes that this document will prove quite valuable in the setting of policy by the Government. It will also prove useful in helping to guide private sector priorities and investments in new technology. It is worthy of note that the Panel that produced the report was composed of both government officials and private citizens.

The PCAST would be delighted, Mr. President, to elaborate our views on this topic if you should desire.

# DRAFT

July 10, 1991

## DRAFT PCAST MEMORANDUM

FROM: RALPH GOMORY, ON BEHALF OF PCAST  
SUBJECT: Megaprojects

The Federal Government can be proud of its role in supporting research since World War II. This research has had two components, support of individual investigators and support of large-scale projects, or the so-called Megaprojects. While both components have had significant successes, the historical record shows that the most far reaching successes have clearly come from the individual investigator component. We need only mention the work on solid state physics that made the transistor possible, or the fundamental work on molecular biology leading to the development of the biotechnology industry.

PCAST is concerned that the working of the principal investigator system is under great stress and is further threatened by the planned out-year growth of Megaprojects.

Some of the Megaprojects are bonafide - if expensive - scientific projects from which significant results can be expected. The Superconducting Super Collider is an example of this. However there are others, the Space Station is an example, which can make at best a minor scientific contribution. Given their great expense, such projects can not be justified solely on scientific grounds, and thus their continuation needs to be based on something else.

While in the past, when budgets were expanding, Megaprojects were affordable, and their out-year growth could be dealt with. However, in this time of limited budgets, this is no longer the case. PCAST is concerned that the impact of this out-year mortgage will be felt on what has historically been the most productive component of our R&D investment, the individual investigator.

PCAST believes that priorities will have to be set and choices made among the Megaprojects. PCAST recognizes the sensitivity of this issue, and the fact that we are dealing with major legacy decisions.

Nevertheless PCAST would be willing to contribute its views on these necessary choices if you should find that useful.

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# PCAST

## Panel on Technology and National Security

*Terms of Reference*  
*Panel Members*

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THE WHITE HOUSE  
WASHINGTON

March 27, 1991

MEMORANDUM FOR SOLOMON J. BUCHSBAUM, PRESIDENT'S COUNCIL OF  
ADVISORS ON SCIENCE AND TECHNOLOGY (PCAST) AND  
JOHN S. FOSTER, CHAIRMAN, DEFENSE SCIENCE BOARD

FROM: D. ALLAN BROMLEY

SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
TECHNOLOGY AND NATIONAL SECURITY

You are requested to establish a PCAST Panel on Technology and National Security.

The purpose of this Panel is to enable the PCAST to advise the President on selected policy issues related to technology and the national security interests and objectives of the United States.

In his "National Security Strategy of the United States", the President has put forth the enduring elements of our national strategy and the broad agenda needed to satisfy the goals of that strategy. The President's report also addressed future opportunities and uncertainties and stated his policy for political, economic and defense initiatives. In his report, the President acknowledged that the economic and military strength of the United States rests on technological superiority.

The President, in his national security strategy report said: "Broadly and properly understood, our national security is shaped by the totality of the domestic and international environment- an environment that is today dramatically changing." It is because of these dramatic changes that I believe there may be a need for national level guidance on the expenditure of federal funds supporting technology. As we prepare this guidance, the advice of PCAST would be most helpful.

The "U.S. Technology Policy" of the White House Office of Science and Technology Policy responds to the President's national security strategy. The paper presents a strategy to implement technology policy and recognizes the role of the private sector, and state and Federal governments in implementing this policy. Among Federal responsibilities, the paper requires the maintenance of "... a strong Defense technology base to provide options for future weapons systems development and to help avoid technological surprises by potential adversaries." The paper notes that "Special emphasis needs to be placed on shortening the time required for transferring R&D results to production and on using commercial products."

The Department of Defense has published statements of its technology policy, for example, the Secretary of Defense's Annual Report to the Congress. Over the years, this report has consistently stressed the importance of U.S. technological superiority as a goal. The technology policy and strategy of DoD is also guided by the work of its Defense Science Board and particular note is made of the DSB's report of its 1990

Summer Study: "Research and Development Strategies for the 1990's." Also of note is the current "Defense Technology Strategy and Action Plan" of the Office of the Director, Defense Research and Engineering, Department of Defense. Finally, administration technology policy development benefits extensively from private sector efforts.

I would like the Panel on Technology and National Security to define and discuss:

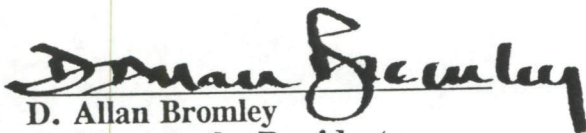
- o the role technology is expected to play vis-a-vis national security during the decade of the 1990's; and
- o how well the Government is carrying out that role; identifying gaps or deficiencies in activities being conducted or sponsored by the Government; and identifying alternate mechanisms if appropriate.

The Panel should base its deliberations primarily on prior work of others. I expect the Panel to consider technology programs, present or planned, in all Government agencies and departments directly or indirectly responsible for key aspects of national security. Thus, the Panel will look beyond Department of Defense and Department of Energy military programs.

The Panel shall submit a preliminary report to the PCAST within 3 months and a final report 6 months after the Panel's first meeting.

The Office of the Assistant Director for National Security, Office of Science and Technology Policy will sponsor this Panel. Dr. Solomon J. Buchsbaum and Dr. John S. Foster will serve as Co-Chairmen. Ms. Michelle Van Cleave will serve as Executive Secretary and Mr. William Snyder will be the PCAST Secretariat representative.

Approved:



D. Allan Bromley  
Assistant to the President

for Science and Technology  
Chairman, President's Council of Advisors on Science and Technology

March 28, 1991  
Date



**PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY**

**PANEL ON  
TECHNOLOGY AND NATIONAL SECURITY  
as of July 10, 1991**

**Chairman**

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**Solomon J. Buchsbaum**      **Senior Vice President  
Technology Systems  
AT&T Bell Laboratories  
Member of PCAST**

**Vice Chairman**

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**John S. Foster**      **Vice President  
Science and Technology  
TRW, Inc  
and  
Chairman  
Defense Science Board**

**Panel Members**

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**Office of Science and Technology Representatives**

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**Charles Herzfeld**

**Consultant**

**Michelle Van Cleave**

**Assistant Director for National Security**

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# PCAST

## Panel on High Performance Computing and Communications

*Terms of Reference*  
*Panel Members*

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THE WHITE HOUSE  
WASHINGTON

MEMORANDUM FOR SOLOMON J. BUCHSBAUM  
President's Council of Advisers on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY  
Chairman, PCAST

SUBJECT: Terms of Reference for the PCAST Panel on  
High Performance Computing and Communications

You are requested to chair a PCAST Panel on High Performance Computing and Communications.

The purpose of this Panel is to enable PCAST to advise the President on issues related to high performance computing and communications that have a bearing on long-range national goals, government regulation, the transition of Federal programs to industry, participation of the States, and foreign access.

The U.S.'s technological leadership in computing, communications, and applications is critical to its ability to compete effectively in world trade. Maintaining a strong national defense capability is also directly related to the advancement and application of computing and digital communications technology. There is a five-year history of development for a Federal initiative in high performance computing supported by reports authored by participants from academia, industry, the National Academy of Sciences, the National Research Council, the White House Science Council, the Office of Technology Assessment, and professional societies, that include the Institute of Electrical and Electronics Engineers and the Society for Industrial and Applied Mathematics. The Office of Science and Technology Policy (OSTP) and the Federal Coordinating Council for Science, Engineering and Technology (FCCSET) have issued six reports that have led to plans for such an initiative. Federal science agencies, including DOD, NSF, DOE, and NASA, have created major programs that support the initiative. Congress has shown growing interest as well: three pieces of legislation are active, and a fourth is under development. The goal is to maintain and extend U.S. leadership, encourage additional U.S. sources of production, quicken the pace of innovation by diffusing the technology into the research and education communities, and increase U.S. productivity and competitiveness through networked computing in analysis, design and manufacturing. Finally, the OSTP report, The Federal High Performance Computing Program, issued on September 8, 1989, calls for an advisory panel consisting of eminent individuals from industry and academia.



The Panel on High Performance Computing and Communications shall:

1. Conduct a one-time review of and advise on the goals and strategies proposed in The Federal High Performance Computing Program report of September 8, 1989.
2. Advise on an effective transition strategy to evolve the NREN (National Research and Education Network) into a commercial, high performance, general purpose national communications network serving the S&T community, business, educational institutions, and eventually the general public.
3. Advise on general societal needs that can be served by high performance computing suitably connected through digital networks, and identify means for a broad diffusion of the benefits of the High Performance Computing Program.
4. Identify major issues and decisions of a non-technical or semi-technical nature (e.g. standards, foreign participation, and regulatory issues) that will have a significant impact upon the ability of the private sector to remain viable and competitive.
5. Advise on ways of coping with, even exploiting, the various contrasting objectives in computational education. These include: theory vs. systems; scientific computing vs. business computing; research personnel vs. practicing professionals; production of Ph.Ds vs. other goals of higher education.

The Panel will submit its first report by December 31, 1990.

#### Administrative Provisions

- (a) This PCAST Panel on High Performance Computing and Communications shall satisfy the requirement of The Federal High Performance Computing Program's private sector panel to advise on issues related to long-range national goals, government regulation, transition of Federal programs to industry, participation of the States in the national program, and issues of foreign access.
- (b) Ad hoc working groups with participation not limited to the Panel members may be formed to assist the Panel in its work.

#### Duration

The Panel's activities and the continuing need for the Panel shall be reviewed annually by the Chairman of the PCAST.

### Chairman

The Panel Chairman shall convene meetings of the Panel at times and locations of the Chairman's choice in consultation with the Chairman of the PCAST.

### Vice Chairman

The Vice Chairman shall act in the stead of the Chairman at his request.

### Compensation

Private sector members of the Panel shall receive no compensation for their service. Their travel expenses and per diem subsistence shall be reimbursed in accordance with regulations which apply to persons serving intermittently in government service.

Temporary supporting staff of the Panel who are not Federal employees may be reimbursed in accordance with contracts developed by the OSTP in accordance with regulations which apply to temporary employees of the Executive Office of the President.

### Determination

I hereby determine that the formation of the PCAST Panel on High Performance Computing and Communications is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on High Performance Computing and Communications include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:

  
D. Allan Bromley

  
Date

**PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY**

**PANEL ON  
HIGH PERFORMANCE COMPUTING AND COMMUNICATIONS**  
as of July 10, 1991

**Chairman**

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**Solomon Buchsbaum**      **Senior Vice President  
Technology Systems  
AT&T Bell Laboratories  
Member of PCAST**

**Vice Chairman**

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**Ralph Gomory**      **President  
The Alfred P. Sloan Foundation  
Member of PCAST**

**Panel Members/Presenters**

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**Alan G. Chynoweth**      **Vice President  
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(201) 829-2100**

**Richard Hackborn**      **Vice President  
Peripherals  
Hewlett-Packard Company  
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**Sheryl Handler**      **President  
Thinking Machines Corporation  
245 First Street  
Cambridge, MA 02142  
(617) 876-1111**



|                    |                                                                                                                                                                               |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Paul G. Huray      | Senior Vice President for Research<br>University of South Carolina<br>106 Osborne Administration Building<br>Columbia, SC 29208<br>(803) 777-9520                             |
| Ken Kennedy        | Director<br>Center for Research on Parallel Computation<br>Rice University<br>P.O. Box 1892<br>Houston, TX 77251<br>(713) 285-5188                                            |
| George A. Keyworth | Director of Research<br>Hudson Institute<br>P.O. Box 26-919<br>Indianapolis, Indiana 46226<br>(317) 545-1000                                                                  |
| Joel Moses         | Professor<br>Department of Electrical Engineering<br>and Computer Sciences<br>Massachusetts Institute of Technology<br>Room NE43-407<br>Cambridge, MA 02139<br>(617) 253-8592 |
| John A. Rollwagen  | Chairman and Chief Executive Officer<br>Cray Research, Inc.<br>1200 Northstar East<br>608 Second Avenue<br>Minneapolis, MN 55402<br>(612) 333-5889                            |
| Larry L. Smarr     | Director<br>National Center for Supercomputing Applications<br>University of Illinois<br>605 East Springfield Avenue<br>Champaign, IL 61820<br>(217) 244-0079                 |
| Joseph B. Wyatt    | Chancellor<br>Vanderbilt University<br>211 Kirkland Hall<br>Nashville, TN 37240<br>(615) 322-2168                                                                             |

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Office of Science and Technology Representatives

|             |                                                             |
|-------------|-------------------------------------------------------------|
| Eugene Wong | Associate Director for Physical Sciences and<br>Engineering |
|-------------|-------------------------------------------------------------|

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# PCAST

**Panel on Global Environment and Natural Resources**

*Terms of Reference*  
*Panel Members*

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THE WHITE HOUSE  
WASHINGTON

June 11, 1991

MEMORANDUM FOR THOMAS E. LOVEJOY  
President's Council of Advisors on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY

SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
GLOBAL ENVIRONMENT AND NATURAL RESOURCES

You are requested to establish a PCAST Panel on Global Environment and Natural Resources.

The purpose of the Panel is to enable the PCAST to provide private sector input to the President on issues related to natural resources and environmental sciences.

Global environmental and natural resource issues are receiving increasing attention. The economic and social consequences of global environmental changes, both natural and human induced, are complex, and only partially clear. Programs to address such changes require policy decisions based on adequate scientific knowledge. For example, the behavior of the linked ocean, atmosphere, land system and their biotic components are at best only roughly understood. Recent reports developed by the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) National Research Council/ National Academy of Sciences (NAS), the International Geosphere-Biosphere Program (IGBP), and the Intergovernmental Panel on Climate Change (IPCC) all indicate the need for additional research to provide a predictive understanding of the Earth System.

The increasing pressure of human population on biological resources and ecosystems is resulting in erosion of biological diversity (species of plants and animals). These represent important genetic resources, sources of information about living systems, and environmental indicators. In addition, as biological communities (ecosystems), they perform important forecast and other functions in biogeochemical cycles and watershed maintenance.

The Panel on Global Environment and Natural Resources shall:

1. Identify areas of potential interaction and collaboration with the private sector in climate change research.
2. Advise on general societal needs that can be served by natural resources, earth and environmental scientific research.
3. Advise on research needed to protect biological diversity and the impact of human population upon it.



The Panel will submit a preliminary report to the PCAST within 3 months after the Panel's first meeting.

The Office of the Assistant Director for the Environment, Office of Science and Technology Policy will sponsor this Panel. Dr. Thomas E. Lovejoy will serve as Chairman. Dr. Nancy Maynard will serve as Executive Secretary and Mr. William Snyder will represent the PCAST Secretariat Representative.

Determination

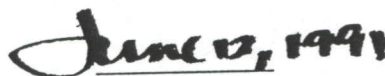
I hereby determine that the formation of the PCAST Panel on Global Environment and Natural Resources is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on Global Environment and Natural Resources include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:



D. Allan Bromley  
Assistant to the President  
for  
Science and Technology

  
Date

**PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY**

**PANEL ON  
GLOBAL ENVIRONMENT AND NATURAL RESOURCES  
as of July 10, 1991**

**Chairman**

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|-----------------------|-----------------------------------------------------------------------------------------------------|
| <b>Thomas Lovejoy</b> | <b>Assistant Secretary for External Affairs<br/>The Smithsonian Institution<br/>Member of PCAST</b> |
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**Vice Chairmen**

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|                      |                                                                              |
|----------------------|------------------------------------------------------------------------------|
| <b>David Packard</b> | <b>Chairman of the Board<br/>Hewlett-Packard Company<br/>Member of PCAST</b> |
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|-----------------------|------------------------------------------------------------------------------------------|
| <b>Norman Borlaug</b> | <b>International Maize and Wheat<br/>Improvement Center (CIMMYT)<br/>Member of PCAST</b> |
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**Panel Presenters**

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**Not yet submitted**

**Office of Science and Technology Policy Representatives**

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|----------------------|-----------------------------------------------|
| <b>Nancy Maynard</b> | <b>Assistant Director for the Environment</b> |
|----------------------|-----------------------------------------------|

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# PCAST

## Panel on Megaprojects in the Sciences

*Terms of Reference*  
*Panel Members*  
*Letter Sent to Panel Members*

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THE WHITE HOUSE  
WASHINGTON

May 9, 1991

MEMORANDUM FOR JOHN McTAGUE

FROM: D. ALLAN BROMLEY *Alan*  
SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
MEGAPROJECTS IN THE SCIENCES

You are requested to establish a PCAST Panel on Megaprojects in the Sciences.

The purpose of the Panel is to develop information and policy options to provide a base for PCAST advice to the President on national and international policy issues related to the planning, financing and organization of large scale projects in the sciences, otherwise known as megaprojects.

Megaprojects in the sciences are unique in character and are so costly that it is becoming increasingly difficult for one country to fully finance them. Even when the burden of costs is borne by one country, the benefits are often shared by many nations. They require long lead time for planning and construction. They affect scientists in many nations, either via distributed research projects or widespread use of central facilities. Thus, they are inherently international in nature even when totally financed by one country.

This topic is particularly timely. Its importance was discussed recently at the Informal Meeting of Science Advisors To Heads of Government at Mount Kisco, New York and at the first meeting of the US-European Commission (EC) Joint Consultative Group in Washington in February, when it was agreed to establish a US-EC task group to discuss megaprojects in preparation for the Spring 1992 Organisation for Economic Co-operation and Development (OECD) Ministerial Meeting, at which megaprojects will be a major topic.

PCAST advice is also important because of increased pressures on funding for individual principal investigators in the face of constrained budgets. Thus, escalating costs of scientific instrumentation and facilities, coupled with these budgetary constraints, point to a need to consider international cooperation in funding megaprojects.

A subcommittee of the Committee on International Science, Engineering and Technology (CISSET) of the Federal Coordinating Council for Science, Engineering and Technology (FCCSET) is currently examining this issue. It is expected that the

PCAST panel will utilize studies prepared for the Ciset deliberations on megaprojects.

The Panel on Megaprojects in the Sciences shall:

1. Address the relative roles of megaprojects and smaller investigator-initiated science projects.
2. Characterize the role of the scientific community in terms of the proposal and planning of megaprojects.
3. Advise on an appropriate approach to the planning and coordination of such projects domestically. This might include identification of lead agency responsibilities and consideration of whether megaprojects should be handled all together or considered individually.
4. Advise whether a comprehensive international framework for coordination and cooperation is desirable, and how countries could cooperate to ensure that the cost and benefits of big science projects are shared equitably.
5. Suggest the most appropriate international fora, governmental and scientific, in which such cooperation could be further discussed and coordinated (for example, OECD, United Nations, International Council of Science Unions (ICSU), and/or the group of seven economic summit countries (G-7)). The US is currently developing a position regarding megaprojects for the Spring 1992 OECD Ministerial Meeting.
6. Examine mechanisms and criteria for country participation. How can country participation in planning and organization be ensured without jeopardizing the design and organization of the projects? Some observations of successful and unsuccessful administrative/executive arrangements relating to past or current international megaprojects would be useful.
7. Consider ways to increase continuity of commitment and sustained life-of-project funding by the United States. Many countries are reluctant to cooperate with the United States on large scale projects due to U.S. difficulties in ensuring funding over a long term, even after we have a Presidential commitment. Consideration of highly credible arrangements, such as treaties would be examined.



The Panel will be established on a temporary basis and will complete its charge in six to nine months. In addition to providing the advice on the specific items listed above, the Panel will serve as a sounding board on related topics/issues in the interim and possibly after its charge is complete.

The Panel will submit a preliminary report to PCAST within three months after the Panel's first meeting.

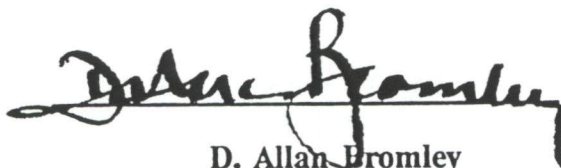
The Office of the Associate Director for Policy and International Affairs, Office of Science and Technology Policy will sponsor the Panel. Dr. John McTague will serve as Chairman of the Panel and Dr. Harold Shapiro will serve as Vice Chairman.

Determination

I hereby determine that the formation of the PCAST Panel on Megaprojects in the Sciences is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST panel on Megaprojects in the Sciences include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:



D. Allan Bromley  
The Assistant to the President  
for  
Science and Technology

May 9, 1991  
Date



PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY

PANEL ON  
MEGAPROJECTS IN THE SCIENCES  
as of July 10, 1991

Chairman

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|              |                                                                              |
|--------------|------------------------------------------------------------------------------|
| John McTague | Vice President<br>Technical Affairs<br>Ford Motor Company<br>Member of PCAST |
|--------------|------------------------------------------------------------------------------|

Panel Presenters

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|                |                                                                                                                                |
|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| D. James Baker | President<br>Joint Oceanographic Institutions, Inc.<br>1755 Massachusetts Avenue, NW<br>Suite 800<br>Washington, DC 20036-2102 |
|----------------|--------------------------------------------------------------------------------------------------------------------------------|

|              |                                                                        |
|--------------|------------------------------------------------------------------------|
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|                |                                                                                                        |
|----------------|--------------------------------------------------------------------------------------------------------|
| James M. Beggs | Chairman<br>SPACEHAB Incorporated<br>Suite 201 West<br>600 Maryland Avenue, SW<br>Washington, DC 20024 |
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|                |                                                                                                                  |
|----------------|------------------------------------------------------------------------------------------------------------------|
| Jack Sandweiss | Professor<br>Department of Physics<br>503 J.W. Gibbs<br>260 Whitney Avenue<br>Yale Avenue<br>New Haven, CT 06511 |
|----------------|------------------------------------------------------------------------------------------------------------------|

|                   |                                                                                                                                                   |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Edward A. Frieman | Director<br>Scripps Institution of Oceanography<br>University of California, San Diego<br>9500 Gilman Drive, Mail Code 0210<br>La Jolla, CA 92093 |
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Office of Science and Technology Representatives

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|                     |                                                            |
|---------------------|------------------------------------------------------------|
| J. Thomas Ratchford | Associate Director for Policy and International<br>Affairs |
|---------------------|------------------------------------------------------------|

EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF SCIENCE AND TECHNOLOGY POLICY  
WASHINGTON, D.C. 20506

June 27, 1991

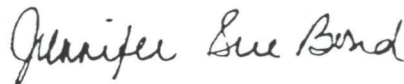
Dear Mr. Beggs:

Dr. John McTague, Chairman of the Panel on Megaprojects in the Sciences of the President's Council of Advisors on Science and Technology (PCAST), has asked that you be sent the following as background reading:

- o "International Issues Associated with Megascience Projects," (Tab A) a draft document that discusses many of the issues of concern to the PCAST panel. Please note that it is "work in progress." Your comments would be welcome.
- o "Science Megaprojects: Status and Funding, February 1991," (Tab B) a report from the Congressional Research Service covering several large science projects and budget initiatives in the President's FY 1992 budget request;
- o A section on "Science Megaprojects," from a recent report from the Office of Technology Assessment entitled Federally Funded Research: Decision for a Decade; enclosed as Tab C; and
- o Materials related to FY 1992 Space Station Freedom funding, including Dr. Bromley's letters to the Congress, letters received from various foreign officials, and Congressional testimony by the State Department. (Tab D)

As noted in Dr. Bromley's letter to you of May 10, 1991, Dr. J. Thomas Ratchford, Associate Director for Policy and International Affairs, is the OSTP representative on the PCAST Panel. Please feel free to call Dr. McTague, Dr. Ratchford, or me with any questions or comments you may have.

Sincerely,



Jennifer Sue Bond  
Senior Policy Analyst

cc: John McTague  
J. Thomas Ratchford

Mr. James M. Beggs  
Chairman  
SPACEHAB Inc.  
Suite 201 West  
600 Maryland Avenue, S.W.  
Washington, D.C. 20024

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# PCAST

## Panel on Bioscience and Biotechnology

*Terms of Reference  
Panel Members*

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THE WHITE HOUSE  
WASHINGTON

June 11, 1991

MEMORANDUM FOR DANIEL NATHANS  
President's Council of Advisors on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY

SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON  
BIOSCIENCE AND BIOTECHNOLOGY

You are requested to establish a PCAST Panel on Bioscience and Biotechnology.

The purpose of the Panel is to enable PCAST to advise the President on national policy issues related to the health of the American people and the international competitiveness of the nation's biotechnology industries. The principal focus of the panel will be on the role of bioscience and biotechnology in promoting these national goals.

Since the post-World War II period the United States has been the leading contributor to knowledge in the life sciences, due largely to federal support of research and training. The returns on this investment include major improvements in the health of the American people and United States leadership in the biotechnology and pharmaceutical industries. We are in a golden age of the biosciences in which basic discoveries are made at a rapid rate, many with direct relevance to human health, food production, and the environment. To maintain our leadership we need to coordinate the role of the Federal Government with those of industry, universities, and others in order to optimize the development and application of new knowledge. The challenge for the Panel is to consider these roles, especially the Federal role, in terms of specific policy alternatives. In doing so the Panel should take advantage of the recent reports on these issues, particularly those of the President's Council on Competitiveness, the Federal Coordinating Council for Science, Engineering, and Technology, the National Science Foundation, the National Institutes of Health, and others.

The Panel on Bioscience and Biotechnology shall:

- o Review particularly promising opportunities in bioscience and biotechnology relevant to health.
- o Examine the Federal commitment to research in bioscience and biotechnology in relation to the conclusions drawn from item 1 above.
- o Evaluate human resource needs in bioscience and biotechnology and recommend ways by which the Federal Government can help meet those needs.

- o Review current and possible future governmental policies that will enhance basic research in the life sciences and long term research and development by the biotechnology industry.
- o Identify regulatory barriers to innovation, and alternative measures that would minimize such barriers consistent with protection of the health and safety of the public.
- o Evaluate current policies related to the transfer of biotechnology from federally supported laboratories to American industry and recommend ways to enhance the transfer process.

The Panel shall submit a preliminary report to the PCAST within 3 months after the Panel's first meeting.

The Office of the Associate Director for Life Sciences, Office of Science and Technology Policy, will sponsor this Panel. Dr. Dan Nathans will serve as Chairman. Mr. William Snyder will represent the PCAST Executive Director.

#### Determination

I hereby determine that the formation of the PCAST Panel on Bioscience and Biotechnology is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on Bioscience and Biotechnology include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:



D. Allan Bromley  
Assistant to the President  
for  
Science and Technology



Date

**PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY**

**PANEL ON  
BIOSCIENCE AND BIOTECHNOLOGY  
as of July 10, 1991**

**Chairman**

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|                       |                                                                                                      |
|-----------------------|------------------------------------------------------------------------------------------------------|
| <b>Daniel Nathans</b> | <b>Professor of Molecular Biology and Genetics,<br/>Johns Hopkins University<br/>Member of PCAST</b> |
|-----------------------|------------------------------------------------------------------------------------------------------|

**Vice Chairman**

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|                       |                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Norman Borlaug</b> | <b>Distinguished Professor, Department of Soils and<br/>Crop Sciences, Texas A&amp;M University<br/>Member of PCAST</b> |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------|

**Panel Presenters**

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|                           |                                                                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Theodore Cooper</b>    | <b>President<br/>Upjohn Company<br/>Kalamazoo, MI 49001<br/>(616) 323-7094<br/>(Representing Pharmaceutical Manufacturing<br/>Association)</b>                                                                                   |
| <b>Arthur E. Humphrey</b> | <b>Professor and Director<br/>Center for Molecular Bioscience and Biotechnology<br/>Lehigh University<br/>Bethlehem, PA<br/>(215)758-5426</b>                                                                                    |
| <b>Ernest G. Jaworski</b> | <b>Former Vice President for Biological Sciences,<br/>Monsanto Company<br/>St. Louis, MO 63198<br/>(314) 694-6321<br/><br/>Mailing Address:<br/>Consultant<br/>800 North Lindburgh<br/>St. Louis, MI 63167<br/>Mail Code 02E</b> |



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**Philip A. Sharp**

**Professor of Biology and Director  
Center for Cancer Research  
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Cambridge, MA 02139  
(617)-253-6421**

**Edward Penhoet**

**Vice Chairman and Chief Executive Officer  
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(Representing Industrial Biotechnology Association)**

**Office of Science and Technology Representatives**

**D. A. Henderson**

**Associate Director for Life Sciences**

**Rachel Levinson**

**Assistant Director for Life Sciences**

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# **PCAST**

## **Panel on Education and Human Resources**

*Terms of Reference*  
*Panel Members*

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THE WHITE HOUSE  
WASHINGTON

June 12, 1991

MEMORANDUM FOR PETER LIKINS

President's Council of Advisors on Science and Technology  
(PCAST)

FROM: D. ALLAN BROMLEY

SUBJECT: TERMS OF REFERENCE FOR THE PCAST PANEL ON EDUCATION  
AND HUMAN RESOURCES

You are requested to establish a PCAST Panel on Education and Human Resources.

The purpose of this Panel is to enable PCAST to advise the President on issues related to education and human resources in the fields of science, technology, engineering, and mathematics.

The agenda for the Panel includes two tasks: (1) keeping abreast of work in the field, including the corresponding committee of the Federal Coordinating Council for Science, Engineering, and Technology, and providing an extragovernmental perspective on the work of governmental agencies and interagency groups; and (2) undertaking specific studies of potential interest to the President.

An example of the second task is the PCAST evaluation of strategies for meeting the National Goals for Education, as reported to the President in December of 1990.

The specific study next on the Panel's agenda focuses on the education of those extraordinary members of the population who have the capacity to reach the highest levels of achievement in science and engineering, with particular attention to those who teach such key contributors from childhood through doctoral studies. Unless our most talented citizens achieve their full potential in science and technology, the desired improvements in mass education in these fields will not be sufficient to assure the competitiveness of our Nation in the global economy.

The Panel on Education and Human Resources may discuss issues such as:

- o Is the education in science and mathematics most appropriate in childhood for students of high potential different in any way from that appropriate for other students? If so, can such high potential students be identified in childhood, even in the presence of such obscuring factors as poverty or deficiencies in family or community support?



- o What is the influence of early teachers and teacher behavior on the development of children of high potential in science and mathematics? How can teachers discover and develop such talents, particularly among girls and children of minority groups under-represented in these fields?
- o What are the effects of accelerated or enriched study on the development of high potential students in science and mathematics? What are the roles of parents, elementary and secondary school teachers, and adult mentors such as college professors, scientists and engineers?
- o Are undergraduate enrollments in engineering and the sciences an appropriate reflection of society's needs and the talents of the population? In particular, are these enrollments appropriate for women and under-represented minorities? If in any case inappropriate, can enrollments be altered? How? Can teachers make a difference?
- o Are graduate student enrollments in engineering and the sciences an appropriate reflection of society's needs and the talents of the population? Is the participation of U.S. citizens and permanent residents appropriate? If in any case inappropriate, can graduate enrollments be altered? How? Can teachers make a difference?
- o Are Ph.D. recipients likely to be available in sufficient numbers and quality to meet the demands for faculty in engineering and the sciences in the decade of the nineties? Is the current reliance on foreign-born faculty appropriate? Are women and currently under-represented minorities likely to be available in adequate numbers and quality to meet any special requirements in this area? If any of these questions suggests a negative response, what strategies can be devised to correct the anticipated deficiencies? Can teachers make a difference?

Additional questions will arise in the course of the study.

The Panel shall submit a preliminary report to the PCAST within 3 months after the Panel's first meeting.

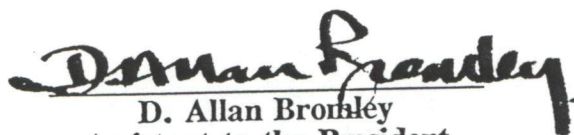
The Office of the Associate Director for Policy and International Affairs, Office of Science and Technology Policy, will sponsor this Panel. Dr. Peter Likins will serve as Chairman and Dr. Charles Drake will serve as Co-Chairman. Mr. William Snyder will represent the PCAST Executive Director.

#### Determination

I hereby determine that the formation of the PCAST Panel on Education and Human Resources is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

The Terms of Reference for the PCAST Panel on Education and Human Resources include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:



D. Allan Bromley  
Assistant to the President  
for  
Science and Technology

  
Date

PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY

PANEL ON  
EDUCATION AND HUMAN RESOURCES  
as of July 10, 1991

Chairman

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Peter Likins                      President, Lehigh University  
Member of PCAST

Vice Chairman

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Charles Drake                      Albert Bradley Professor of Earth Sciences and  
Professor of Geology, Dartmouth College  
Member of PCAST

Panel Presenters

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Paul Sally                      Professor  
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University of Chicago  
5801 South Ellis Avenue  
Chicago, Illinois 60637

Lauren Resnick                      Co-Director  
Learning Research and Development Center  
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Julian Stanley                      Professor  
Study of Mathematically Precocious Youth  
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Stephanie Marshall                      Executive Director  
Illinois Mathematics and Science Academy  
1500 West Sullivan Road  
Aurora, IL 60506-1039

Office of Science and Technology Policy Representatives

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J. Thomas Ratchford                      Associate Director for Policy and International  
Affairs



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# PCAST

## Panel on International Economic Competitiveness

*Terms of Reference*  
*Panel Members*

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THE WHITE HOUSE  
WASHINGTON

June 12, 1991

MEMORANDUM FOR RALPH GOMORY

President's Council of Advisors on Science and Technology  
(PCAST)

FROM:

D. ALLAN BROMLEY *Alan*

SUBJECT:

TERMS OF REFERENCE FOR PCAST PANEL ON  
INTERNATIONAL ECONOMIC COMPETITIVENESS

You are requested to establish a PCAST Panel on International Economic Competitiveness.

The purpose of this Panel is to enable PCAST to advise the President on issues in science and technology that affect U.S. economic competitiveness and quality of life.

The private sector today is facing severe competition from abroad where vastly improved industries are emerging even in the most advanced technical areas, and where the more traditional industries have shown great ability to improve their manufacturing process and development technologies. Industry abroad is also making effective use of the high skill level of some of the competitive work forces.

In addition there are foreign government policies closely supportive of emerging and strategic technologies and designated industries.

While product competitiveness is largely the result of the internal actions of individual firms, firms are also influenced by their surroundings. Familiar examples of this from the economic arena are cost of capital and tax structure.

But there are other and more technically oriented aspects of the surroundings as well.

First there is the availability of new scientific and engineering knowledge. This is the kind of knowledge that historically has launched whole new industries, radically different materials, or provided new sensors to make possible new instruments, etc. It is a longstanding Federal role to contribute here and many government agencies have focused on this.

The Report of the Panel on National Critical Technologies selected 22 technologies deemed critical to national economic prosperity and to our military security. The Department of Defense, in its "Critical Technologies Plan" presents dual-purpose technologies which are adaptable to enhancing the economic competitiveness of the private sector. The Department of Commerce has issued its "Emerging Technologies Report" which identifies 12 emerging technologies. Also, the private sector Council on Competitiveness issued "Gaining New Ground - Technologies Priorities for America's Future" identifies priorities for enhancing economic competitiveness.

With regard to technologies, President Bush has stated: "If America is to maintain and strengthen our competitive position, we must continue not only to create new technologies, but to learn to more effectively translate those technologies in commercial products."

In addition to new technologies there is a second aspect in the need for improvement of existing product. This includes research on existing process and manufacturing, or improved materials. Sometimes the availability of special and extreme instrumentation is useful. Sometimes it is the support of long range projects beyond a single firm's economic time horizon. Federal examples include Sematech and Brookhaven synchrotron light source.

A third competitiveness element is the availability of a technical labor force. This means vocational training as well as the training of scientists and engineers. To the extent that other panels do not deal with some aspects of this, I would like this to be included in the work of his committee.

In the areas of new technology, product improvement, and technical workforce I would like the Panel to:

- o Report on how best to enhance the partnership between the government and the private sector aiming at a major improvement in our competitive position, and
- o Discuss actions that the government and the private sector can take, together or separately, aimed at enhancing our competitive posture.

The Panel shall submit a preliminary report to the PCAST within 3 months after the Panel's first meeting.

The Office of the Associate Director for Industrial Technology, Office of Science and Technology Policy, will sponsor the Panel. Dr. Ralph Gomory will serve as Chairman and Dr. Harold Shapiro will serve as Vice Chairman. Mr. William Snyder will serve as the PCAST Secretariat Representative.

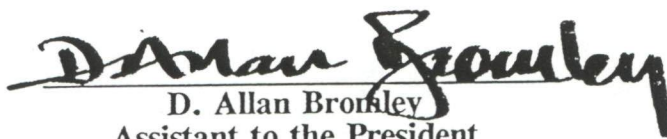
#### Determination

I hereby determine that the formation of the PCAST Panel on International Economic Competitiveness is in the public interest in connection with the performance of duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.



The Terms of Reference for the PCAST Panel on International Economic Competitiveness include no assignment requiring Panel members to participate personally and substantially in the conduct of any specific procurement, or place any member in the position of acting as a "procurement official."

Approved:

A handwritten signature in dark ink, appearing to read "D. Allan Bromley", written over a horizontal line.

D. Allan Bromley  
Assistant to the President  
for  
Science and Technology

June 12, 1991  
Date

**PRESIDENT'S COUNCIL OF ADVISORS  
ON SCIENCE AND TECHNOLOGY**

**PANEL ON  
INTERNATIONAL ECONOMIC COMPETITIVENESS  
as of July 10, 1991**

**Chairman**

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**Ralph Gomory**

**President  
The Alfred P. Sloan Foundation  
Member of PCAST**

**Vice Chairmen**

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**Harold Shapiro**

**President  
Princeton University  
Member of PCAST**

**Panel Presenters**

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**Not yet submitted**

**Office of Science and Technology Policy Representatives**

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**William D. Phillips**

**Associate Director for Industrial Technology**