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Materials Research Plays a Role in Broader Science Issues of PCAST 2002 Reports and 2003 Agenda

The President's Council of Advisors on Science and Technology (PCAST), co-chaired by Presidential Science Advisor Jack Marburger and E. Floyd Kvamme, a partner with Kleiner, Perkins, Caufield & Byers, a high-technology venture capital firm, drafted four reports in 2002 and calls for three additional ones in 2003, in response to the administration's various science and technology initiatives.

Most notable is the report "Assessing U.S. R&D Investment," which drew significant media attention. The report was produced by the PCAST Subcommittee on Federal Investment in Science and Technology and Its National Benefits, chaired by G. Wayne Clough, president of the Georgia Institute of Technology.

The subcommittee was charged with exploring issues surrounding the historical patterns of federal investment in S&T. To that end, it held a series of hearings with both private- and public-sector organizations to gain insight into the prevailing issues. It also commissioned a study by the RAND Corporation to examine trends and patterns of federal support of R&D over the past 25 years, comparing U.S. investment in both the federal and private sectors to that of other countries that compete with the United States in the global marketplace.

Based on that input, the report, released on October 16, 2002, recommended targeting the physical sciences—including materials, metallurgy, and the electrical, mechanical, and chemical engineering fields—for future funding increases, striking a balance with previous increased funding for the life sciences. The report acknowledges that breakthroughs in life sciences rely on the support of the physical sciences. Furthermore, the report points out, research in the physical sciences is required for national defense and economic development in the areas of semiconductors, advanced materials, and energy efficiency.

With the previous decrease in funding of the physical sciences came a decrease in students pursuing physical science degrees. Yet, in citing IBM as an example, the report found that 97% of the researchers with doctorate degrees who work at IBM in the area of nanotechnology hold degrees in the physical sciences. In addition, half of the students in science and engineering doctoral programs in U.S. institutions are not U.S.-born. Noting the declining workforce in the physical sciences in the United States, the report recommends government programs to attract

U.S.-born students and to retain non-U.S. students once they have completed their program.

PCAST's report on combating terrorism, released on September 5, 2002, urged the Bush administration to significantly elevate the role of S&T in the newly established Department of Homeland Security (DHS). The panel behind this report was chaired by Norman R. Augustine, former chair and CEO of Lockheed Martin Corporation. The report calls for an under-secretary of S&T within DHS and for R&D to be conducted under nonconventional scientific collaboration. The report cites relevant research currently conducted in U.S. government agencies and departments, including materials-related programs within the National Science Foundation and the Departments of Commerce, Defense, and Energy.

Among PCAST's other reports were a study of broadband supply and demand, including materials-related input, particularly by the Semiconductor Industry Association; and a report on improving energy efficiency. The latter emphasizes the need for R&D in the area of high-temperature superconductors in order to increase the energy efficiency of electricity transmission. The 2002 reports can be accessed at Web site www.ostp.gov/PCAST/pcast.html.

This year promises to be just as busy for PCAST. The 2003 agenda calls for three additional studies on equally complex topics. One study will explore more fully the workforce issue raised in "Assessing U.S. R&D Investment," while another is specifically aimed at manufacturing, most notably the long-term ramifications of the growing amount of high-tech manufacturing being done outside the United States and its potential impact on U.S. leadership in high-tech fields.

The third study will involve the entire panel in an exploration of federal invest-

ment in nanotechnology, identifying the grand challenges of the field that should be targeted as funding priorities. With such a huge area to cover, PCAST has assigned three subcommittees for that report alone, focusing on energy, biotechnology, and semiconductors and materials. Clough will chair the third subcommittee.

PCAST's future beyond 2003 is uncertain; the panel is traditionally appointed for two-year periods. President Bush must decide whether the panel's activities and input are worthwhile and whether to authorize another two-year term, by the end of this year, according to Kvamme.

PCAST follows a long tradition of presidential S&T advisory panels dating back to Eisenhower and Truman. It was established in 1990 to provide the president with advice from the private sector and academic community on technology, scientific research priorities, and math and science education. The current panel was appointed by President Bush in early December 2001, and its 23 members come from industry, educational institutions, and research organizations.

South African Official Receives Honorary Degree in Recognition of His Leadership in National Science and Research Efforts

South African Minister of Arts, Culture, Science, and Technology, Dr. Ben Ngubane, has accepted the conferment of the Doctorate of Philosophy from the government's Department of Science and Technology and the Medical University of South Africa (MEDUNSA) during the MEDUNSA graduation ceremony in May. Ngubane was recognized for leadership that paved the way for the newly established Department of Science and Technology to make major contributions to the economic development of South Africa and the quality of life of its citizens through research, development, and innovation.

DOE Issues Call for Research Proposals in Hydrogen Storage

In support of the President's Hydrogen Fuel Initiative, the U.S. Department of Energy issued a "Grand Challenge" to the scientific community to solicit applications for the research and development (R&D) of hydrogen-storage materials and technologies. A total of \$150 million, subject to congressional appropriations, will be invested through the Grand Challenge to support universities, national laboratories, and industry over the next five years. In addition to applied R&D, a major focus will be on basic research to improve the fundamental understanding of hydrogen storage in solid-state materials, including the impact and potential benefits of nanoscale effects. Grants are expected to cover a broad range of ideas, including new materials, nanostructures, metal hydrides, chemical hydrogen storage, carbon, compressed and liquid hydrogen, and both on-board and off-board hydrogen-storage technologies. Proposals are due September 30, 2003. More information can be obtained at Web site <http://www.eere.energy.gov/hydrogenandfuelcells>.

Ngubane has led the development of policies and strategies for his science and technology portfolio in South Africa since his appointment as minister in 1994. In October 2002, the South African Cabinet approved the National Research and Development Strategy, aimed at building capacity to replace and reinvigorate the country's aging community of active scientists. The strategy also identifies new research missions and areas where South Africa will seek scientific and research excellence and aims to recruit and retain scientists from previously disadvantaged communities.

Ngubane has also been instrumental in enabling South Africa to be a major international science and technology player. He chairs the Commonwealth Science Council (CSC), which aims, among other goals, to strengthen and foster mutually beneficial collaborations between developed and developing countries in harnessing science and technology (S&T) for sustainable development.

Most recently, the European Union/

Africa Caribbean Pacific (EU/ACP) ministerial meeting approved €50 million (USD ~\$57.6 million) for building the S&T infrastructure for the ACP countries. This venture was initiated and chaired by Ngubane in an 18-month negotiation process with his counterparts in the European Union.

China's Hefei Institutes of Physical Science Officially Inaugurated

The nameplate for the Chinese Academy of Sciences (CAS) Hefei Institutes of Physical Science (HIPS) was officially unveiled on May 27 in Hefei, the capital of southern China's Anhui Province. CAS President Lu Yongxiang and vice governor of the Anhui Province, Zhang Ping, attended the ceremony.

Established on the basis of the former Hefei Branch of the CAS in December 2001, HIPS is made up of four research institutes, namely, the Institute of Solid-State Physics, the Anhui Institute of Optics and Fine Mechanics, the Institute of Plasma Physics, and the Hefei Institute of Intelligent Machines.

Headed by Xie Jikang, whose expertise is in plasma physics and controlled nuclear-fusion research, HIPS pursues research in eight areas: plasma physics and magnetic confinement fusion, atmosphere optics, nanoscience and materials physics, environmental optics and monitoring, high-magnetic-field science and technology, ion-beam bioengineering, laser application technology, and cryogenic and superconducting magnet technology.

HIPS has a staff of about 2000, among whom 1000 are scientists and technicians. It also has 680 graduate students, postdoctoral researchers, and visiting scholars.

Euro-Mediterranean Area Strengthens S&T Cooperation

The European Commission has announced two new agreements for science and technology (S&T) cooperation, one with Morocco and one with Israel.

The first agreement, signed in May by the European Commissioner for Research, Philippe Busquin, and the Moroccan Minister for Scientific Research, Omar

Fassi-Fehr, will make it easier for Moroccan universities, companies, and research centers to participate in the European Union's (EU's) 6th Research Framework Programme (FP6) (2003–2006). It will open Moroccan activities to participation by European researchers and enable sharing of intellectual property rights generated by joint activities. Implementation of the agreement will be managed through an EU–Morocco joint committee. The EU has been engaged for many years in various forms of S&T cooperation with Morocco. Nearly 170 joint projects have been undertaken to date by European and Moroccan research teams, from water management to agricultural research. Previous projects included independent solar reactors for water purification and processes for studying ancient ceramics and earth glass compounds.

The second agreement, signed in June by Busquin and Israel's Minister of Science, Eliezer Zandberg, reinforces five years of collaboration between Israel and the EU. Israeli scientists and technologists have participated in research areas such as information-society technologies, nanotechnology, aeronautics, and the life sciences, which are now of particular importance in FP6. Israeli partners have participated in more than 600 EU-backed research projects during the 5th Framework Programme (1998–2002), a fourth of them coordinated by Israeli project leaders. Dealing with human resources, science and society matters, and small and medium-sized enterprises will be among the issues addressed in the context of the new research agreement between Israel and the EU. □

European Commission Issues Report on Energy Outlook in Next 30 Years

The European Commission (EC) has released its report, "World Energy, Technology and Climate Policy Outlook 2030—WETO," which is available at Web site http://194.185.30.69/energysite/gp/gp_pubs_en.html. The report positions Europe in a global context as it addresses world energy projections (including future energy demand and supply, carbon dioxide emissions, and fossil-fuel production and prices), energy technology progress (including learning curves and specific cases for power-generation technologies), and the impact of climate-change policy (including a CO₂ emission-abatement case and the consequences of accelerated technological development).

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