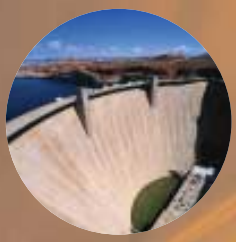
2006
Annual Report

NATIONAL ACADEMY OF ENGINEERING





ENGINEERING THE FUTURE

NATIONAL ACADEMY OF ENGINEERING
OF THE NATIONAL ACADEMIES

Letter from the President

Wm. A. Wulf

As I write this, I am approaching the end of my second and final term as the President of NAE. I step down on June 30, so this is my last annual report. Looking back over the last 11+ years, I'm extremely pleased with the continued evolution of the NAE and the National Academies overall as institutions that make vital contributions to the national debate on issues at the intersection of engineering, technology and public policy. It has been a great pleasure to serve you and the NAE, and I thank the members of the NAE and staff of the Academies for their support as well as our many friends in Congress and the Executive Branch for their collegial interactions.

As members of the Academy know, a nominating committee elected by Academy members, representing each section of the Academy and chaired by former University of Michigan President, James Duderstadt, selected Charles M. Vest, President Emeritus of the Massachusetts Institute of Technology, as the candidate to be the next president of the NAE. I want to congratulate Chuck on his selection and thank the nominating committee for their efforts.

It is tempting to engage in a retrospective of the NAE over my tenure. I'm reminded, however, that this is the 2006 annual report, so I'll limit my comments to activities which have occurred over the last year. I would like to tie them, though, to the general observation that international activities are an increasingly important component of NAE's mission to promote the technological welfare of the nation. The U.S. technological workforce, for example, depends significantly on foreign-born scientists and engineers, and many U.S. companies conduct a substantial portion of their business outside the United States. In addition, the increased science and engineering capacity of developing countries will fundamentally affect our future as well as theirs. Promoting the technological welfare of our nation will increasingly require taking into account the international dimensions of technology, policy, and their interaction.

In this regard, I am deeply worried that, in the midst of legitimate concerns about illegal immigration and terrorism, the benefits to the United States of *legal* immigration are being overlooked. For decades we have attracted the "best and brightest" from around the world, and we are both more prosperous and more secure because of that. Two current issues, visas and "deemed exports," are important to our continued access to that talent. The Academies have made our views known on the former and I'm pleased that the general situation for foreign students receiving visas has continued to improve in the last year.

The issue of "deemed exports" is, in some ways, more pernicious. Congress long ago decided that disclosure of information about a controlled technology to a foreign national, is "deemed" to be an export of the technology itself. Recent findings by the Inspectors General of several agencies suggested that even a simple use of such a technology for basic research—use of a laboratory instrument, for example—should also be considered an export and require a special license. Since these licenses are difficult to get, this has the potential to effectively preclude foreign students, ones that are legally here, from participating in academic engineering research. The Academies have also been active in this debate and, in October, the U.S. Department of Commerce created a 12-member advisory committee to address the issue. NAE member Norm Augustine chairs the committee, and NAE members Ruth David and I serve on it. The work of the Deemed Export Advisory Committee is very important because the wrong policy could do enormous damage to engineering graduate education, and hence to U.S. access to the best talent from around the world.

Further on internationalization, in June I attended the Annual Meeting of the Chinese Academy of Engineering in Beijing. The entire top leadership of China was present, along with 3,000 of the best scientists and engineers in the country. China's President Hu gave the keynote address, the subject of which was making China an innovation-driven nation. The items on his agenda included education, research, intellectual property rights, and making China an attractive place for people from inside *and outside* China to pursue science and engineering careers. As China and India become increasingly successful at science, technology and innovation, the U.S. will have to work both hard and smart in order to maintain its competitive edge.

How to do so is precisely the subject of the Academies report, *Rising Above the Gathering Storm*, released last year. The report effort arose when several members of Congress asked us to help them address the question of how the United States can prosper in the 21st century. The report continues to generate great interest and although not as much legislative action as we would like happened last year, the prospects for this year look good. As a follow-up, in September, the Academies convened a meeting of state representatives to see what they could do at the state and regional level to augment the federal response. Eight hundred people, including representatives from all 50 states, attended and another 200 participated by video conference from locations across the country. Speakers included four senators (Pete Domenici, Kay Bailey Hutchison, Lamar Alexander, and Jeff Bingaman), one congressman (Sherwood Boehlert), and one cabinet secretary (Elaine Chao). The meeting generated some excellent ideas about how states can support the agenda laid out in the *Gathering Storm*.

Another NAE activity with an international component is the Frontiers of Engineering (FOE) program, which brings together competitively selected younger engineers who represent the full spectrum of engineering disciplines, about equally divided between academic and industrial participants, to explore cutting-edge research in several engineering fields. We now hold three Frontiers symposia each year—one for U.S. participants and two bilateral international symposia, with Japan and Germany. In 2006, we held our first

bilateral meeting with India and a second is planned for 2008. To me, the most important outcome of these yearly meetings is that they are building a network of future engineering leaders—across fields, across the university-industry divide, and across countries and cultures. Additionally, we have experimented by holding the FOE symposia at industrial research facilities. One of the strengths of the FOE program has been to encourage academic-industrial interactions, and this simple change of venue has greatly increased those interactions. I invite companies interested in finding out about hosting an FOE meeting to contact me.

In November, NAE hosted a workshop on the "outsourcing" of engineering jobs. The issue of outsourcing is far more complex and nuanced than the way it is portrayed in the media. We hope to have a report of the proceedings available in the Spring of 2007. The most interesting outcome to me, however, was that lower labor costs in other countries is not a primary driver for outsourcing engineering—access to talent and markets dominates corporate decisions to outsource.

Continuing the international theme, the NAE 2006 Annual Meeting was a great success and we were privileged to have Calestous Juma, Distinguished Professor of the Practice of International Development at Harvard as a guest speaker. His talk focused on the essential role of engineers in sustainable development in developing countries.

Finally, a note on a subject a little closer to home. One of my long-standing objectives has been for NAE to become more actively involved in activities to promote engineering ethics. A few years ago I convened a small committee to recommend what the academy might do to further that goal. One of their recommendations was to create an online portal through which people could access information on the subject. I am pleased to report that NAE will soon host the "Online Ethics Center," which will do that and more. It's the first concrete step toward a sustained involvement of the NAE in this important subject.

The pages that follow describe the broad scope of NAE work done in 2006 in more detail. These activities have been conceived and executed to pursue our goal of proactively "promoting the technological welfare of the nation." This report also lists the financial support of our members and friends, whose generous financial contributions help allow the NAE to continue making meaningful contributions to the well-being of the nation. We are deeply grateful for their support. Thank you.

Wm. A. Wulf
President

In Service to the Nation

Every day our nation faces questions related to engineering and technology. How can we keep our nation safe from terrorism? How can we increase diversity in the engineering workforce? What role should citizens play in decisions about technology development? How can we help journalists and others in the media provide accurate, timely information on engineering and technology? Answering these questions is becoming increasingly difficult as we advance technologically and become more involved in the global community.

Since 1964, the National Academy of Engineering (NAE) has provided independent, objective advice to the nation on engineering-related topics and policies. NAE operates under the same congressional act of incorporation that established the National Academy of Sciences, signed in 1863 by President Abraham Lincoln. Under this charter, NAE is directed "whenever called upon by any department or agency of the government, to investigate, examine, experiment, and report upon any subject of science or art."

NAE has about 2,400 peer-elected members and foreign associates, approximately 47 percent from academia, 45 percent from industry, and 8 percent from nonprofit institutions and government. NAE members are drawn from bioengineering, computer science, electronics, aerospace, earth resources, electric power and energy systems, civil engineering, mechanical engineering, chemical engineering, industrial engineering, materials engineering, and interdisciplinary engineering. They serve as members of research and study committees, plan and conduct symposia and workshops, and assist in the work of the organization in many other ways. Areas of focus include working collaboratively at home and abroad to identify and solve technological problems, assessing the technological needs of the nation and sponsoring programs to meet those needs, advising Congress and government agencies on engineering-related matters of national importance, and recognizing and honoring outstanding engineers for their contributions to the well-being of the nation and the world.

NAE not only responds to requests from government, but also conducts activities sponsored by foundations, industry, and state and local governments and funds projects through endowment funds supported by private contributions. Thus, NAE is a unique organization that brings together distinguished engineers for the purpose of improving the lives of people everywhere.

NAE is a member of the National Academies, which also includes the National Academy of Sciences, Institute of Medicine, and National Research Council.

Mission Statement

To promote the technological welfare of the nation by marshalling the expertise and insights of eminent members of the engineering profession.

PROGRAM REPORTS

Engineering Education

The Committee on Engineering Education (CEE), a standing committee of the National Academy of Engineering, is composed of thought leaders and experts from the business, academic, and public sectors who have demonstrated a commitment to the advancement of engineering education. The mission of CEE is to provide guidance and advice to policy makers, administrators, employers, and other stakeholders to ensure quality, diversity, and quantity in engineering education and the engineering workforce.

In 2006, CEE focused its efforts on developing projects to leverage the success of the Engineer of 2020 Project, which produced two highly influential reports, one in 2004 and one in 2005. CEE assisted NAE staff in securing funding for a workshop, "The Engineering Curriculum: Understanding the Design Space and Exploiting Opportunities," to be held in 2007. The workshop will focus on how curricular structure, content, and sequencing affect the learning of fundamental science and mathematics concepts and will suggest how fundamental concepts can be related explicitly to core engineering courses.

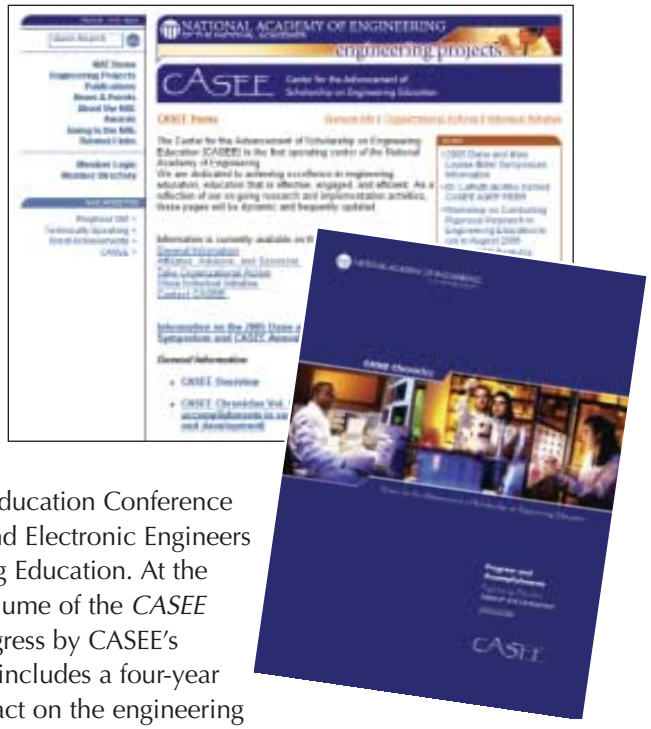
CEE is also collaborating with the Center for the Advancement of Scholarship on Engineering Education (CASEE) on a consensus study to evaluate instructional scholarship in engineering education. The study will include a discussion of the development of a metric (based on currently available metrics) to assess the level of instructional scholarship of individual faculty members. This metric could lead to a recognition and reward system for teaching skills and knowledge similar to the reward system for research contributions.

Center for the Advancement of Scholarship on Engineering Education

The mission of the Center for the Advancement of Scholarship on Engineering Education (CASEE) is to make engineering education more valuable to employers, graduate schools, the graduates themselves, and society at large. To achieve this goal, CASEE is working collaboratively with diverse institutions and organizations in the engineering community to leverage opportunities for making continuous, significant improvements in engineering education.

In 2006, NAE hosted three Scholars in Residence who worked on research projects on improving access to and success in engineering education by pre-college and

undergraduate students, with an emphasis on underrepresented populations. One of these scholars also did background research to inform a consensus study by the Committee on Engineering Education to examine ways of evaluating the quality of engineering instruction.



In October 2006, CASEE held the third Dane and Mary Louise Miller Symposium, a showcase for innovative research and development activities in engineering education. The symposium is an affiliate activity of the Frontiers in Education Conference sponsored by the Institute of Electrical and Electronic Engineers and the American Society for Engineering Education. At the symposium, CASEE released the third volume of the *CASEE Chronicles*, a community update on progress by CASEE's 40 organizational affiliates. This volume includes a four-year retrospective assessment of CASEE's impact on the engineering education community.

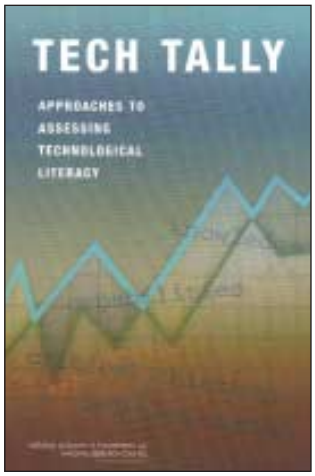
CASEE currently has external support for 12 projects on community building as well as advancing research on and use of effective educational practices in engineering education. In 2006, CASEE secured $2.7 million in grant money, not all which was spent in the calendar year 2006.

Technological Literacy

The purpose of the Program on Technological Literacy is to explore how Americans can become better prepared to navigate our technology-dependent society. What do adults and children need to know about technology? What role should citizens play in deciding which technologies are developed, and for what purposes? What changes in formal and informal education and in the policy arena are necessary to prepare citizens to be knowledgeable participants in this process?

The program, now in its ninth year, has contributed to the development of standards for the study of technology in elementary and secondary schools; carried out a variety of outreach efforts to educators, policy makers, and the general public; sponsored a number of informational workshops; and overseen two consensus studies. One of the program's most visible published works is the 2002 report, *Technically Speaking: Why All Americans Need to Know More About Technology*. The report makes the case for technological literacy and is accompanied by a companion website, <*www.nae.edu/techlit*>.

In summer 2006, *Tech Tally: Approaches to Assessing Technological Literacy*, was published. This follow-on project to *Technically Speaking* addresses theoretical and practical issues involved in measuring technological literacy in students, teachers, and out-of-school adults. The project was carried out jointly by NAE and the National Research Council (NRC) Board on Testing and Assessment.



In late 2006, NAE received a gift of $550,000 from NAE member Stephen D. Bechtel, Jr. This gift and an earlier gift from Mr. Bechtel of $150,000 will be used to support a new, two-year study on the teaching of engineering in K-12 classrooms in the United States. This project will be carried out in partnership with the NRC Board on Science Education.

Public Understanding of Engineering

Developing Effective Messages Project

In 2006, the Committee on Public Understanding of Engineering Messages contracted with a New York-based marketing-research firm to conduct focus groups and an online survey to identify effective ways of communicating with the public about engineering. Data from their research will be disseminated widely to the engineering community in early 2007. In addition, the 10-person committee, chaired by NAE member Don P. Giddens, Georgia Institute of Technology, will publish a final report on the project in fall 2007. The NAE media/public relations office hopes to leverage the results of this initiative for other Academy projects, such as Grand Challenges for Engineering <*www.engineeringchallenges.org*>. The messaging study is being funded by the National Science Foundation.

Media Relations

In 2006, NAE continued to work closely with the Radio and Television News Directors Foundation on our joint project, News and Terrorism: Communicating in a Crisis, which is funded by the U.S. Department of Homeland Security. In 2004–2005, 10 workshops were conducted in 10 different cities around the country. Each workshop featured a customized terrorism-scenario exercise for journalists, government officials, and the engineering and science communities.

In 2006, we enlisted the help of past workshop participants and experts new to the project to assess the effectiveness of the series. A select group was invited to a meeting in January to share their pre- and post-workshop experiences, brainstorm about changes in format, consider inviting representatives of the private sector to participate in workshops, and discuss scenario topics for future workshops. In response to these discussions, the workshop format was modified to encourage more direct participation

and discussion, and the focus of the scenarios was expanded to include natural disasters. The last two workshops of the current phase of the project, held in 2006 in Columbus, Ohio, (a "dirty bomb" scenario) and Seattle, Washington, (an aerosolized anthrax scenario) were designed in the new format.

Public Relations

The popular NAE radio segments on engineering innovations continued to air each week on WTOP Radio, the only all-news radio station in Washington, D.C., and the surrounding region. In 2006, the engineering segments were also aired on Federal News Radio WFED. The accompanying NAE website <*www.nae.edu/radio*> is updated each week with new scripts, audio, and links to information on the story topics.

NAE established a new website <*engineeringchallenges.org*> in 2006 and invited the public to brainstorm about how engineering can help shape the world of the future. The website features exclusive essays by former president Jimmy Carter, NAE members Norm Augustine and Ed Catmull, and others about the greatest challenges/opportunities facing engineering. The site also includes articles about innovations and a forum for submitting and discussing ideas.

In 2007, a prestigious international committee of experts in science and technology, chaired by former Defense Secretary William Perry, will cull the information from the website and identify Grand Challenges for Engineering. These challenges will then be publicized in a variety of ways to a variety of audiences. The goal is to capture the imagination and ideas of young people, engage the general public, and focus the efforts of public officials and engineers on engineering for a better future.

Engineering Ethics

NAE and Case Western Reserve University worked together in 2006 to move the Online Ethics Center for Engineering and Science <*www.onlineethics.org*> from its original content-management system (CMS) at Case to a CMS at NAE. In a period of eight months, more than 2,000 HTML pages were transferred. Once the transfer was complete, the site design and styles were updated and modified. The new website features intuitive navigation, easy citing and sharing of content, and dynamically generated lists of related materials. In addition, scholars and undergraduates can easily contribute content to the Online Ethics Center, thus facilitating the citing and sharing of information. NAE is currently investigating a cost-effective technology to support online discussions.

Diversity in the Engineering Workforce

The Diversity in the Engineering Workforce Program was established to promote diversity in the U.S. engineering workforce based on a well educated, diverse domestic talent pool. To address this mission, NAE brings together experts and stakeholders to share information, identify needs, and initiate actions.

Engineer Girl! Website

The Engineer Girl! website <*www.engineergirl.org*>, a major component of NAE's web presence, is a resource for middle-school girls interested in learning about engineering. With thousands of visitors weekly, this popular website is the number one listing on Google for "girls and engineering." The website is designed to be a general reference for young women considering careers in a field in which they have been underrepresented. Engineer Girl! provides career guidance for students and parents, links, games, and interesting facts about the history of women in engineering.

In spring 2006, the Engineer Girl! website participated in outreach programs to students during National Engineers Week and the Global Marathon on Women in Engineering. During the marathon, students were able to chat, via the Internet, with women engineers and engineering students from around the world. The topics ranged from cybersafety to determining if an engineering college is female-friendly to what it's like to be an engineer.

During the summer of 2006, the website was completely revamped to support a variety of technologies, including streaming video, podcasting, and other media related tools. As a result, EngineerGirl! is now a more effective launch point for girls exploring the opportunities and options of engineering.

Extraordinary Women Engineers Project

The Extraordinary Women Engineers Project is a national initiative that encourages college-bound high-school girls to consider pursuing undergraduate degrees in engineering. Members of the project, in addition to NAE, are the American Association of Engineering Societies, American Society of Civil Engineers, and WGBH Foundation. Currently, the project is focused on developing an ad campaign targeting high-school students and a website, hosted by NAE, to provide resources for students, teachers, and guidance counselors about careers in engineering. The project will highlight the importance of engineering and technology in finding solutions to the difficult challenges facing our planet and the wide variety of engineering careers available.

Gender Equity Extension Service Project

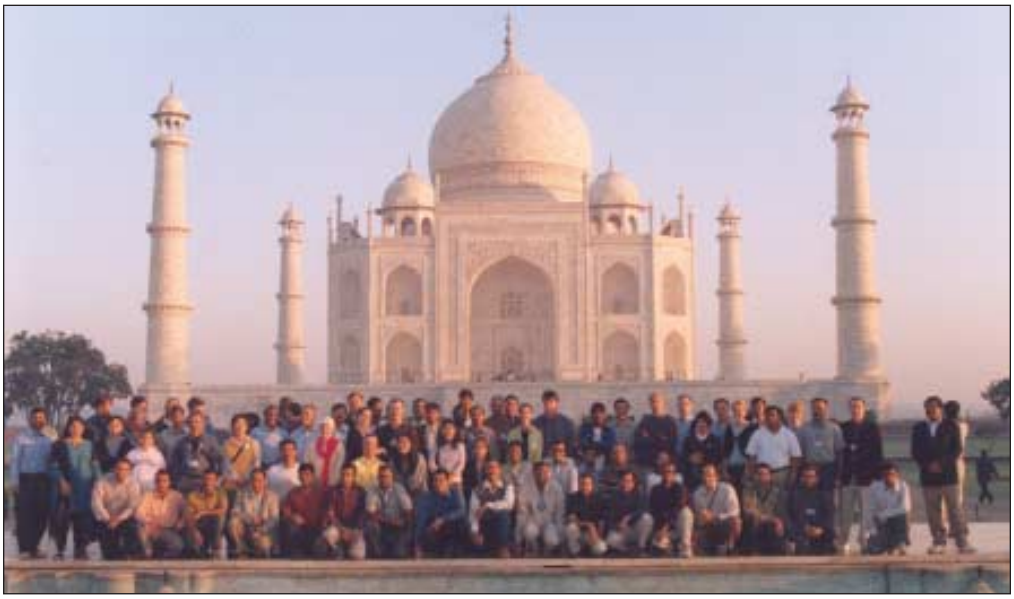
The purpose of the Gender Equity Extension Service Project is to increase the enrollment, retention, and graduation of women as baccalaureate-level engineers. NAE, the Institute of Electrical and Electronics Engineers, Inc. (IEEE), the American Society of Mechanical Engineers (ASME), and Project Lead the Way (PLTW) are working together to provide training in targeted areas for members of the collaborating organizations. ASME is focusing on what mechanical engineering faculty can do to retain students in their programs. IEEE is working with members who visit classrooms to improve their outreach to pre-college students from all backgrounds. PLTW is enlisting the help of master teachers to show PLTW teachers how to encourage students from diverse backgrounds to consider pre-college engineering courses. All of the training is designed to engage traditional players in the engineering community and to work within existing structures to increase gender equity in current programs. The training methods and results will be disseminated by a variety of Web-based tools.

The Gender Equity Extension Service is unusual in that it brings expertise in both gender studies and research on science and engineering education to bear on the academic preparation of students from middle school to the sophomore year of college. The project will also assess the impact of in-class social environments and instructional styles on the attrition of female students and the importance of the out-of-class environment for recruiting and retaining young women in engineering programs. The NAE Center for the Advancement of Scholarship on Engineering Education (CASEE) is leading NAE's effort on this project.

Frontiers of Engineering

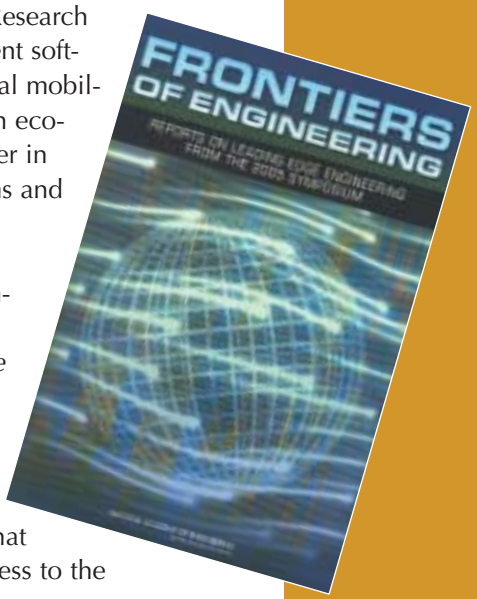
Frontiers of Engineering (FOE) is a symposium series that brings together emerging engineering leaders from industry, academe, and government laboratories to discuss pioneering technical work and leading-edge research in various engineering fields and industry sectors. The goals of the symposia are (1) to introduce outstanding engineers (ages 30-45) to each other and promote the establishment of contacts among the next generation of engineering leaders and (2) to facilitate collaboration and the transfer of techniques and approaches across engineering disciplines.

The annual U.S. Frontiers of Engineering (U.S. FOE) Symposium brings together approximately 100 engineers from across the country. FOE also has three bilateral programs: (1) German-American Frontiers of Engineering (GAFOE), in partnership with the Alexander von Humboldt Foundation; (2) Japan-America Frontiers of Engineering (JAFOE), in partnership with the



Japan Science and Technology Agency and the Engineering Academy of Japan; and (3) Indo-American Frontiers of Engineering (IAFOE), in partnership with the Indo-U.S. Science and Technology Forum. Each bilateral symposium is attended by approximately 30 engineers from the partner country and 30 from the United States.

Four symposia were held in 2006. In March, the inaugural Indo-American FOE Symposium was held in Agra, India. The topics were nanotechnology, wireless research opportunities and challenges, natural disaster simulation and mitigation, and the interface of engineering with biology and medicine. The GAFOE Symposium, in May, was hosted by Bell Labs/Lucent Technologies in Murray Hill, New Jersey. The topics were managing technological risk, security and privacy implications of connected products, emerging applications of nanotechnologies, and oil and gas exploration and production. The U.S. FOE Symposium was held in September at the Ford Research and Innovation Center in Dearborn, Michigan. The topics were intelligent software systems and machines, the nano/bio interface, engineering personal mobility for the 21st century, and supply chain management applications with economic and public impact. The JAFOE Symposium was held in November in Tsukuba, Japan. The topics were cybersecurity, biomechatronics, systems and synthetic biology, and organic electronics.



FOE encourages continuing interaction among participants in FOE symposia through ongoing outreach activities. Yearly proceedings, such as *Frontiers of Engineering: Reports on Leading-Edge Engineering from the 2005 NAE Symposium on Frontiers of Engineering,* which was published in February 2006, are mailed to past U.S. FOE participants. Other outreach activities include U.S. and bilateral FOE alumni newsletters, which encourage alumni to keep in touch and share information about their work and current status, and an FOE website that includes a searchable database, a directory of all FOE alumni, and access to the

presentations from the U.S. FOE meeting. In addition, the Alexander von Humboldt Foundation and Indo-U.S. Science and Technology Forum provide support for ongoing collaborations among participants in the GAFOE and IAFOE symposia, respectively.

Armstrong Endowment for Young Engineers-Gilbreth Lectures

The Armstrong Endowment for Young Engineers-Gilbreth Lectures, a related but independent program, selects outstanding engineers from FOE speakers to give presentations at the NAE Annual Meeting in Washington, D.C., and the NAE National Meeting in Irvine, California. In 2006, four speakers gave Gilbreth lectures at the National Meeting. Michael McGehee, assistant professor, Department of Materials Science and Engineering, Stanford University, spoke on "Organic-Based Solar Cells," Steven Conolly, associate professor, Department of Bioengineering, University of California, Berkeley, gave a lecture on "Small MRI Scanners," Tsu-Jae King Liu, senior director of engineering, Advanced Technology Group, Synopsys Inc., presented a talk on "Sustaining the Silicon Revolution: Challenges and Opportunities," and Barry Stipe, research staff member, Hitachi Global Storage Technologies, spoke on "Data Storage: Hard Disk Drives vs. Semiconductors."

Two Gilbreth lectures were given at the NAE Annual Meeting. John-Paul Clarke, associate professor, School of Aerospace Engineering, and director, Air Transportation Laboratory, Georgia Institute of Technology, addressed the group on "Air Transportation's Global Impact." Karen Hagedorn, operations technical manager, Reservoir U.S. Production, ExxonMobil Production Company, spoke on "Use of Modeling in Petroleum Reservoir Development and Production Enhancement."

Engineering and the Health Care System

In 2005, NAE and the Institute of Medicine (IOM) published *Building a Better Delivery System: A New Engineering/Health Care Partnership*, a consensus report that identified engineering applications and research directions that could lead to system-wide improvements in the quality and productivity of U.S. health care delivery. During 2006, the authoring committee co-chairs, NAE Home Secretary W. Dale Compton, Purdue University, and IOM member Jerome H. Grossman, Harvard University, other members of the committee, the project sponsors, and NAE study director, Proctor Reid, conducted dissemination, outreach, and planning activities aimed at building networks of expertise to advance the use of systems engineering and information/communications technologies to improve health care delivery.

In April and June 2006, two of the three co-sponsors of the study—the National Institute for Biomedical Imaging and Bioengineering at the National Institutes of Health, and the National Science Foundation jointly sponsored two research agenda-setting workshops inspired by the study. On April 11-12, Dr. Grossman presented the findings and recommendations of the study at a workshop on "Improving Health Care Accessibility through Point-of-Care Technologies." The workshop focused on the integration of supporting technologies of health care delivery, such as biosensors,

monitors, imaging and informatics, into clinical and tele-health settings. NAE Program Director Proctor Reid gave a similar presentation on June 15-16 at a workshop on "Health Care Systems Engineering Research." Also in June, Dr. Reid delivered a plenary lecture and led a workshop based on the report findings at the Mayo Clinic in Rochester, Minnesota. In September 2006, Dr. Compton presented the report findings at a public meeting of the Medicare Payment Advisory Commission during a session on "Reengineering of Health Care."

Drs. Compton, Grossman and Reid helped organize a two-day planning workshop held on May 1, 2006, to identify and prioritize future activities of the National Academies related to health informatics. In June 2006, NAE and IOM established an informal joint steering group of expert engineers and health professionals, led by Drs. Compton and Grossman, to provide guidance for follow-on activities.

In October 2006, based on discussions earlier in the year with the U.S. Army Telemedicine and Advanced Technology Research Center (TATRC) and representatives of the U.S. Department of Defense's Military Health System (MHS), an NAE/IOM proposal (currently pending) was submitted to TATRC for a series of workshops to provide information and guidance to MHS on effective strategies for using systems tools and technologies to improve the quality and productivity of MHS health care delivery by TRICARE health programs.

Technology for a Quieter America

Noise—unwanted or harmful sounds—has an impact on the quality of life of many Americans. An estimated 10 million Americans have some degree of noise-induced hearing loss, and some 30 million are exposed to dangerous levels of noise each day. Statistics show that the most common community complaints are related to unwanted noise. The sources of noise are almost invariably by-products of engineered systems, such as air transportation; highway and rail transportation; the operation of construction and other heavy equipment; large infrastructure projects, such as natural gas pipelines; manufacturing equipment; household appliances; and even toys and consumer electronics.

Efforts in the United States over the last 30 years to address noise-related concerns have been uneven at best. Other regions in the world have taken the lead in developing

noise standards for various situations and applications. Some of these regulations may limit the export potential of American products.

Significant advances have been made in understanding how individuals react to and are impacted by noise from both an auditory and non-auditory standpoint. For example, a growing body of evidence shows that high noise levels delay learning of reading and mathematics at the elementary and middle-school levels. However, the metrics used to assess noise levels are not always based on the most up-to-date technologies.

In September 2005, NAE hosted a three-day workshop for more than 70 engineers and scientists who specialize in noise-control technologies. The workshop resulted in a project proposal for a 30-month study called "Technology for a Quieter America." The project was approved in January 2006, and the first meeting of the study committee was held in May 2006.

The study committee identified three categories to be explored. Each category has three subtopics related to noise-control engineering and public concerns:

Applications of Current Technology
- Cost-benefit analysis of noise-control technologies
- Impact of noise on U.S. competitiveness
- Industry demand for, and educational system supply of, noise-control specialists

Research and Development Initiatives for Noise-Control Technology
- New technologies
- Engineering controls and common descriptors for hazardous noise
- Improved metrics for measuring community noise

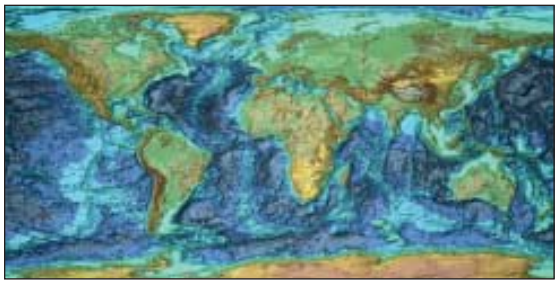
Intra-governmental and Public Relations Programs
- Raising awareness of the benefits of low-noise products and the adverse effects of excessive noise
- Coordination of noise-control activities by federal and state agencies
- Assistance to state and local community noise-control programs

Subcommittees are being formed to review existing information, identify gaps in research, and gather expert advice on how technology and policy interact. The subcommittees will report their findings and recommendations to the study committee.

Grainger Challenge Prize for Sustainability

In early 2005, NAE, with the support of The Grainger Foundation, established the Grainger Challenge Prize for Sustainability—gold, silver, and bronze awards of $1,000,000, $200,000, and $100,000—for the design and creation of a workable, sustainable, economical system for treating arsenic-contaminated groundwater in Bangladesh, India, Nepal, and other nations worldwide. Complementary goals of the

prize competition are to increase awareness in the U.S. engineering community of the importance of designing and engineering for sustainability, particularly in an international context; to encourage and showcase efforts by U.S. engineers to bring sustainable technologies to the marketplace; and to promote green design philosophies.

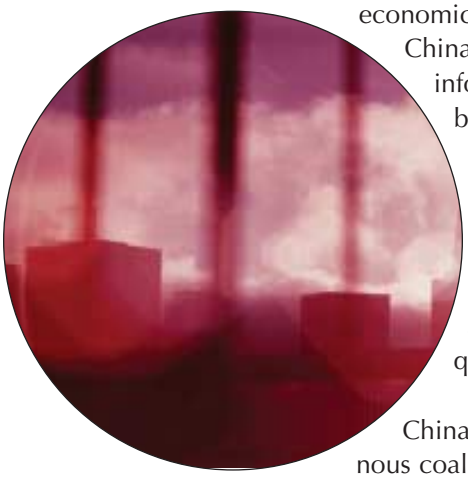


In 2006, a committee of experts headed by NAE member Charles O'Melia of Johns Hopkins University reviewed more than 70 proposals and selected 15 finalists for laboratory testing. The selected systems were then tested at the Environmental Protection Agency's National Risk Management Research Laboratory in Cincinnati, Ohio, one of the leading laboratories for arsenic research in the United States. Managed by Shaw Environmental Inc., the lab has all of the facilities and know-how necessary for evaluating arsenic-treatment systems. These full scale plant tests were intended to demonstrate the competing technologies under monitored conditions by an impartial body approved by NAE.

The committee will select the prize winners in early 2007 and the prizes will be awarded at the NAE annual awards ceremony during National Engineers Week in February 2007.

China/U.S. Energy-Air Pollution Study

This joint study by NAE and the NRC Policy on Global Affairs Division is the latest phase of an ongoing cooperative program with the Chinese Academies of Science and Engineering that dates back to the late 1990s. As the number of economic, scientific, and technical issues common to China and the United States increases, exchanges of information are becoming increasingly important to both countries. A case in point is China's current efforts to secure energy concessions from countries around the world to ensure its supply of transportation fuel for a rapidly growing number of vehicles. Moreover, China's decisions about its burgeoning energy sector will have regional and global implications for energy resources, air quality, and greenhouse gas emissions.



China's most secure form of energy remains indigenous coal, which provides much of the power for its electricity, urban heating, and cooking. However, air pollution from burning coal has had severe detrimental effects on public health and the nation's biota and water

resources. Economists have determined that China's GDP growth rate would be several points higher without this pollution. In its recent energy and air-quality policies, China has acknowledged the significant effects of pollution from coal, but implementation of these policies has largely been left to local leaders.

In 2006, a committee of Chinese and U.S. experts, led by Dr. John Watson, an air-quality researcher from the University of Nevada Desert Research Institute, visited Pittsburgh and Los Angeles, the two U.S. case-study cities for this report. The committee toured industrial facilities and research institutes, met with local leaders and regulators, and held discussions about their experiences; in October 2005, a similar group visited Huainan and Dalian, China, the two Chinese case-study cities. At the end of the Los Angeles trip, the committee met at the Beckman Center to discuss preliminary conclusions and recommendations and hand out writing assignments.

Scheduled for completion in summer 2007, the study will compare and contrast U.S. and Chinese approaches to managing energy use and urban air quality at the national level and in the four case-study cities. The final report will include discussions of regulatory institutions, approaches to compliance, and performance measures; the broad objectives of local and national energy policy and the air-quality implications of those policies; evolving air-quality issues, such as controls on emissions of sulfur and particulates, which have been implemented but have been rendered less than effective by increasing vehicle use; and recommendations for Chinese policy makers based on experiences in the United States. The history of air-pollution regulation in the Pittsburgh and greater Los Angeles areas can provide many lessons for China in terms of regional air-quality management, energy efficiency, and pollution-control technologies.

Perhaps the most important lesson will be how public access to air-quality data in the United States has led to less expensive, more efficient strategies for air-quality control. Finally, this study will identify potential areas of future cooperation, such as coal-gasification technologies, carbon-mitigation opportunities, liquid-fuel alternatives, and green building strategies.

Countering a Terrorist Attack on the U.S. Electrical Transmission and Distribution System

This joint study by NAE and the Board on Energy and Environmental Systems formally began in 2005 under the leadership Dr. Granger Morgan of Carnegie Mellon University. The committee members are drawn from the public-utility, academic, private-sector, and regulatory communities. Funded by the U.S. Department of Homeland Security (DHS), the purpose of the study is to identify vulnerabilities of the U.S. electrical transmission system to terrorist attack and explore how they can be minimized.

During 2005 and 2006, the committee held several fact-finding meetings during which speakers from a variety of institutions described how terrorists might damage electrical transmission and distribution systems and what could be done to reduce the damage, expedite restoration, and minimize the impact of extended outages. The fact-finding sessions in 2006 were focused on physical and cyber protection of the grid.

The final report, which is expected to be released in fall 2007, will be especially useful to DHS, the U.S. Department of Energy, state and local agencies, and industry.

Offshoring of Engineering

A new study, "Offshoring of Engineering: Facts, Myths, Unknowns, and Implications," was launched in early 2006 and is expected to be completed in spring 2007. The steering committee, chaired by NAE member William J. Spencer, includes seven other NAE members. The project is supported by the United Engineering Fund, National Science Foundation, and National Academy of Engineering. In this study, "offshoring" is defined as the transfer of work overseas, either through subsidiaries or outsourcing to other organizations. "Engineering work" is defined as the full spectrum of activities, from research, product and process development, design, and analysis, to manufacturing/production engineering and engineering management.

The committee's findings will address several key questions: (1) what we know about the current status and trends in offshoring of work with significant engineering content, including extent, motivation, types of work subject to offshoring, industry-specific characteristics, and future prospects; (2) what are the key areas where data is lacking and how information gaps might be filled; and (3) what actions engineering educators, professional societies, industry leaders, policy makers, and the engineering community at large might consider to strengthen the U.S. engineering enterprise.

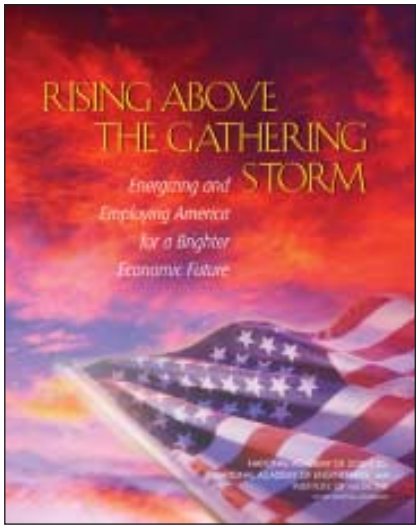
The centerpiece of the study process was a two-day workshop held in October 2006 in Washington, D.C. In advance of the workshop, the steering committee commissioned research papers on engineering offshoring in six sectors—software engineering, semiconductors, personal computer manufacturing, automobiles, pharmaceuticals, and construction engineering and services. In addition to presentations and discussions of the papers, the workshop featured keynote talks on the globalization of engineering by NAE members Robert Galvin, chairman emeritus of Motorola Inc., and Charles M. Vest, president emeritus of MIT, as well as panel discussions on the implications of offshoring for the U.S. engineering profession and workforce, engineering management, and engineering education.

The final report will include a summary of insights based on the commissioned papers, workshop discussions, and relevant literature; the papers will be revised for publication and included in the volume. The report will be widely disseminated to policy makers, educators, and engineering leaders in industry.

Rising Above the Gathering Storm

Today the United States leads the world in science and technology development and enjoys a robust economy based largely on scientific and technological innovation. However, danger signs are appearing on the horizon that the dominance of the United States in these areas is threatened. U.S. students consistently score below the international average in math and science, and, for the cost of hiring an engineer in the United States, a company can hire eight young professional engineers in India. U.S. industry spends more on tort litigation than on research and development. These and other factors indicate that America's advantages are beginning to erode.

This was the conclusion of *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, a landmark report from the National Academies. The distinguished committee that wrote the report was chaired by NAE member Norman Augustine—retired chair of Lockheed Martin—and included Nobel laureates and prominent business, government, and academic leaders, nine of them NAE members. The report sounds a strong warning that the United States is losing its global competitive edge in research and technology and that, unless we take concrete steps now, U.S. prosperity will decline.



These are not new concerns. Similar warnings have been issued in the past by Thomas Friedman of the *New York Times*, Rep. Sherwood Boehlert, former chair of the House Science Committee, and Sens. Lamar Alexander and Jeff Bingaman, to name a few. "We're now playing in a tougher league," Alexander said. "China and India are competing for our jobs. The best way to keep those jobs in America is to maintain our brainpower edge in science and technology."

Rising Above the Gathering Storm stresses two major challenges to U.S. pre-eminence in science and engineering: (1) the need for high-quality jobs for all Americans; and (2) the need for clean, affordable, reliable energy. The report recommends that the government provide incentives for improving the quality of middle-school and high-school science, technology, engineering, and math (STEM) teachers by encouraging undergraduate students in STEM subjects to attain teacher certification when they get their degrees. The report also recommends that the federal investment in long-term

basic research be increased by 10 percent per year for the next seven years, focusing on the physical sciences, engineering, mathematics, and information sciences. In addition, policy makers should establish an organization like DARPA (Defense Advanced Research Projects Agency) in the U.S. Department of Energy to sponsor innovative research to meet the nation's long-term energy challenges.

To the excitement of many who have called for government action, the Academies report propelled both the executive and legislative branches into declaring science and math education and basic science research as top priorities. "Sometimes these things sit for years," said Alexander, who commissioned the report with Bingaman, "and then suddenly they come together in a big way."

Shortly after the release of the report, Rep. Nancy Pelosi, new Speaker of the House, announced steps to embrace its recommendations. Various congressional and White House briefings followed, led by Mr. Augustine and fellow committee members, NAS President Ralph Cicerone, and NAE President Wm. A. Wulf, urging government to take action.

In the 2006 State of the Union Address, President Bush announced the American Competitiveness Initiative, which incorporates many of the recommendations in the report. This presidential initiative has encouraged a flurry of legislative activity. In both the Senate and the House, committees have outlined legislation and a bipartisan package of bills, labeled the "Protecting America's Competitive Edge Act," introduced by Alexander and Bingaman, along with Sens. Pete Domenici, Barbara Mikulski, and Craig Thomas, that would implement all 20 of the action items recommended in the report.

And the ripple effects continue. The Association of American Universities recently submitted a proposal to President Bush and Congress calling for improving the quality of teaching through partnerships among educators, businesses, and government and through increased funding for research. Rep. Frank Wolf, chair of the House Appropriations Subcommittee for Science; the U.S. Departments of State, Justice, and Commerce; and related agencies strongly support increases in basic science research proposed in the report and the presidential initiative. "I don't plan to spend a year talking about it, like we had to do last year," Wolf said. "We're going to get it done."

2006 NAE AWARDS RECIPIENTS

Charles Stark Draper Prize

Recognized as one of the world's preeminent awards for engineering achievement, this prize honors an engineer or engineers whose contributions have significantly improved the quality of life, enabled people to live freely and comfortably, and/or permitted the access to information. Presented annually, the prize carries a $500,000 cash award.

Willard S. Boyle

Willard S. Boyle and George E. Smith "for the invention of the Charge-Coupled Device (CCD), a light-sensitive component at the heart of digital cameras and other widely used imaging technologies."

George E. Smith

Bernard M. Gordon Prize

The Gordon Prize for Innovation in Engineering and Technology Education is a cash prize of $500,000, shared between the educator(s) and the educational institution, to support the continuation of the award-winning program. The Gordon Prize honors technology educators whose innovative programs have strengthened the engineering workforce by cultivating students' leadership, creativity, and teamwork skills. The Gordon Prize is presented annually.

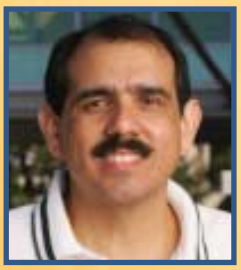
Jens E. Jorgensen, John S. Lamancusa, Lueny Morell, Allen L. Soyster, and Jose Zayas-Castro "for creating the Learning Factory, where multidisciplinary student teams develop engineering leadership skills by working with industry to solve real-world problems." (Pennsylvania State University)

Jens E. Jorgensen

John S. Lamancusa

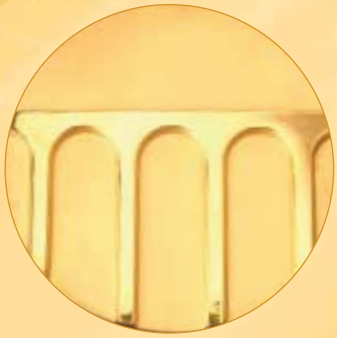
Lueny Morell

Allen L. Soyster



Jose Zayas-Castro

Founders Award



The Founders Award is given in recognition of an NAE member or foreign associate who has exemplified the ideals and principles of NAE through professional, educational, and personal achievement and accomplishment. The Founders Award is presented at the NAE Annual Meeting and carries a $2,500 cash prize.

Shu Chien

Shu Chien "for outstanding contributions to elucidating the engineering foundation of cardiovascular dynamics, and integrating engineering and biomedical sciences for the development of the biomedical engineering profession."

Arthur M. Bueche Award

The Bueche Award honors an engineer who has been actively involved in advancing U.S. science and technology policy, promoting technological development, and enhancing relations between industry, government, and universities. The award is presented at the NAE Annual Meeting and carries a $2,500 cash prize.

Chauncey Starr "for leadership in the development of nuclear power, contributions to the creation of the field of risk analysis and leadership in electric power R&D as the founding president of EPRI."

Chauncey Starr

For additional information about the NAE awards, please visit our website <*www.nae.edu/awards*>.

2006 NEW MEMBERS AND FOREIGN ASSOCIATES

In February, NAE elected 76 new members and nine foreign associates, bringing the total U.S. membership to 2,216 and the number of foreign associates to 186. Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature," and to the "pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education."

A list of the newly elected members and foreign associates follows, with their primary affiliations at the time of the Induction Ceremony, October 15, 2006.

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NATIONAL ACADEMY OF ENGINEERING FUND FINANCIAL REPORT

Governed by the National Academy of Engineering Fund (NAEF) Board of Trustees, the NAEF is the tax-exempt corporation (under section 501(c)(3) of the Internal Revenue Code) that serves as a holding entity for the independent assets and operating funds of the National Academy of Engineering (NAE). The NAE operates within the charter and framework of the National Academy of Sciences (NAS).

The table on page 32 summarizes both the NAEF and outside operating revenue and expenses as well as non-operation-related transactions for the NAE for 2006 and 2005. The information on the NAEF presented in this table has been extracted from the Fund's audited financial statements also contained in this report.

During 2006, contributions for the National Academy of Engineering were solicited from corporations, NAE members, and private foundations. These funds and contracts and grants from the federal government are a major source of support for the Academy's self-initiated programs, which are described in this report.

A second source of revenue for the Academy is the allocation from the overhead charge assessed on government and privately funded contracts for National Research Council (NRC) projects; the NRC is the operating arm of the NAE and the National Academy of Sciences. This allocation is used to offset expenses incurred in the oversight function and for such other administrative operations as NAE membership services and governance.

Under a policy established by the NAEF Board of Trustees, the Academy may use a certain percent of its unrestricted invested assets for operations each year. In 2006, 3.2 percent was allocated for normal operating expenses and 2.8 percent was allocated for fund-raising expenses. This allocation, combined with annual meeting registration fees, membership dues, and investment earnings on current operating funds, make up the remainder of the Academy's operating revenue.

The Academy welcomes corporate and private gifts, which are used to help finance the research, education, and public information programs of the institution. The NAE does not, however, conduct proprietary studies for private clients or corporations.

NAE/NAEF Combined Summary of Revenues, Expenses, and Changes in Net Assets (Unaudited-Pro Forma)

(Thousands of Dollars)

	2006	2005
NET ASSETS, BEGINNING	**$63,052**	**$64,406**
CONTRIBUTIONS RECEIVABLE, NET	**1,615**	**1,398**
TOTAL ASSETS, BEGINNING	$64,667	$65,804
OPERATIONS		
Revenue		
Contributions (Unrestricted)	$1,501	$1,457
Dues (Annual), Fees, Miscellaneous	438	247
Indirect Allowance From Contracts and Grants	2,799	2,723
Award Specific Funds Allocation to Operations*	1,746	2,403
Program Specific Funds Allocation to Operations*	4,238	3,789
Unrestricted Allocation to Operations	2,101	2,107
Total Operations Revenue	**$12,823**	**$12,726**
Expenses		
Awards	$1,807	$2,423
Development	908	823
Management	2,081	1,893
Membership	1,278	1,138
National Academies Activities	276	323
Programs	6,019	5,466
Total Operations Expenses	**$12,369**	**$12,066**
OPERATIONS SURPLUS	**$454**	**$660**
NONOPERATIONAL TRANSACTIONS		
Allocation to Operations	($5,218)	($5,730)
Contributions to Reserves	2,981	2,450
Dues (Lifetime), Miscellaneous	109	101
Gain (loss) on Investments	4,608	(443)
Investment Earnings (Interest and Dividends)	1,915	1,873
Investment Fees	(271)	(265)
NONOPERATIONAL GAIN (LOSS)	**$4,124**	**($2,014)**
NET ASSETS, ENDING	**$67,630**	**$63,052**
CONTRIBUTIONS RECEIVABLE, NET	**3,541**	**1,615**
TOTAL ASSETS, ENDING	$71,171	$64,667

*Restricted funds are reported in this unaudited-pro forma report as operating revenue when earned

NOTE: The audited financial statements that follow record contributions as revenue the year in which the pledge is received in accordance with generally accepted accounting principles.

NATIONAL ACADEMY OF ENGINEERING FUND
December 31, 2006 and 2005

Report of Independent Certified Public Accountants

Board of Trustees
National Academy of Engineering Fund

We have audited the accompanying statement of financial position of the National Academy of Engineering Fund (the Fund) as of December 31, 2006, and the related statements of activities and cash flows for the year then ended. These financial statements are the responsibility of the Fund's management. Our responsibility is to express an opinion on these financial statements based on our audit. The prior-year summarized comparative information has been derived from the Fund's 2005 financial statements and, in our report dated March 29, 2006, we expressed an unqualified opinion on those financial statements.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America, as established by the American Institute of Certified Public Accountants. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Fund's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used, and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the National Academy of Engineering Fund as of December 31, 2006, and the changes in its net assets and its cash flows for the year then ended, in conformity with accounting principles generally accepted in the United States of America.

Grant Thornton LLP

McLean, Virginia
May 30, 2007

NATIONAL ACADEMY OF ENGINEERING FUND

Statements of Financial Position

December 31,	2006	2005
Assets		
Current Assets		
Cash and cash equivalents	$ 175,116	$ 340,680
Short-term investments	1,509,458	1,390,433
Contribution receivable	1,052,525	560,077
Award medals and other assets	171,536	132,553
Total Current Assets	2,908,635	2,423,743
Non-current Assets		
Contribution receivable–long-term portion, net	2,488,496	1,055,027
Investments	65,977,595	61,479,272
Total Non-current Assets	68,466,091	62,534,299
Total Assets	$ 71,374,726	$ 64,958,042
Liabilities and Net Assets		
Liabilities		
Accounts payable–National Academy of Sciences	$ 203,462	$ 291,283
Commitments and Contingencies	—	—
Net Assets		
Unrestricted	32,904,132	31,082,089
Temporarily restricted	10,089,741	8,054,480
Permanently restricted	28,177,391	25,530,190
Total Net Assets	71,171,264	64,666,759
Total Liabilities and Net Assets	$ 71,374,726	$ 64,958,042

The accompanying notes are an integral part of this statement.

National Academy of Engineering Fund

Statements of Activities and Changes in Net Assets

Year ended December 31,

	2006				2005
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total	Total
Revenue					
Interest and dividends	$ 925,316	$ 989,635	$ —	$ 1,914,951	$ 1,877,912
Realized gain on investments	1,349,442	1,404,053	—	2,753,495	1,502,234
Contributions	1,736,107	1,891,209	2,647,201	6,274,517	4,131,938
Membership dues	246,640	—	—	246,640	236,220
Registration fees	95,585	—	—	95,585	80,470
Miscellaneous revenue	204,238	—	—	204,238	30,508
Net assets released from restrictions:					
Satisfaction of program restrictions	3,239,111	(3,239,111)	—	—	—
Satisfaction of time restrictions	34,189	(34,189)	—	—	—
Total Revenue	7,830,628	1,011,597	2,647,201	11,489,426	7,859,282
Expenses					
Program services:					
Programs	2,793,319	—	—	2,793,319	2,698,749
Member programs	235,638	—	—	235,638	202,029
Support for NRC and NAS	275,857	—	—	275,857	322,714
Awards	1,806,904	—	—	1,806,904	2,423,131
Total program services	5,111,718	—	—	5,111,718	5,646,623
Supporting services:					
Fundraising	908,436	—	—	908,436	822,500
Operations	819,756	—	—	819,756	582,851
Total supporting services	1,728,192	—	—	1,728,192	1,405,351
Total Expenses	6,839,910	—	—	6,839,910	7,051,974
Change in Net Assets Before Unrealized (Loss) Gain on Investments	990,718	1,011,597	2,647,201	4,649,516	807,308
Unrealized (loss) gain on investments	831,325	1,023,664	—	1,854,989	(1,944,868)
Change in Net Assets	1,822,043	2,035,261	2,647,201	6,504,505	(1,137,560)
Net Assets, beginning of year	31,082,089	8,054,480	25,530,190	64,666,759	65,804,319
Net Assets, end of year	$31,082,089	$ 10,089,741	$28,177,391	$71,171,264	$64,666,759

The accompanying notes are an integral part of this statement.

National Academy of Engineering Fund

Statements of Cash Flows

Year ended December 31,	2006	2005
Cash Flows from Operating Activities		
Change in net assets	$ 6,504,505	$ (1,137,560)
Adjustments to reconcile change in net assets to net cash (used in) provided by operating activities:		
Realized gain on investments	(2,753,495)	(1,502,234)
Unrealized (gain) loss on investments	(1,854,989)	1,944,868
Changes in assets and liabilities:		
Contributions receivable	(1,925,917)	(216,850)
Award medals	(38,983)	10,080
Accounts payable–National Academy of Sciences	(87,821)	(2,254,426)
Net Cash Used in Operating Activities	(156,700)	(3,156,122)
Cash Flows from Investing Activities		
Proceeds from sale of investments	63,858,977	37,447,500
Purchase of investments	(63,867,841)	(34,393,090)
Net Cash (Used in) Provided by Investing Activities	(8,864)	3,054,410
Net Decrease in Cash and Cash Equivalents	(165,564)	(101,712)
Cash and Cash Equivalents, beginning of year	340,680	442,392
Cash and Cash Equivalents, end of year	$ 175,116	$ 340,680

The accompanying notes are an integral part of this statement.

NATIONAL ACADEMY OF ENGINEERING FUND
Notes to Financial Statements

December 31, 2006 and 2005

NOTE A—GENERAL INFORMATION AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

General Information
The National Academy of Engineering Fund (the Fund) is an independent non-profit organization established by the National Academy of Engineering (NAE) to collect and disburse funds for accomplishing the goals of NAE. NAE operates within the charter and framework of the National Academy of Sciences (NAS), which accounts for NAE's expenses. The operating expenditures of NAE are accounted for by offices of NAS, and are offset by reimbursement from funds received from the Fund and from contracts administered by NAS on behalf of the National Research Council (NRC), which is the operating arm of NAS and NAE. The net expenditures of NAE, except for the approved budgeted indirect costs, are paid by the Fund to balance accounts with NAS.

Basis of Accounting
The Fund's financial statements are prepared using the accrual basis of accounting.

Cash and Cash Equivalents
For purposes of the statement of cash flows, the Fund considers all investments purchased with an original maturity of three months or less to be cash equivalents, except for the cash in the investment portfolio, which will be reinvested on a long-term basis.

Short-term Investments
Temporary investments consist of money market funds that are used to fund normal operations of the Fund and are recorded at their readily determinable fair values as determined by quoted market prices.

Contributions Receivable
Unconditional promises to give are recognized as revenue and contributions receivable in the period the promises are made. Unconditional promises to give that are expected to be collected within one year are recorded at their net realizable value. Unconditional promises to give that are expected to be collected in future years are recorded at the present value of their estimated future cash flows. The discounts on those amounts are computed using risk-free interest rates commensurate with the risk involved applicable to the years in which the promises are received. Amortization of the discounts is included in contribution revenue. Conditional promises to give are not included as support until the conditions are substantially met.

Awards Medals
The Fund maintains gold medals for various awards, which are carried at cost.

Investments
Investments, consisting of cash and money market funds, federal agency securities, treasury securities, corporate debt securities, and equity securities, are recorded at readily determinable fair values determined by quoted market price.

Temporarily Restricted Net Assets
Temporarily restricted net assets consist of amounts that are subject to donor-imposed time or purpose restrictions and income earned on temporarily and permanently restricted net assets. The Fund is permitted to use or expend the donated assets in accordance with the donor restriction.

Permanently Restricted Net Assets
Permanently restricted net assets consist of assets whose use is limited by donor-imposed restrictions that neither expire by the passage of time nor can be fulfilled or otherwise removed by action of the Fund. The restrictions stipulate that resources be maintained permanently, but permit the Fund to expend the income generated in accordance with the provisions of the agreement. Permanently restricted net assets consist of the following:

Draper Prize—represents an endowment given by the donor for the purpose of establishing and awarding an annual prize in honor of the memory of Charles Stark Draper. It is the Fund's intention to use the investment earnings of the endowment to cover the expenses incurred in connection with administration of the prize and in providing the honorarium awarded with the prize.

Gordon Prize—represents an endowment given by the donor for the purpose of establishing and awarding an annual prize in honor of Bernard M. Gordon. It is the Fund's intention to use the investment earnings of the endowment to cover the expenses incurred in connection with administration of the prize and in providing the honorarium awarded with the prize.

Capital Preservation and Hans Reissner—represent endowments requiring that the principal be invested and that only the income be used for general operations of NAE.

Hollomon—represents an endowment requiring that the principal be maintained in perpetuity and that the income be used to support the Hollomon Fellow.

Industry Scholar—represents an endowment to support fellowships for recently retired corporate executives to assist with strategy and management of program activities in NAE and NRC.

Senior Scholar—represents an endowment to support an outstanding member of industry or another field working as an advisor and assistant to the president of NAE in the management and execution of NAE's programmatic activities.

Young Engineer—represents an endowment to support programs aimed at engaging engineers at a younger age in the activities of NAE, and to provide an opportunity to identify nominees from industry for membership in NAE.

Wm. A. Wulf Initiative for Engineering Excellence—represents an endowment to ensure the future of programs that Bill Wulf instituted as president and provide his successor some flexibility in addressing the most pressing issues before the engineering community and the nation at any given time.

Restricted Support

The Fund reports gifts of cash and other assets as restricted support if they are received with donor stipulations that limit the use of the donated assets. When a donor restriction expires, i.e., when a stipulated time restriction ends or purpose restriction is accomplished, temporarily restricted net assets are reclassified to unrestricted net assets and reported in the statement of activities as net assets released from restrictions.

Allocation of Expenses

The costs of providing various programs and other activities have been summarized on a functional basis in the statement of activities. Accordingly, certain costs have been allocated among the programs and supporting services benefited.

Income Taxes

The Fund is incorporated under the District of Columbia Non-profit Corporation Act and is exempt from income taxes under Section 501(c)(3) of the Internal Revenue Code. In addition, the Fund has been determined by the Internal Revenue Service not to be a private foundation. The Fund is required to remit income taxes to the federal government and the District of Columbia for unrelated business income. For the years ended December 31, 2006 and 2005, there was no unrelated business income and, consequently, no provision for income taxes has been made.

Use of Estimates

In preparing financial statements in conformity with accounting principles generally accepted in the United States of America, management is required to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements and revenue and expenses during the reporting period. Actual results could differ from those estimates.

Reclassifications

Certain 2005 amounts have been reclassified to conform to the 2006 presentation.

NOTE B—CONTRIBUTIONS RECEIVABLE

Contributions receivable consist of unconditional promises to give and are deemed fully collectible as follows at December 31, 2006:

	Unrestricted	Restricted	Total
Unconditional promises to give	$ 368,325	$ 3,492,643	$ 3,860,968
Less: unamortized discount	—	(337,227)	(337,227)
Net unconditional promises to give	$ 368,325	$ 3,155,416	$ 3,523,741
Amounts due in:			
Less than 1 year	$ 368,325	$ 684,200	$ 1,052,525
1 to 5 years	—	2,488,496	2,488,496
	$ 368,325	$ 3,172,696	$ 3,541,021

Contributions receivable consist of unconditional promises to give and are deemed fully collectible as follows at December 31, 2005:

	Unrestricted	Restricted	Total
Unconditional promises to give	$ 306,000	$ 1,352,361	$ 1,658,361
Less: unamortized discount	—	(43,257)	(43,257)
Net unconditional promises to give	$ 306,000	$ 1,309,104	$ 1,615,104
Amounts due in:			
Less than 1 year	$ 306,000	$ 254,077	$ 560,077
1 to 5 years	—	1,055,027	1,055,027
	$ 306,000	$ 1,309,104	$ 1,615,104

Net restricted contributions consist of $275,017 and $96,579 at December 31, 2006 and 2005, respectively, which is subject to time restrictions, and $2,880,399 and $1,212,525 at December 31, 2006 and 2005, respectively, which is subject to donor-imposed purpose restrictions.

NOTE C—INVESTMENTS

Investments at fair value consist of the following at December 31:

	2006	2005
Cash and money market	$ 5,044,802	$ 4,463,937
Federal agency securities	13,915,102	15,168,078
Certificate of deposit	865,189	863,924
Corporate debt securities	2,337,526	7,848,312
Equity securities	32,899,400	28,056,631
Managed futures	6,972,209	6,468,823
Other	5,452,825	—
	67,487,053	62,869,705
Less: short-term investments	(1,509,458)	(1,390,433)
	$ 65,977,595	$ 61,479,272

Investments are further classified as follows at December 31:

Unrestricted	$ 32,869,321	$ 31,173,559
Temporarily restricted	8,487,412	6,279,673
Permanently restricted	26,130,320	25,416,473
	$ 67,487,053	$ 62,869,705

Investment return consists of the following at December 31:

Dividends and interest	$ 1,914,951	$ 1,877,912
Unrealized gain (loss)	1,854,989	(1,944,868)
Realized gain	2,753,495	1,502,234
	$ 6,523,435	$ 1,435,278

NOTE D—PERMANENTLY AND TEMPORARILY RESTRICTED NET ASSETS

Permanently and temporarily restricted net assets consist of the following at December 31, 2006:

	Permanently Restricted	Temporarily Restricted
Draper Prize	$ 8,000,000	$ 2,992,002
Gordon Prize	13,438,250	2,116,477
Capital Preservation	2,370,119	1,006,213
Hollomon	201,200	345,571
Great Achievements	—	95,341
Public Understanding	—	641,020
Technology and Environment	—	5,091
Frontiers Fund	—	47,627
Bueche Award	—	61,765
AT&T	—	12,451
CASEE	—	121,174
Russ Prize	—	66,782
Engineering Ethics Center	—	10,252
Diversity in the Engineering Work Force	—	1,703
Engineering Education	—	651,935
PUE Messaging	—	17,176
Grainger Prize	—	928
Hans Reissner	25,624	33,892
U.S./India Frontiers	—	—
Information Technology	—	29,072
Engineering & Services	—	2,860
Homeland Security	—	8,080
Communication with Public in Crisis	—	1,916
Industry Scholar	353,038	88,928
Senior Scholar	370,000	61,705
Young Engineer	778,641	121,504
Media Relations Mettler	—	1,527
Noise Policy Development	—	291,243
Urban Infrastructure	—	388,550
Offshore in UEF	—	1,479
China Project	—	6,752
Wm. Wulf Initiative	2,640,519	21,609
Unrestricted contributions to be received in future years	—	714,408
Others	—	122,708
	$ 28,177,391	$ 10,089,741

NOTE D—PERMANENTLY AND TEMPORARILY RESTRICTED NET ASSETS (Continued)

Permanently and temporarily restricted net assets consist of the following at December 31, 2005:

	Permanently Restricted	Temporarily Restricted
Draper Prize	$ 8,000,000	$ 2,435,020
Gordon Prize	13,438,250	1,434,401
Capital Preservation	2,363,437	810,011
Hollomon	201,200	295,479
Great Achievements	—	123,655
Public Understanding	—	567,162
Technology and Environment	—	5,852
Frontiers Fund	—	149,905
Bueche Award	—	73,198
AT&T	—	37,827
CASEE	—	136,342
Russ Prize	—	4,892
Engineering Ethics Center	—	10,964
Diversity in the Engineering Work Force	—	2,674
Engineering Education	—	150,810
PUE Messaging	—	18,405
Grainger Prize	—	87,583
Hans Reissner	25,624	30,813
Information Technology	—	24,636
Engineering & Services	—	2,749
Homeland Security	—	7,765
Communication with Public in Crisis	—	1,915
Industry Scholar	353,038	67,744
Senior Scholar	370,000	35,719
Young Engineer	778,641	68,530
Media Relations Mettler	—	64,530
Noise Policy Development	—	435,742
Urban Infrastructure	—	80,763
Offshore in UEF	—	30,426
China Project	—	100,000
Unrestricted contributions to be received in future years	—	603,405
Others	—	155,563
	$ 25,530,190	$ 8,054,480

NOTE E—DESCRIPTION OF PROGRAM AND SUPPORTING SERVICES

The following program and supporting services are included in the accompanying financial statements:

Programs—programs that address relevant issues in the engineering field including, but not limited to: *Education, Engineering Practice and the Engineering Workforce; Engineering and the Environment; Engineering, the Economy and Society; Information Technology and Society; National Security and Crime Prevention; and Public Policy* and *Program Reviews*.

Member Programs—organization and administration of the Annual Meeting and publication of NAE Memorial Tributes.

Support for NRC and NAS—contributions to joint activities of the National Academies, including, but not limited to, the NAS/NAE/IOM Committee on Human Rights, the NRC Office of Scientific and Engineering Personnel, and *Issues in Science and Technology*.

Awards—NAE presents five awards: the Bernard M. Gordon Prize, the Charles Stark Draper Prize, the Fritz J. and Dolores H. Russ Prize, the Arthur M. Bueche Award, and the NAE Founders Award. Activities include soliciting nominations, selection of the recipients, announcement of the recipients and presentation of the prizes.

Fundraising—provides the structure necessary to encourage and secure private financial support from individuals, foundations and corporations.

Operations—includes the functions necessary to provide an adequate working environment, provide coordination and articulation of the Fund's programs, secure proper administrative function of the Board of Trustees, maintain competent legal services for program administration, and manage the financial and budgetary responsibilities of the Fund.

NOTE F—RELATED-PARTY TRANSACTIONS

The National Academies Corporation

The National Academies Corporation (TNAC) is a non-profit corporation that was incorporated in January 1986 for the purpose of constructing and maintaining a study and conference facility, the Arnold and Mabel Beckman Center, in Irvine, California, to expand and support the general scope of program activities of NAS, NAE, the Institute of Medicine (IOM), and NRC. TNAC is organized as a tax-exempt supporting organization for NAS and the Fund. The Board of Directors and officers of TNAC include certain officers of the Fund. The Fund had no transactions with TNAC for the years ended December 31, 2006 and 2005.

National Academy of Sciences and National Research Council

The Fund reimburses NAS by making monthly payments based on NAE's estimated expenditures for the year. This resulted in a payable to NAS at December 31, 2006 and 2005 of $203,462 and $291,283, respectively. Payments made to NAS by the Fund for the Fund's allocated portion of the expenditures shared jointly by NAS, NAE and IOM were $1,184,293 and $1,145,214 for the years ending December 31, 2006 and 2005, respectively. The Fund made no payments to NRC for the years ended December 31, 2006 and 2005. See Note A for the relationship of related parties.

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‡ *Indicates term ended June 30, 2006. Year in parentheses indicates the year term expires.*

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The Bridge, the NAE quarterly journal, is available from the NAE Program Office or can be read online at <*www.nae.edu/thebridge*>. A PDF version is also available on the website.

The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The National Academy of Engineering was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Wm. A. Wulf is president of the National Academy of Engineering.

The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. Wm. A. Wulf are chair and vice chair, respectively, of the National Research Council.

www.national-academies.org

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