Statement by

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Mr. Chairman, thank you for the opportunity to testify today about the Department of Energy's (DOE) role in math and science education and the K-12 education programs of the Office of Science. The DOE's most significant contribution to education, broadly defined, over the years has been through our support of graduate students pursuing advanced degrees and by providing opportunities for undergraduate students and K-12 teachers to utilize our research facilities and work with the scientific and technical staff at the laboratories, which are unique places for research, learning, and collaboration. Our long history of support of programs for students and teachers has helped establish a culture at the National Laboratories where mentoring and learning are encouraged and supported. For more than 30 years, the DOE National Laboratories have provided mentor-intensive research internship and fellowship opportunities for undergraduate and graduate students studying in science, technology, engineering, and mathematics (STEM) fields. Since 1989 we have also supported programs that bring K-12 teachers into the National Laboratories to work with researchers and build content knowledge and skills that they then take back to their classrooms.

The two most important ways the Federal government can improve science and math education is to help ensure that there is a highly qualified teacher in every classroom and second, to help ensure that students have the opportunity in their schools to study science and math every day of the school year and every year throughout their K-12 education. The No Child Left Behind Act has put great emphasis on providing a qualified teacher in every classroom. Providing opportunities for professional development for STEM teachers is an area where DOE and the National Laboratories have played and will continue to play a valuable role.

The role of the Department and particularly the Office of Science in STEM education is complementary to the efforts of other Federal agencies. Our collaboration with the National Science Foundation (NSF) in various programs is especially productive and effective in bringing students from NSF funded programs to our National Laboratories; strengthening transfer of teacher research experiences to classrooms; curriculum development that strengthens our

mission, and increasing science literacy. In contrast, work on specific curricula is more a responsibility of State and local education communities across the country.

I would note here that, the Department of Energy's overall role in K-12 education is small. In the Office of Science, for example, our current budget for the Office of Workforce Development for Teachers and Scientists (WDTS) is just over $7 million. For Fiscal Year 2007 we have requested almost $11 million – a significant increase, though WDTS is small relative to the programs of other more education-focused Federal agencies. In addition, however, it should also be noted that the National Laboratories conduct independent, overhead-funded K-12 education programs that reach out to thousands of students every year. With annual spending of roughly $8 million dollars these are truly community-based programs, developed and sustained by strong local support and participation.

The Office of Science and STEM Education

The DOE Office of Science sponsors fundamental research programs in basic energy sciences, materials and chemical sciences, nanoscale science, climate change, genomics, life sciences, fusion energy sciences, high energy physics, nuclear physics, and advanced scientific computing. The Office of Science supports a diverse portfolio of research at more than 275 colleges and universities nationwide. This year, we are funding the work of about 23,500 scientists, including more than 10,000 Ph.D.s, graduate students, undergraduates, and postdoctoral researchers at the Nation's institutions of higher learning.

The Office of Science is also the steward of 10 world-class laboratories with unmatched capabilities for solving complex interdisciplinary scientific problems, and we fund research at DOE's seven other National Laboratories as well. The DOE National Laboratory system is the most comprehensive research system of its kind in the world and the backbone of American science. The Office of Science also builds and operates the world's largest suite of scientific facilities and instruments, used annually by more than 19,000 researchers to extend the frontiers of all areas of science.

The Office of Science has played a fundamental role in training America's scientists, engineers, and teachers for more than 50 years. Today we offer a range of workforce development programs for teachers and scientists to provide opportunities for scientific discovery and to ensure that this Nation has the scientific workforce we will need in the 21st century.

In science, the mission of research and the mission of education are inextricably linked. There is no more powerful spur to interest in science than hands-on experience in cutting edge research in a well-equipped laboratory. I believe the DOE has played a valuable role in math and science education at the K-12, undergraduate, and graduate levels by providing young scientists and teachers with in-depth exposure to the world of science through hands-on experience at our advanced facilities. While other Offices within the Department support undergraduate and graduate research, the Office of Science, through its Office of Workforce Development for Teachers and Scientists, supports the majority of programs that target K-12 education.

Preparing K-12 Teachers for the Classroom

It is widely recognized that the most effective means for improving student performance is through the training and continued support of the professional development of elementary and secondary school teachers (Educational Leadership, March 2002). In a survey of thousands of STEM graduate students, conducted by the NSF in 2002, 84 percent of those surveyed stated that they had chosen to pursue a STEM field career by the time they left high school. This suggests that K-12 teachers play a critical role in increasing the size and quality of the science, technology, and engineering workforce. Unfortunately, various studies including the Glenn Commission Report, *A Report to the Nation from the National Commission on Mathematics and Science Teaching for the 21st Century*, 1999; *Rising Above the Gathering Storm*, 2005, from the National Academy of Sciences Committee on Prospering in the Global Economy of the 21st Century; and "Tapping America's Potential: The Education for Innovation Initiative," 2005, led by the Business Roundtable have indicated that the teaching pool in mathematics and science is inadequate to meet the current needs in K-12 schools across the Nation.

According to the Glenn Commission Report, classes in K-12 math and science are often taught by unqualified and under-qualified teachers who have little or no formal training in math or science (citing Linda Darling-Hammond, *Supply, Demand, and Quality in Mathematics and Science Teaching*. Briefing for the National Commission on Mathematics and Science Education for the 21st Century, Washington, D.C., September, 1999.):

> More than one in four high school mathematics teachers and nearly one in five high school science teachers lack even a minor in their main teaching field.
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> About 56% of high school students taking physical science are taught by out-of-field teachers, as are 27% of those taking mathematics. These percentages are much greater in high poverty areas. Among schools with the highest minority enrollments, for example, students have less than a 50% chance of getting a science or mathematics teacher who holds both a license and a degree in the field being taught.

This finding is troubling because research indicates students who are taught by well-prepared science, math, and technology education teachers achieve at higher levels in class performance and on standardized exams. Citing *What Matters Most: Teaching for America's Future*, 1996, by the National Commission on Teaching and America's Future, and state studies correlating National Assessment of Educational Progress rankings with teacher qualifications, the Glenn Commission notes:

> Evidence of the positive effect of better teaching is unequivocal; indeed, the most consistent and powerful predictors of student achievement in mathematics and science are full teaching certification and a college major in the field being taught. Better math and science teaching is therefore grounded, first of all, in improving the quality of teacher preparation and in making continuing professional education available for all teachers.

The No Child Left Behind Act requires States to fill the Nation's classrooms with teachers who possess content knowledge in the field in which they teach and requires, beginning in school year 2007-08, that states measure students' progress in science at least once in each of three grade

spans (3-5, 6-9, 10-12) each year. The measuring of students' performance in science over several years also has the potential to provide a valuable measurement of the effectiveness of federally funded teacher training programs and efforts to increase the number of qualified teachers in the classroom.

DOE K-12 In-Service Teacher Professional Development Programs

All of the studies cited emphasize the importance of well-prepared science and math teachers in the classroom. Since 1989 DOE has played a role in providing professional development for K-12 teachers. Since the early 1950's, DOE and its predecessor agencies have been major contributors to the preparation and training of the next generation of scientists. DOE continues this effort through mentor-intensive research experiences at the National Laboratories for students, teachers, and faculty at all levels of education.

The Office of Science created its current in-service teacher professional development program targeting the Nation's K-12 STEM teachers in 2004. The primary goal of the Laboratory Science Teacher Professional Development (LSTPD) program is to create a cadre of STEM teachers who have the proper math and science content knowledge and scientific research experience to perform as leaders and agents of positive change in their local and regional education communities. In developing this program our WDTS office reviewed the best practices in teacher professional development identified by the National Academy of Sciences, the American Association for the Advancement of Science, and the American Institutes for Research. Several professional development models for teachers were also considered, including: the National Board for Professional Teaching Standards, "Five Core Propositions" and Loucks-Horsley and colleagues' "Fifteen Strategies for Professional Development." A primary expected outcome of the program is that teachers who participate will better educate and inspire students to study and become more involved in academic and extracurricular STEM activities, eventually raising student achievement on standardized tests and ultimately leading to more well-prepared students pursuing STEM majors in college. To achieve these results, the program provides K-12 classroom teachers with long-term, mentor-intensive professional development through scientific research or research-like opportunities at the National Laboratories over a three-year period.

Each teacher selected for the program makes a three-year commitment. Teachers are recruited nationwide and apply through an online system. Teachers are selected from a wide variety of demographic and educational backgrounds and are chosen on the basis of their qualifications as teachers of science and whether the National Laboratory they have chosen can provide the necessary developmental support in the particular subject-matter area where the teachers have identified a need. Participants' program placement is based upon their self-identified areas of content knowledge that need strengthening and on the laboratory's ability to meet that need. Participants receive a weekly stipend and housing allowance for the period they are at the laboratory. They also receive monetary support to help them extend what they have learned to their classrooms, purchase supplies for laboratory equipment and technology, connect students via classroom activities to National Laboratory research, continue contact and collaboration with other participant teachers and laboratory scientists, make return visits to the laboratory, and communicate their experiences at professional conferences and in publications.

The participants can choose from two different types of laboratory experiences. The first is primarily a Laboratory Research Experience where the teacher conducts research under the guidance of a lab scientist. This experience is most popular among high-school teachers and is eight weeks long. The other is a more modest approach, known as the Research Institute Model, where teachers work in small groups doing mock research projects under the guidance of educators and lab scientists. This approach, which runs four weeks, is most popular with elementary- and middle-school teachers.

All LSTPD teachers are provided guidance and mentorship by a "Master Teacher." The Master Teacher not only has experience and a proven record of teaching excellence, but s/he is also familiar with the National Laboratory environment. The Master Teacher helps the participating teachers prepare a three-year professional development plan, guided by initial evaluation of the teachers' command of subject matter in the courses that they teach. This reflection and collaboration process has been shown in educational research to be fundamental to successful implementation of teacher professional development. The teacher assessments and delivered outputs will ultimately track the effects of the program on student science and math achievement.

The LSTPD program has funded 115 teachers to participate in a pilot program that began in 2004; the first cohort will complete the three-year program this summer. The FY 2007 budget request for the program will increase the number of teachers participating to more than 300, and the Office of Science is in the process of planning to offer the program at all 17 DOE laboratories in the summer of 2007. Although the program is new and small, it has already had positive impact on its participant teachers, as described later in this testimony.

DOE Program for Future K-12 Teachers

The Office of Science also funds the Pre-Service Teacher (PST) summer internship program for undergraduate students who are working toward teacher certification in K-12 science, mathematics, and technology. The program places between 40 and 60 undergraduate students at one of seven National Laboratories. This program allows future science and math teachers an opportunity to work with and learn from DOE scientists, researchers, and mathematicians before they enter K-12 classrooms to teach science and math. Participants spend ten weeks with scientists or engineers working on projects related to the laboratory's research programs and build content knowledge and skills through their research experience.

Participants also attend professional enrichment activities, workshops, and seminars that help them apply what they learn to their academic programs and the classroom, help them understand how to become members of the scientific community, and help them improve their communications skills. Each participant has well-defined outcomes that include a research abstract, research papers, poster presentations, and an educational module that develops their laboratory experience into something they can use in the classroom. A Master Teacher reviews each of the participant's outcomes, and the participants' science abstracts are graded and published in Workforce Development for Teachers and Scientists annual peer-reviewed *Journal of Undergraduate Research.*

Program Evaluation

Evaluation of the Office of Science's teacher professional development programs is a two-part process which can generally be divided into short-term collection and review of teacher and student outcomes and longer-term teacher and student outcomes that are formally reviewed and assessed by outside organizations. Short-term evaluation occurs each year and is both "formative" in that it generates small adjustments in how the program is being conducted and "summative" in that hard data are used to determine whether the program is addressing what it is intended to address.

The LSTPD program, for example, requires teachers to self-identify their weaknesses in science and to define how they will address those weaknesses in their research experiences. Teachers also document in a portfolio how their experiences in the laboratory influence their classroom teaching and how they provide leadership in their schools and in their districts. This information is generally formative in nature.

Additionally, there are tangible outcomes that each teacher produces that can be objectively evaluated. These range from research papers based on their research performed at a National Laboratory to lesson plans that attempt to transfer the content knowledge they have gained at a National Laboratory to their students in the classroom. This information is summative in nature.

Both the formative and summative data are compiled and reviewed by the WDTS staff and a yearly meeting of all 17 laboratories is convened to discuss outcomes of the teachers and what adjustments, if any, should be made. At a certain point, programs are evaluated by an outside organization. This evaluation is done after the program has operated long enough to demonstrate its proposed outcomes and with enough participants to yield a sample size sufficient for reliable evaluation.

Initial Evaluation of LSTPD

Initial evaluation of the LSTPD program has relied on self-assessments of the participating teachers and assessments of the teachers by laboratory education staff. The evaluation of the LSTPD is in part based on components completed by the participants: 1) a content knowledge self-assessment; 2) a professional development plan; 3) a professional practice inventory; and 4) an education module that is submitted by each participant. Several teachers have also submitted research abstracts, papers, and posters related to their research at the National Laboratories. As indicated above, the program requires the teachers to collect data that will support the program evaluation, and those data become useful to the participants in their classrooms and in their own professional development.

An independent educational testing and evaluation company, WorldViews, LLC, conducted an external evaluation of the pilot year of the program and provided its report in May 2005. The report stated:

> The LSTPD Program in its pilot year was an overall success. Significant credit goes to the LSTPD Program managers and participating science mentors at each of the

participating laboratories, and the Office of Science LSTPD leadership and staff. A variety of professional development models were employed to a wide range of audiences.

These professional models include those of the National Board for Professional Teaching Standards and Loucks-Horsely's "Fifteen Strategies for Professional Development." WorldViews, LLC, conducted its evaluation based upon interviews, work samples and surveys, basing success on statistically significant increases in teacher work sample quality and respondents' evaluations of the program to pre-and post measures.

Other yearly evaluation indicators of LSTPD program success include: 1) a less than 5% attrition rate for the three-year program; 2) one-third of the middle school teachers in the LSTPD program at DOE's Jefferson Laboratory have opted to move from the mock research institute format of teaching to one based on their independent research experience with scientists and researchers at the laboratory, the embedded research model; 3) a number of LSTPD teachers have won national education awards, including recognition as Albert Einstein Distinguished Educator Fellows, Milken Educator Award Winners, and Expert Environmental Teachers; and 4) LSTPD teachers are becoming science teacher-leaders in their communities and in their professional circles.

Evidence of this leadership by LSTPD teachers comes from their presentations of professional development workshops at several national conferences. Teachers from the LSTPD program at the National Renewable Energy Laboratory in Golden, CO provided two workshops to teachers at the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) national conference in Denver, CO. Teachers from Argonne National Laboratory provided a workshop at the National Science Teachers Association (NSTA) regional conference in Chicago, IL. Additionally, LSTPD teachers will be providing workshops at the national NSTA conference in April 2006. Several LSTPD teachers are applying to participate in collaborative projects with the Department of Education's Teacher-to-Teacher Corps. LSTPD teachers from Lawrence Berkeley National Laboratory have also created an applied physics summer class targeted at high-school students who do not have the opportunity to take physics at their schools.

Full Evaluation of the LSTPD Program

A full evaluation of the impact of this program will be done in 2008. At that time, the evaluation will cover at least 500 participants who have finished a full three years in the program. Evaluation at the five year point in the program allows enough time to reliably track not only the impact on the quality of the teaching, but also any impact on students. Evaluation will include but not be limited to: 1) evidence of improved content knowledge through testing of teachers, review of teacher work portfolio, technical/scientific publications and presentations, classroom assessments by outside evaluators; 2) evidence of leadership, shown by teachers organizing/presenting workshops and instituting new classes or programs in their respective school systems such as AP courses, science fairs, Science Bowls; 3) and evidence of impact on students, as shown by more students taking advanced or elective science and math courses and participating in science fairs and Science Bowls, more students pursuing science, math, and engineering majors, and improved standardized test scores. This evaluation will be repeated in year ten of the program.

Evaluation of Pre-Service Teacher program

The PST program gives undergraduates planning to become science or mathematics teachers the opportunity to experience how science is performed and to improve both their direct knowledge of the scientific process and their communications skills. The evaluation of the PST program is primarily based on the quality of the participants' submitted research papers, abstracts, and oral presentations, as a measure of their knowledge gained and skills acquired during the program. The submission rate of these required deliverables is better than 95% for each year of the program since it began in the summer of 2000. The abstracts are graded by an outside panel of educators who are all Albert Einstein Distinguished Educator Fellows. PST participants have typically scored slightly above the mean grades in abstracts compared to participants in similar internship programs for other undergraduate students at our National Laboratories. The PST participants, as a group, have also been more likely to have their research papers accepted for publication in the *Journal of Undergraduate Research* compared to other undergraduate students in similar internships at our National Laboratories. PST participants have also presented their work at the American Association for the Advancement of Science national conference.

Continued Evaluation of DOE Programs

In addition to evaluation of students' deliverables, all of the National Laboratories are also evaluated by WDST staff to determine that they are meeting the program criteria and guidelines, such as conducting mentor training sessions and providing academic, professional, and social activities for their interns. Each National Laboratory's education office is also evaluated every year on its execution of all of its education program elements, as well as all other Office of Science-administered programs, by a panel of Einstein Fellows and the Office of Science WDTS office.

For the past four years, particularly in teacher training, the WDTS has been working with the National Laboratories to help them align their education programs with the main principles of No Child Left Behind (NCLB) The WDTS office is currently compiling an inventory of all the DOE education activities through the programs and the Laboratories and their respective funding levels. This inventory will include evaluations that were done on our education programs and will support DOE participation in the Academic Competitiveness Council (ACC).

The ACC, which was established by the Deficit Reduction Act of 2005 (P.L.109-171, Sec.8001) and signed by the President on February 8th 2006, is reviewing science and math education programs across federal agencies. At the Council's first meeting its Chair, Secretary of Education Margaret Spellings stated, "Currently, there are more than 200 programs that focus on math and science, spread across 13 agencies, all of whom were represented today. Our goal is to gauge effectiveness and better coordinate these programs. Over the next several months, we will be looking at the data to see what policies are working for students, and where we can use taxpayers' dollars more efficiently. One of the best ways to do that is to align programs with the principles of NCLB, focusing on accountability, assessment, scientifically based research, local control, and results for students."

K-12 Programs Led by the National Laboratories

The scientific and technical staffs at the National Laboratories have not only enthusiastically participated in the Office of Science-sponsored education programs, but have also initiated independent overhead-funded programs to engage K-12 schools in their respective communities. Each laboratory has a number of outreach programs to their local schools. For example, Lawrence Berkeley National Laboratory (LBNL) offers a popular nanoscience lecture series at the lab on several Saturdays throughout the year. Pacific Northwest National Laboratory and LBNL have been instrumental in helping their respective States establish State teaching standards and guiding the design of various statewide initiatives in science education. Thomas Jefferson National Accelerator Facility has a training program for local K-12 science teachers which has shown a significant impact on student achievement.

Most of the laboratories offer short eight-week summer internships for high-school students. Fermi National Laboratory in Chicago has the Lederman Education Center through which it offers a number of workshops, training programs, and science kits for K-12 students and teachers. Brookhaven National Laboratory has a Science Center that offers similar programs and hosts over 25,000 guests per year. The Lawrence Livermore National Laboratory has the Edward Teller Center that offers training for teachers on various technical subjects, such as DNA isolation and gene duplication, that teachers might wish to perform in their schools but do not have the training to do so. Most of the National Laboratories also host educational websites that provide a rich set of resources and extensive activities for educators and students at all levels.

Working with Other Federal Agencies

Federal agencies develop education programs based on their respective strengths. The Department of Energy's strength is our scientists and engineers and research capabilities at the National Laboratories, and we play to that strength in both our own support of K-12 education and in leveraging our activities with other agencies such as the NSF. We do not believe it is DOE's role to support curriculum development, and we are seldom involved with school systems directly. The exception is the individual local programs at some of the National Laboratories. We also recognize that DOE's contribution to K-12 education programs is quite modest relative to some other Federal agencies. Our strength is in actually "doing" the exciting and cutting edge science, and what we offer to K-12 education is the opportunity to transform teachers of science into "teacher scientists." We believe that we can excite tomorrow's future young scientists and engineers by helping to form motivated and knowledgeable teachers today.

DOE meets regularly with other federal agencies like NSF, NASA, NIH and NOAA to discuss their math and science education programs. We work through the National Science and Technology Council and with our Albert Einstein Distinguished Educator Fellows, who work in Congress and other Federal agencies for one year. The Office of Science has a strong relationship with the NSF in support of science and mathematics education, and we collaborate broadly. In 1999, for example, DOE began a partnership with the NSF "Collaboratives for Excellence in Teacher Preparation" and the National Laboratories to pair future teachers with a Master Teacher and a laboratory scientist to build content knowledge and skills through a

summer research experience at the National Laboratories. This allows NSF's undergraduate pre-service teachers to have access to the same opportunities as our own PST program students.

In 2000, the DOE partnered with NSF to support a new module for the popular NSF-supported *Active Physics* curriculum. This helped the DOE meet its goals for energy education under its Rebuild American program in line with the National Science Education Standards. The "Home Module to Active Physics" followed the content, design, and pedagogical format of the NSF-supported Active Physics Curricula, helping student understand energy conservation and the relationship of energy and matter.

As mentioned above, the DOE also meets with the Department of Education periodically. In a recent meeting regarding alignment with NCLB, the DOE agreed to coordinate some of the activities of the teachers participating in the DOE Laboratory Science Teacher Professional Development Program to help the Department of Education in its Teacher-to-Teacher training program. We will provide some of the teachers the Department of Education needs, teachers who are highly trained in the subjects that they teach and are teacher leaders in their communities.

DOE does not support K-12 education programs designed to target a particular gender, minority, or economic class. The LSTPD teachers and PST undergraduates are selected from broad geographical regions, representing both rural and urban populations. These in-service and future teachers are building science and math content knowledge and teaching skills that have the potential to positively impact the education of the diverse student groups they teach, irrespective of gender or socio-economic differences.

Inspiring Young Minds in Science and Mathematics

The National Science Bowls

To inspire young minds and promote science literacy and enthusiasm for math and science, DOE conducts the National Science Bowl® and the National Middle School Science Bowl. These annual events have generated student enthusiasm for learning about science by engaging over 110,000 students over the years.

The National Science Bowl® is a highly regarded educational event that continues to grow every year in reputation among students, educators, science coaches, and volunteers. It is a very exciting educational experience – an annual "grassroots" program in which more than 1,800 high schools from across the Nation participate in regional events, with the highest performing team from each region then coming to Washington, DC to participate in the national event. The regional and national events are primarily volunteer programs where several thousand people (teachers, parents, and even undergraduates from local colleges) dedicate weeks of their time to support educational events and reward students for their enthusiasm and commitment to STEM.

Since its inception in 1991, more than 110,000 high school students have participated in regional tournaments leading up to the national event. In Washington, students meet many DOE and non-DOE scientists and are given a rare chance to learn firsthand about the wide variety of careers in

science. The 2006 National Science Bowl® will be held April 27 – May 1, 2006, here in Washington, DC, and you are all invited to come and observe this exciting educational event.

It is well recognized that the middle-school years are critical in attracting and retaining student interest in science and math. There are two events at the Middle School Science Bowl: an academic event in mathematics and science, and an activity to design, build, and race hydrogen fuel cell model cars. The academic event is a fast-paced question and answer format where students solve problems about earth, life, physical, and general sciences and mathematics. The model hydrogen fuel cell car competition challenges students to design, build, and race model hydrogen fuel cell cars to help them understand the future energy challenges that our Nation is facing. Students who win in regional events enjoy a trip to a National Laboratory and participate in a final three-day event designed to capture their interest and reward them for their hard work. The inspiration students receive by interacting with scientists and engineers at this age can be a very positive, even a transforming experience and lead them into STEM careers.

Other Inspiring Programs: The World Year of Physics

The activities associated with the celebration of the World Year of Physics is another example of a series of programs that the Office of Science has sponsored to inspire and capture the interest of young minds in science inside and outside of the classroom. In 2005, in coordination with researchers at universities nationwide and the DOE National Laboratories, DOE celebrated the 2005 World Year of Physics through a year-long program of activities and materials highlighting how physics enables advances in science and contributes to our quality of life. In celebration of the centennial of Albert Einstein's "miracle year," 1905, when he published four papers that laid the foundations of much of physics as we know it today, the Office of Science co-sponsored a new PBS NOVA program, "Einstein's Big Idea." The NOVA program aired on PBS stations nationwide in October 2005. Library guides about the program were distributed to 16,000 libraries nationwide, and teacher's guides were sent nationwide to 15,000 high-school physics teachers, 3,700 middle-school physics teachers, and 400 middle-school science chairs. Several of the National Laboratories held special lectures, symposia, and education events for local middle- and high-school students and the surrounding communities.

A DOE/Office of Science website was also created to educate the public about the significance of Einstein's revolutionary work, describe the role of physics in various science and technology fields, publicize events, and highlight the work of DOE-sponsored physicists. The "DOE Physicists at Work" website continues to profile the work of young physicists conducting research in the universities and National Laboratories funded by the Office of Science. Several activities coordinated by the American Physical Society were also co-sponsored by the Office of Science. These included the PhysicsQuest, an outreach event held on the grounds of the Institute for Advanced Studies in Princeton, NJ, that took over 100,000 middle-school students through a series of experiments on a hunt to finding Einstein's "missing treasure", and Physics on the Road, a project that provided materials and equipment for teams of students and faculty from colleges and universities to perform physics demonstrations at schools and other public venues across the nation.

Conclusion

The Department of Energy's strength with regard to education is in using its scientists, engineers, and research facilities at the National Laboratories to provide transforming fellowship, internship, and post-doctoral programs. The multidisciplinary, team-centered, scientific culture of the National Laboratories is an ideal setting for teachers to make the connections between the science and technology principles they are asked to teach. The extensive mentoring expertise of our laboratory scientists provides the basis for lasting relationships that allow teachers to remain connected to the scientific community once they return to the classroom.

By incorporating K-12 STEM teachers into the scientific community of the National Laboratories, teachers are provided many of the tools they need to improve their professional performance, their leadership abilities in the STEM education communities, and most importantly, their students' achievement. While the laboratories are not positioned to support the training of the thousands of STEM teachers in need, the modest numbers of teachers who are building content knowledge and leadership skills at our National Laboratories will become agents of reform and change, not only taking their skills back to the classroom, but also teaching those skills to other teachers through workshops and seminars.

There is a growing recognition that the standard of living we enjoy and the security of our Nation rests on the quality of the science and technology education we provide America's students from elementary through graduate school. The DOE and the Office of Science remain committed to its role in training America's scientists, engineers, and teachers to help ensure that we will have the scientific workforce we will need to stay on the cutting edge of science and technology and to maintain our Nation's competitiveness in the 21st century.

This concludes my testimony. I would be pleased to answer any questions you may have.

James F. Decker
Principal Deputy Director, Office of Science

James F. Decker is the Principal Deputy Director of the Office of Science (SC) in the Department of Energy (DOE). He has held this position since 1985, and has concurrently served as Acting Director for approximately six years on five separate occasions between April 1987 and March 2002.

As Principal Deputy Director, Dr. Decker is the senior career executive who directs the day-to-day technical and management activities of an organization that is the third largest Federal sponsor of basic research in the United States and is viewed as one of the premier science organizations in the world. The SC fiscal year 2005 budget of $3.6 billion funds programs in high energy and nuclear physics, basic energy sciences, magnetic fusion energy, biological and environmental research, and computational science. SC, formerly the Office of Energy Research, also provides management oversight of 10 DOE non-weapons laboratories, supports researchers at more than 275 colleges and universities nationwide, and builds and operates the world's finest suite of scientific facilities and instruments used annually by more than 19,000 researchers to extend the frontiers of all areas of science.

Dr. Decker has held several other positions within DOE. In 1973 he joined the Office of Fusion Energy, Office of Energy Research, as a plasma physicist. He subsequently became the Director of the Division of Applied Physics, where he was responsible for all theoretical fusion and basic experimental plasma physics research, the magnetic fusion energy computer network, and evaluation of novel fusion concepts. Dr. Decker later served as a Special Assistant to the Director of the Office of Energy Research, and as the Director of the Scientific Computing Staff.

Before joining DOE, Dr. Decker was a physicist at Bell Telephone Laboratories where he conducted research in plasma physics and worked on ion implantation for integrated circuit development.

He received a B.S. degree from Union College in 1962, a M.S. degree from Yale University in 1963, and a Ph.D. in physics, also from Yale University, in 1967.

Dr. Decker has received several awards from DOE as well as two Presidential Meritorious Rank Awards. He also is a member of several high-level domestic and international science policy advisory committees.

Dr. Decker was born near Albany, New York. He is married and has two children.