California Council on Science and Technology

MAKING KNOWLEDGE WORK FOR CALIFORNIA

2005 - 2006 Annual Report

CCST: MAKING KNOWLEDGE WORK FOR CALIFORNIA

Karl S. Pister
Board Chair

Lawrence T. Papay
Council Chair

Cornelius W. Sullivan
Council Vice Chair

CCST's mandate is to keep California informed about science and technology issues with economic, social and policy ramifications. For over a decade and a half, we have worked to achieve this goal through an expanding series of reports, conferences, and direct dialogues with California leaders, policymakers, agencies and offices, both in Sacramento and in Washington, DC. However, it is not enough to simply know things. In order for knowledge to make a difference, it must be translated into action.

Action can take many forms. At times, it involves the creation of a policy framework based on research and recommendations developed by CCST, as was the case with the Federal Laboratories Contracting Act and the state's focus on Intellectual Property. More and more frequently, we provide a significant component, the expert voice, of the rich and complex debate surrounding major science and technology related issues in the state.

In recent years, we have experienced a substantial increase in the requests for advice and assistance by state decision and policymakers, which we feel is a significant step toward the continuing fulfillment of our mission. Throughout CCST's history, council members have independently identified important issues requiring the attention of policymakers. We continue to develop an agenda of important science and technology areas to work on, but today, more often than not, policymakers are bringing issues to us for analysis and advice at a much earlier stage in the game. We are helping the state to look at long-term strategies for energy, healthcare information technology, high-tech workforce development, and science and math education; we are helping build a proactive, rather than reactive, vision for handling California's science and technology issues. In this, we feel that CCST has truly succeeded in its mission.

We are confident that CCST provides an increasingly valuable contribution to California policymakers. We continue to work on more efficient ways to connect California's broad spectrum of science and technology expertise and to increase our capacity to provide high-quality, evidence-based science and technology advice to the state.

Karl S. Pister, Board Chair

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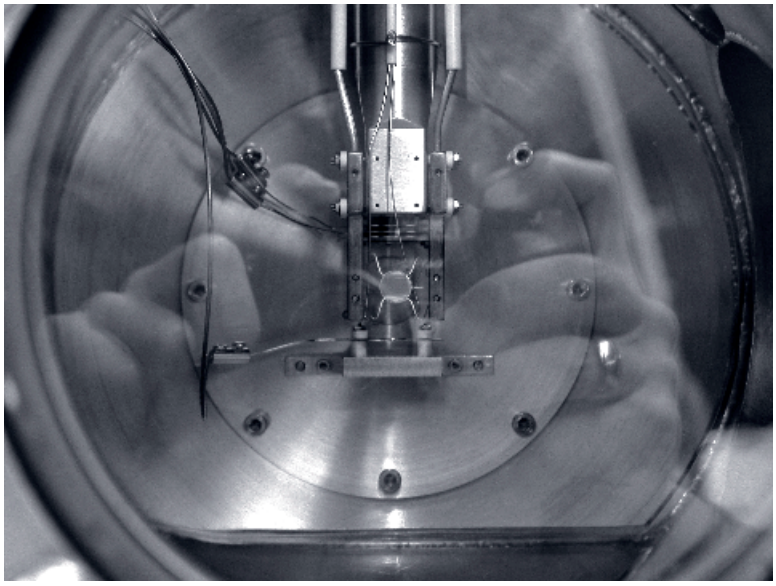
2005-2006 Annual Report



UC Santa Barbara's Wodtke Research Group uses laser-spectroscopy based techniques as well as ultrahigh vacuum surface science techniques to manipulate and monitor molecules at the quantum state resolved level.

California Council on Science and Technology

August 2006

ABOUT CCST

CCST is a nonpartisan, impartial, not-for-profit corporation established in 1988 by state legislation. It is designed to offer expert advice to the state and provide solutions to science and technology-related public policy issues. CCST is modeled in part on the National Research Council, and has developed a close working relationship with the National Academies. More than half of CCST's members and fellows are members of the National Academies, and several are Nobel Laureates.

Since its creation, CCST has worked directly with the Governor's office, state and federal legislators, and agencies to recommend policies that will maintain California's role as a leader in generating technology innovation and maintaining a vigorous economy.

Sustaining Institutions: The strength of CCST lies in the support and resources provided by its sustaining institutions: University of California, California State University, California Institute of Technology, Stanford University, University of Southern California, and the California Community Colleges, as well as affiliate members Lawrence Berkeley, Lawrence Livermore, and Sandia/California National Laboratories, Stanford Linear Accelerator Center, and NASA's Jet Propulsion Laboratory and Ames Research Center. CCST also has strong connections to industry though its membership.

Board and Council: Members of the board of directors and council volunteer their time to govern and guide CCST. The board is made up of leaders from industry and academia. Karl Pister, UC's former vice president for educational outreach and chancellor emeritus of UC Santa Cruz, serves as CCST Board Chairman.

The council is comprised of corporate leaders, academicians, scientists, and scholars of the highest distinction. Lawrence T. Papay, former sector vice president at Science Applications International Corporation, is the chair, and Neal Sullivan, professor of biological sciences and former provost at the University of Southern California, is vice chair.

The board establishes CCST's policies and provides oversight, while the council translates those directives into programs and projects that will ensure the state's science and technology leadership. The council is divided into subcommittees that manage and plan specific projects and studies.

Fellows: The CCST fellows are a select group of scientists, engineers, and technical experts who volunteer their time to address specific projects or conduct reviews. CCST created the program in 1997. Since then, CCST has appointed 120 fellows who are engaged in all aspects of CCST's work addressing important science and technology issues.

California Teacher Advisory Council (Cal TAC): Cal TAC is a group of 12 outstanding K-14 science and math classroom teachers and is modeled after the very successful National Teacher Advisory Council, established in 2002 by the National Academies. Cal TAC works to provide a valuable connection between the teaching community and the educational experts and policymakers who are shaping California's educational system. Stan Hitomi is the chair, and Janet English serves as vice chair.

Staff and Offices: Susan Hackwood is CCST's executive director and provides overall day-to-day leadership. There are two CCST offices. One is in Southern California adjacent to UC Riverside, and the other is one block from the State Capitol in Sacramento. Annzell Loufas directs the Sacramento office.

Response to "Rising Above the Gathering Storm"

Governor Schwarzenegger has requested that CCST help California respond to the National Academies report, *Rising Above the Gathering Storm*. CCST is convening four industry-led task forces to develop actionable items addressing each of the four principal recommendations related to increasing the science and technology talent pool, research base, and business climate in California. The task forces are scheduled to complete their work by the beginning of 2007.

California's Federal Laboratories: A State Resource

In February 2006, CCST released a report on California's major federally funded research facilities and their benefits to the state. The report also identifies challenges the laboratories are facing and ways in which the state could better work to support these important laboratories and make use of their expertise.

Healthcare Information Technology (HIT)

CCST has been focusing a discussion on HIT throughout the year, holding a joint meeting with the Institute of Medicine in October 2005; this meeting, along with subsequent meetings with representatives from the executive and legislative branches of government, led to the development of a proposed California Health Care Infrastructure Authority (SB 1338), currently under legislative consideration.

Policy Framework for Intellectual Property Derived from State-Funded Research

In response to Assembly Concurrent Resolutions 252 and 24, CCST convened a study group to develop intellectual property policy guidelines for the state. The final report was released in January 2006 with specific recommendations for what the state should consider in developing a comprehensive set of state IP policies.

California's Math and Science Teachers: A Critical Path Analysis

Scheduled for publication later in 2006, this report, addressed to California Secretary for Education Alan Bersin, analyzes the production and retention of elementary and secondary math and science teachers in California. The study builds upon the foundation of the original *Critical Path Analysis of California's Science and Technology Education System* and systematically analyzes the current teacher production system and the existing science and math teacher workforce.

Bioethics

At the request of the Assembly Select Committee on Bioethics, CCST convened a panel in December 2005 to assist the state in identifying issues a proposed state council on bioethics should consider, and recommended experts who might be appropriate to serve on or advise such a group. The results were later presented to the select committee in an informational hearing.

Workforce Innovation in Regional Economic Development (WIRED)

CCST has joined a coalition led by the California Space Authority to implement a workforce development project funded by a new $15 million U.S. Department of Labor initiative. CCST's role will involve, among other things, developing an economic model, developing profiles on selected workers within major federal funded laboratories in California, and analyzing how local workforce investment boards could interface with education and industry.

Effective state and federal long-term planning is challenging, particularly for the policy framework and partnerships responsible for supporting the high technology industry and employment that make up such an important part of California's economy.

"Meaningful proactive solutions often require understanding the system as a whole. CCST is constantly working on ways to provide rapid responses to requests from policymakers while seeking to present a bigger picture whenever possible."

Susan Hackwood
Executive Director
California Council on Science and Technology

The challenge is devising long-term solutions in the face of both finite resources and a host of pressing, more immediate needs. In addition, some components of the high-tech infrastructure, such as the education system, take years to manifest any significant changes following shifts in policy. Meaningful proactive solutions often require understanding the system as a whole. CCST is constantly working on ways to provide rapid responses to requests from policymakers as they arise while seeking to present a bigger picture wherever possible.

Last October, the National Academies gave a significant boost to proactive planning efforts both in California and elsewhere with the release of the report, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. The report's conclusions are serious, noting that there is a serious risk that the United States may soon and irrevocably lose its lead in science and technology. And the report's recommendations are sweeping:

- Vastly improve K-12 science and math education.
- Strengthen the nation's commitment to long-term basic research.
- Recruit and retain the best and brightest minds from around the world.
- Encourage innovation.

The *Gathering Storm* has generated a substantial impact among policymakers, communicating the sense that serious, long-term planning must take place if the United States is to remain the world leader in science and technology. That message has taken root, at the national level (where President Bush cited it in his 2006 State of the Union address) and now at the state level. States across the country, including California, are being challenged to develop strategic plans to respond to the *Gathering Storm* report.

CCST has been asked by Governor Schwarzenegger to coordinate a California response to this report. CCST's work already addresses the issues raised by the *Gathering Storm*; for example, improving our science and technology education system is one of the four components of this response, and we have already been focusing on the issue through projects such as *California's Math and Science Teachers: A Critical Path Analysis* and through direct collaboration with our constituent institutions. The California State University, for instance, has already devised a seven-point action plan to improve its production of science and math teachers, and other institutions are following suit.

We believe that with concerted effort, informed and supported by higher education, business and industry and the federal funded laboratories, all of which are represented in the CCST board and council, California can achieve the ambitious goals set out in the National Academies report. CCST is effectively positioned to work not only with these groups, but with the National Academies, to help California develop long-term solutions.

RISING ABOVE THE GATHERING STORM

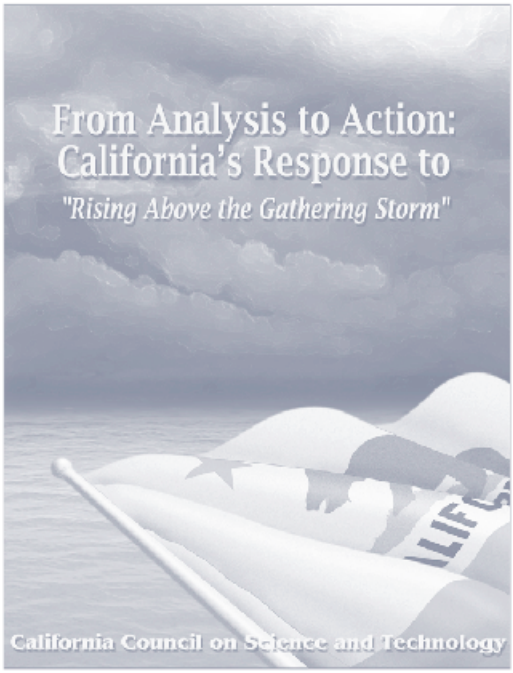
CCST received a request from the Governor asking for assistance in the development of a California response to the National Academies report, *Rising Above the Gathering Storm*. This October 2005 report contains a strong message that the nation's science and math education and economic environment need serious attention in order to safeguard the future prosperity of the nation.

In response, CCST is preparing a list of "actionable" items prepared by representative constituencies of CCST that have short-term and long-term components. This is being accomplished by convening four industry-led task forces to identify state assets and brainstorm about concrete actions by government, business and industry, higher education, and federal laboratories in the state. Industry is the driver of the state's economy, and S&T workforce issues affect industry directly; it is for this reason that CCST, with connections to industry, education, and the federally funded laboratories, was considered appropriate to develop this response and bring CEOs into the task forces.

Each of the four task forces is focusing on one of the National Academies main recommendations related to increasing the talent-pool, research base and business climate. Interpreted for California, these recommendations are:

- Increase California's talent pool by vastly improving K-12 science and mathematics education.
- Sustain and strengthen California's commitment to long-term basic research that has the potential to be transformational to maintain the flow of new ideas that fuel the state's economy, provide security, and enhance the quality of life.
- Make California the most attractive setting in which to study and perform research so that we can develop, recruit, and retain the best and brightest students, scientists, and engineers from within the U.S. and throughout the world.
- Ensure that California is the premier place in the world to innovate; invest in downstream activities such as manufacturing and marketing; and create high-paying jobs that are based on innovation by modernizing the state's intellectual property policies, realigning tax policies to encourage innovation, and ensuring affordable broadband access.

CCST has identified CEOs to lead the task forces and to begin raising funds for the effort. Considering the gubernatorial election in Fall 2006, there is an opportunity to provide action plans to either the incumbent or new administration. To that end, this project has been initiated as quickly as possible. CCST will present initial results from the task forces at the September 2006 National Academies Convocation on the *Gathering Storm* in Washington, DC. A final set of actionable items will be delivered to the state government in December 2006, and CCST will maintain a catalytic role in rolling out the action plans in early 2007.

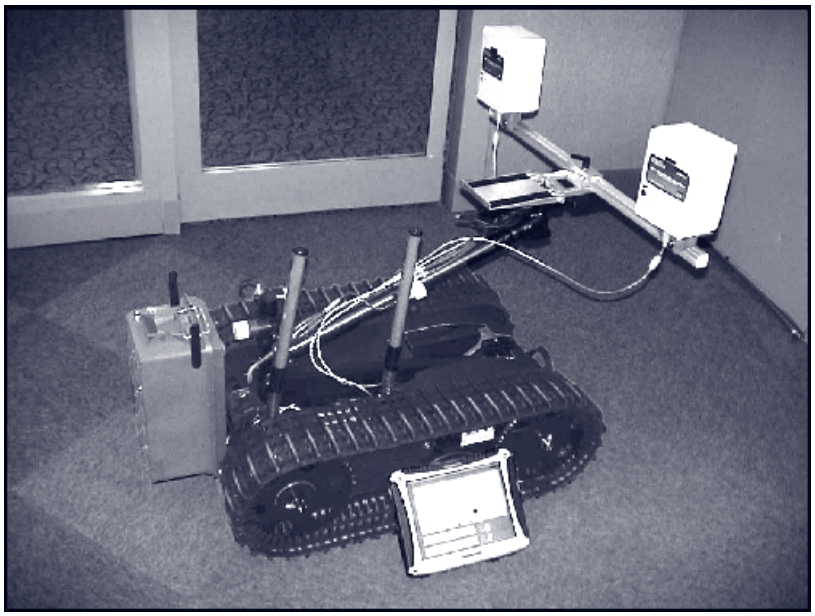


CALIFORNIA'S FEDERAL RESEARCH AND DEVELOPMENT LABORATORIES

At a time when California's economy, energy needs, and security increasingly rely on scientific and engineering expertise, federally funded laboratories provide critically important know-how and highly specialized facilities.

California has over 40 federal laboratories, more than any other state, and their presence spurs innovation in high-tech industries. They also serve as a magnet for some of the best scientific minds in the nation. Even so, they remain a largely untapped resource by the state. As part of a new collaboration with six major federal research and development laboratories, CCST released a report in February 2006, *California's Federal Laboratories: A State Resource*, intended to document the impact of these facilities and examine ways in which the state could connect with them even more effectively.

> *"It is gratifying when a CCST report has a direct impact, and rarely is that impact so rapid or direct... Clarifying what these facilities represent is the first step in helping California make the most of what they have to offer, and act to maximize their chances for success."*
>
> CCST Council Chair Lawrence Papay



Urban Eyes provides the capability to detect, locate, track and identify personnel behind obstructions from a standoff distance using ultra-wideband (UWB) radar sensors in remote or other locations that do not necessarily provide communications infrastructure. Photo courtesy of Lawrence Livermore National Laboratory.

The report, written in response to a request from State Senator Jackie Speier, co-chair of the Senate Subcommittee for Higher Education, focuses on the six largest of California's Department of Energy and NASA funded federal laboratories that have ongoing relationships with research universities, including Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, Sandia National Laboratories/California, Stanford Linear Accelerator Center, NASA Ames Research Center, and the Jet Propulsion Laboratory. It outlines the research they conduct on materials science, energy research, computer science, aerospace engineering, and biotechnology. The report also highlights the collective impact of these facilities on the state's economy. For example, they have a combined budget exceeding $5 billion and employ over 23,000 high-tech workers. In addition, they play an important role in education by working with students, faculty and teachers through a wide variety of programs.

> *"Inside [this report] is an amazing perspective that deserves the immediate attention of state policymakers. We are sitting on a gold mine of technology that can energize our economy and we're not mining it – in fact, we're not even prospecting yet."*
>
> State Senator Jackie Speier

One of the key messages in the report was the fact that contracting procedures between federal and state government make it virtually impossible for the state to contract with federally funded laboratories, making much of the labs' cutting-edge research and development inaccessible to the state. This includes technologies used by the federal government in response to natural and manmade emergencies such as NASA satellite tracking of levees and field robots (the Lawrence Livermore National Laboratory "Urban Eyes" system) capable of locating flood and earthquake victims.

The CCST report was well received in Sacramento upon its release on February 1st, the same day as CCST's first meeting of the year. State Senator Jackie Speier found the message in the report so compelling that she held a press conference to announce legislation addressing some of the challenges identified in the report.

"I didn't quite expect the report I received," said Speier at the February press conference. "Inside is an amazing perspective that deserves the immediate attention of state policymakers. We are sitting on a gold mine of technology that can energize our economy and we're not mining it – in fact, we're not even prospecting yet."

The procedural incompatibility has long been a source of frustration for the federal laboratories, but was not widely known among state policymakers prior to the release of the CCST report.

"I say if it is a matter of saving lives and our economy, let's contract, let's put the technology to use as soon as possible," said Speier.

Senator Speier, together with Assembly Members Sally Lieber and Betty Karnette, proposed a bill, SB 1629 (the Federal Laboratory Technology Contracting Act), which will "modify the existing contracting procedures and policies to authorize a state agency that contracts with a federally funded research and development center, to make contract payments in advance."

In addition to presenting the federal laboratories report to Sacramento lawmakers, CCST Executive Director Susan Hackwood and CCST Fellow William McLean, former director of combustion and physical sciences at Sandia Labs/California, went to Washington, DC to visit the offices of Senators Boxer and Feinstein as well as 18 California congressional representatives; Congressman Ken Calvert hosted a reception for CCST to recognize the launch of the report.

The report represents the first major component of a multi-year affiliate member collaboration between CCST and the federal laboratories. In the coming year, CCST will also study the federal laboratories' relationship with research universities and industry. The laboratories will also work closely with CCST in pursuing other areas of inquiry such as California energy policy and education reform.

RECOMMENDATIONS FROM THE LABS REPORT

- Streamline the contracting process with the state.
- Allow state agencies to pay for technical services in advance, per federal procedures, and develop standardized contract models.
- Create bridges between laboratory and state officials.
- Targeted information exchange workshops facilitated by CCST will enhance working relationships and help match laboratory expertise to pressing state agency needs.
- Use the laboratories to enhance state research on key issues such as homeland security.
- Livermore, Sandia and Ames are developing leading homeland security technologies; some contact has been made here but more could be done.
- Assess the state's competitive edge.
- Find out what research capabilities and facilities the state will need to remain competitive in key fields and industries, and to help the laboratories and the state effectively partner to bring these resources to California.

HEALTHCARE INFORMATION TECHNOLOGIES (HIT)

America spends $1.7 trillion on healthcare each year, but the system remains highly inefficient. High-tech treatments abound, but some of the simpler things, such as keeping track of a patient's chart, can be challenging. Healthcare information technology (HIT) is a field that offers a wide range of information technology applications to help administer healthcare more effectively, and CCST has worked over the past year to help California design a framework to enable consistent HIT standards throughout the state.

One of the biggest HIT goals is the creation of a statewide data exchange system and integration of the healthcare system. While there are many logistical obstacles to designing and implementing such a system, this integration could significantly improve the efficiency of healthcare. In one study, according to the California Regional Health Information Organization, physicians could not find information previously recorded in paper charts 30% of the time and weren't aware of 25% of prescriptions given to patients.

At the October 2005 meeting, held jointly with the Institute of Medicine, CCST concluded that the implementation of healthcare information technologies (HIT) in California was both a huge problem and an opportunity for closing inequities in healthcare costs. Subsequently, with the guidance of CCST members Steve Bruckman, Alfonso Cardenas and Steve Ryan, we have been identifying ways for CCST to elevate the awareness and importance of this issue to state legislators and policymakers, meeting with technology experts from private companies such as Google and the Governor's office.

Following the October Council meeting and subsequent discussions with policymakers, Senator Elaine Alquist introduced SB 1338, which would create a California Health Care Infrastructure Authority. The bill would also charge the Department of Health and Human Services to develop a plan to implement electronic health care records for every resident of the state. In July, Governor Schwarzenegger emphasized the importance of this issue by signing an Executive Order which uses much of the language from SB 1338, calling for a "California eHealth Action Forum" to solicit input and participation in the development of a state policy agenda "to improve health and healthcare through the rapid implementation of health information technology." SB 1338 addresses two issues not covered in the Executive Order (workforce development and personal health record access by individuals).

INTELLECTUAL PROPERTY

In January 2006, CCST released the final report from a study group convened to provide a blueprint for California's intellectual property (IP) policies. The study group consisted of a diverse collection of 17 leaders from California's science and technology community selected for their expertise in IP.

The report, *Policy Framework for Intellectual Property Derived from State-Funded Research*, concludes that the state would be best served by letting inventors own the results of their research, and recommends that California allow universities and other research institutions to retain ownership of inventions developed through state funding with certain restrictions and requirements. A consistent approach is important because the way that IP is handled affects the environment in research institutions as well as the business and industry environment necessary for risk taking.

This approach is largely consistent with federal IP policy (the Bayh-Dole Act) that has allowed researchers to own the patenting rights to federally funded research since 1980. The Bayh-Dole Act appears to have been successful in fostering an effective environment for innovation and bringing these innovations to market, and it would be logical for California to devise a set of policies consistent with this federal environment. Furthermore, extensive research at the federal level has demonstrated that there is a substantial return on investment for basic research funded by the federal government and by private industry, but that this investment takes years, even decades, to manifest. Furthermore, the benefits of this investment are largely indirect, affecting the economy in a variety of ways.

> *"Consistent IP policies increase opportunities for the development of new products and services...key goals in creating a California set of policies would be to streamline contracting processes, preserve the state's rights, and minimize the costs of doing so."*
>
> Stephen Rockwood
> Executive Vice President, SAIC
> Co Chair Intellectual Property Study Group

The CCST report was prepared in response to Assembly Concurrent Resolution (ACR) 252 and ACR 24, authored by Assembly Member Gene Mullin. ACR 252 requests that CCST develop recommendations on how the state should treat IP created under state contracts, grants, and agreements; ACR 24 requests that CCST address specific issues relevant to the California Institute for Regenerative Medicine (CIRM). As requested in the legislation, the CCST study group worked with the State Department of General Services, state government experts in contract and licensing, research and development practitioners, experts in technology transfer, and individuals representing the public interest.

The IP study group made headlines around the state in August 2005 when it released an interim report targeted specifically for CIRM at the request of ACR 24. That report stressed the importance of focusing on bringing therapies to market as efficiently as possible via accelerated commercialization of treatments. In February 2006, CIRM ratified an intellectual property policy which closely follows many of the recommendations of the interim report.

Since the release of the report, Assembly Member Mullin proposed a second bill, AB 2721, that adopted many of the study group's recommendations including the establishment of a central office to track state-funded IP.

CALIFORNIA'S SCIENCE AND MATH TEACHERS: A CRITICAL PATH ANALYSIS

At the request of the Governor's Secretary for Education, CCST is completing a report analyzing the production and retention of K-12 science and math teachers, scheduled for publication later in 2006.

Accurately describing the true supply and demand of science and math teachers in California is a challenging task. To help understand the scope of the problem and provide background for California policymakers, the California Council on Science and Technology, in collaboration with the Center for the Future of Teaching and Learning (the Center), set out to conduct a "critical path analysis" of science and math teacher production in California.

A critical path analysis (CPA) is a tool often used in industry to plan complicated projects and analyze complex business processes. It shows diagrammatically the interrelations in sequence of all the activities in a project in such a way as to highlight those that are critical for the performance of the overall work. For this report, CCST used some of the techniques of a formal CPA to perform a comprehensive examination of each component of the preparation system for science and math teachers in California.

The scale of the gap between production and demand is significant. California hires over 4,000 science and math teachers per year; its teacher preparation programs graduate no more than half this amount. While the state has turned to developing new pathways for producing teachers (primarily university internships, in which prospective teachers begin teaching while earning their credentials), there are questions as to the quality and consistency of these programs, and over a third of incoming science and math teachers are using either emergency credentials or waivers. Just over half of incoming science and math teachers hold a preliminary or clear credential, compared to 75% of the overall new teacher hires.

"We are courting disaster with how we prepare, train and allocate our teaching force. The students who need good teachers are by far the most likely to get the least prepared ones."

Margaret Gaston
Executive Director
Center for the Future of Teaching and Learning

This project is a confluence of many years of independent research efforts by CCST and the Center. CCST has been considering science and technology education as a means of understanding S&T workforce production and, by extension, the health of California's vital S&T economic sector. In its 2002 *Critical Path Analysis of California's Science and Technology Education System*, CCST examined the entire education system as a single process, from kindergarten through postsecondary. That report analyzed science, technology, engineering and mathematics (STEM) degree production in detail in order to determine which points in the education system were impeding success. The Center, in turn, has been documenting the status of the teaching profession in California through a series of annual reports beginning in 1999.

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El Camino College

Descriptive Analysis of Mathematics Teacher Preparation at California Public Colleges and Universities

Yvonne Lux
The Educational Research and Leadership Institute
California Lutheran University

A Descriptive Analysis of Professional Development and Induction for Teachers of Mathematics in California

Eugenia Mora-Flores
Rossier School of Education
University of Southern California

Descriptive Analysis of Science and Math Teacher Preparation though Credentialing in the State's Private Colleges and Universities

Patrick Shields
Center for Education Policy
SRI International

The Supply, Demand, and Distribution of Mathematics and Science Teachers in California

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Science Teacher Induction and Professional Development in California

WORKFORCE INVESTMENT IN REGIONAL ECONOMIC DEVELOPMENT (WIRED)

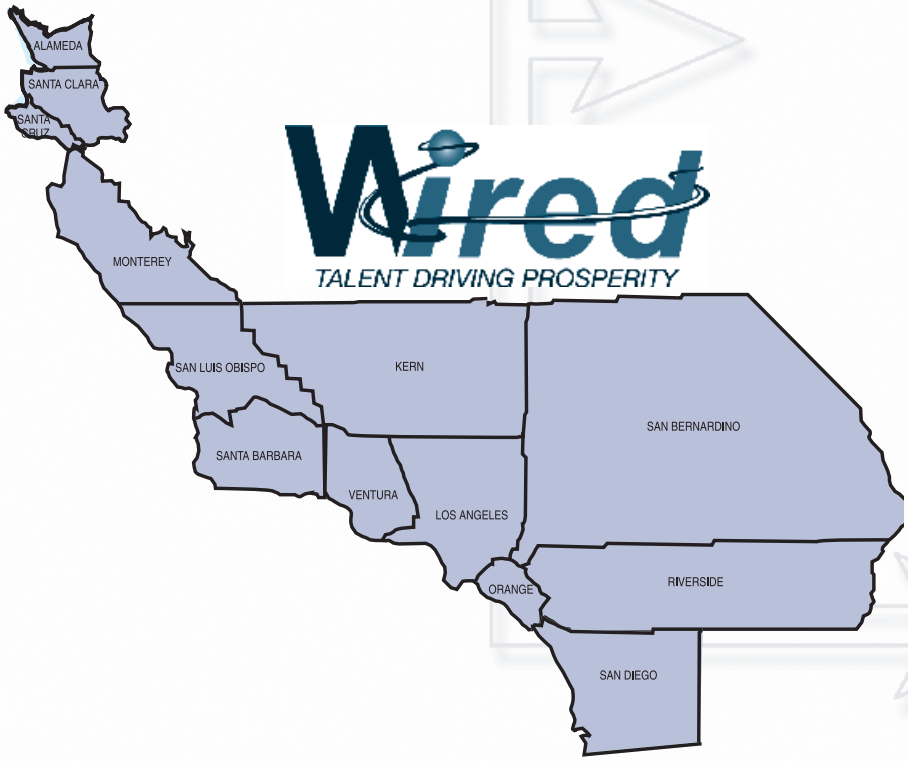
The California Space Authority (CSA) has invited CCST to join in implementing a workforce development project funded by a new $15 million U.S. Department of Labor (DOL) initiative, Workforce Innovation in Regional Economic Development (WIRED).

CSA is a nonprofit corporation representing the commercial, civil, and national defense/homeland security interests of California's diverse space enterprise community in four domains: industry, government, academia, and workforce. The WIRED project focuses on a 13 county economic region comprising the "California Innovation Corridor", an area of California that has a wealth of world-class research centers and technology companies, but limited support for entrepreneurial advancement. In addition to the need for greater financial support for further developing new ideas, the 13-county region — stretching from Alameda County in the San Francisco Bay Area to San Diego County — has also experienced a decline in manufacturing jobs. That creates an opportunity to re-train workers in new skills and transform manufacturing to meet new technology demands.

The DOL initiative is part of an ongoing federal level focus on U.S. economic competitiveness, particularly in the areas of science and technology, stemming in part from the National Innovation Initiative launched in 2003 by the Council on Competitiveness, and reinforced by warnings in reports such as the National Academies' *Rising Above the Gathering Storm* and the President's American Competitiveness Initiative. The grant award is designed to strengthen worker training programs and create new jobs.

CSA will lead the program and focus on three key objectives:

- Build and support sustainable entrepreneurship,
- Support industrial rejuvenation for the manufacturing value chain and supplier competitiveness, and
- Develop technical talent.



In addition to CCST, the CSA coalition includes over 60 partners, including regional organizations such as the Bay Area Economic Forum, and private companies such as Boeing and Lockheed Martin, and NASA. CCST's role will involve, among other things, developing an economic model that leverages federal science and research assets, developing profiles on workers within the federal lab system already employed in high-impact areas, and outlining how local workforce investment boards could interface better with economic development professionals, education, and industry to ensure science and tech-savvy workers for the future.

EDITORIAL: THE ROAD TO INFORMED POLICY

State legislators and executives determine the state's priorities and expenditures in education, energy, security, transportation, natural resources, healthcare, and many other areas, but most policymakers simply cannot effectively assess all the choices posed by science and technology or recognize many of the problems they could solve. Government officials have faced several topics with significant technical components in recent years, such as the regulation, control, and generation of energy; intellectual property policy; and bioethics, among other things. These are complicated issues involving cutting-edge research and having substantial or potentially substantial policy and fiscal impacts on the state.

CCST's mandate is to help inform policymakers about such issues and to enable them to pursue an evidence-based decision making process. During the past year, CCST has worked closely and helped translate analysis into positive policy action. In some cases, CCST has been able to identify issues about which state officials may not have been aware. Our analysis of the Department of Energy and NASA funded federal laboratories, *California's Federal Laboratories: A State Resource*, highlighted the largely unrecognized collective impact of these facilities on California in a variety of ways, and made state officials aware of a conflict between state and federal contracting procedures which impeded the state's ability to access the expertise of these laboratories. We are very pleased that, almost immediately upon the release of this report, state lawmakers proposed legislation to address the conflict and enable California to make use of the research capabilities of these facilities.

But while it is necessary for the state to be able to react to new information, informed policy must involve planning as well. In the past year, CCST has responded to requests to proactively analyze two policy issues: that of intellectual property policy and bioethics. For the intellectual property policy, CCST was requested to convene a study group to explore a possible IP policy framework for the state, as well as for the newly formed California Institute for Regenerative Medicine. The study group released its final report in January 2006, leading to legislation that would, if passed, create the first comprehensive state-level IP policy framework in the country. For bioethics, Assembly Member Lori Saldaña, chair of the Assembly Select Committee on Bioethics, approached CCST to assist in identifying issues which a state council on bioethics might consider, and in identifying experts who might be appropriate to serve on or advise such a group.

And most recently, Governor Schwarzenegger has requested that CCST develop recommendations for the state to address a response to the educational and economic issues recently highlighted by the National Academies report *Rising Above the Gathering Storm* to ensure the vitality of Califonia's science and technology sector.

It is not CCST's role to formulate policy, but to inform policymaking. In the case of the IP and bioethics analyses, CCST was asked not only to answer technical questions, but to help determine what questions would be appropriate to discuss. We are very pleased that the Governor, the Legislature, and state agencies are approaching CCST for input at increasingly early stages of discussing the many science and technology policy related issues affecting California. It is a genuine fulfillment of our mandate to advise the state effectively, and one which we look forward to continuing and building upon in the years to come.

Molly Coye

OCTOBER 2005
MAJOR THEME: Healthcare Information Technologies

The implementation of healthcare information technologies (HIT) in California is both a huge problem and an opportunity for closing inequities in healthcare costs, according to CCST Fellow Molly Coye.

"The development of integrated digital patient records could have a significant impact on the quality and safety of healthcare in California," said Coye, founder and CEO of the Health Technology Center (HealthTech), a non-profit education and research organization established in 2000 to advance the use of beneficial technologies in promoting healthier people and communities. " At HealthTech, we have been working to provide objective technology forecasts, innovative decision-making tools, and expert learning networks for medical institutions and organizations around the country. However, there is a direct role that state government needs to play in order to foster truly effective integration of HIT."

The government needs to create incentives, standards, and related enabling legislation to help HIT develop in a way that will systematically improve quality and efficiency throughout the state, according to Coye. The state's role could include accelerating market forces through incentives to adopt and use standards, and subsidizing change by targeting the development of regional health information exchange networks and decreasing risk in HIT adoption.

The meeting was jointly held with the Institute of Medicine.

Raymond Seed

JANUARY 2006
MAJOR THEME: Emergency Response

The dramatic levee failures that led to the inundation of New Orleans are the greatest disaster to hit an American city, but a similar situation could happen in California with even larger consequences, according to Raymond Seed, the keynote speaker at the January meeting.

Seed, a professor in the Department of Civil and Environmental Engineering at the University of California, Berkeley, warned that the levees protecting the Sacramento Delta have an even greater chance of failure than the New Orleans levees did. In his presentation, *Performance of the New Orleans Flood Defenses in Hurricane Katrina and a Look at the State of California's Levee-Related Exposure*, he noted that while Sacramento would be easier to evacuate than New Orleans in case of flooding, California faces additional challenges.

"We have the additional risks of earthquakes," said Seed, "and the sand-based levees used throughout much of the Sacramento Delta perform much worse against seismic disturbances." Another serious issue is the fact that over two thirds of California's water supply is channeled across the Delta; if the region were to flood, the water delivery system could be knocked out for up to two years.

"In general, people don't want to deal with long-term, expensive planning," said Seed. "But there are solutions California should pursue."

MAY 2006
MAJOR THEME: California's Energy Future

Harold Ray

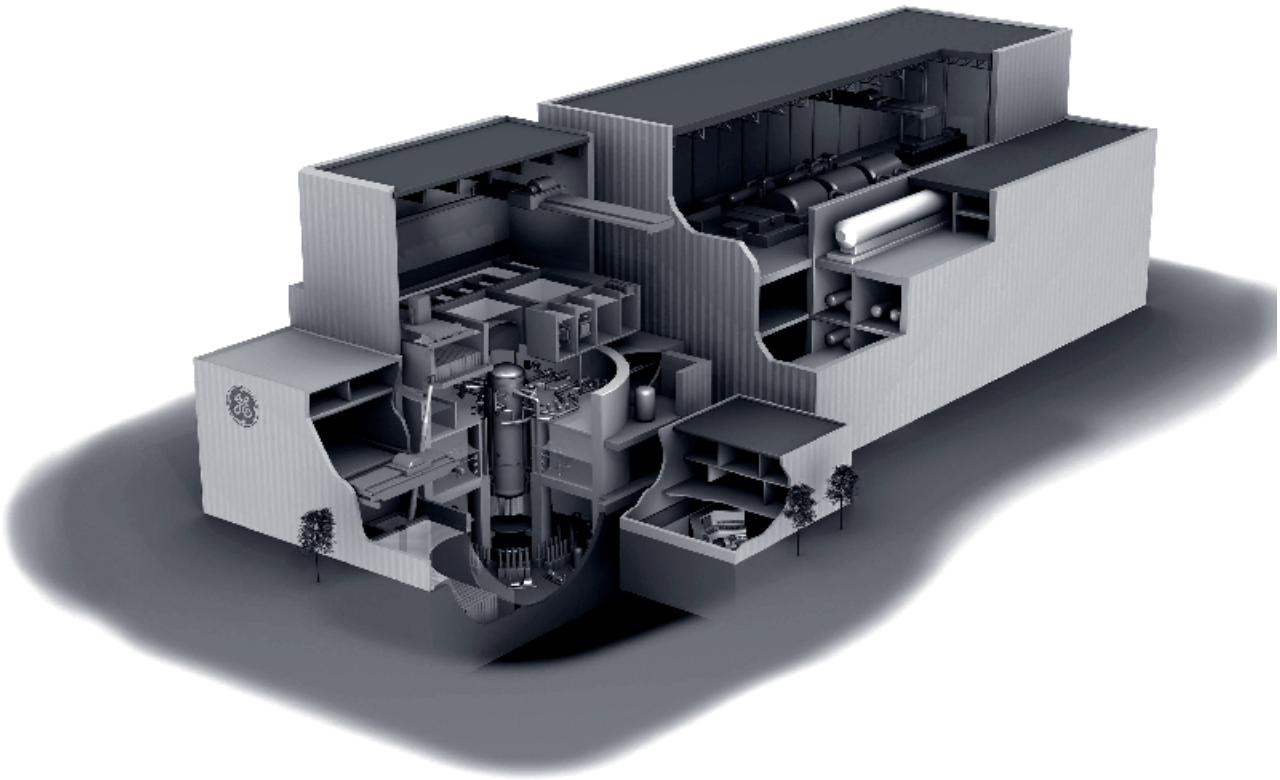
Keynote speaker Harold Ray, consultant and retired executive vice president, Southern California Edison, and former president of the American Nuclear Society, told council members that California needs to begin in-depth discussions of its energy future if it is to create a balanced energy portfolio that meets environmental standards.

In his talk, *Challenges and Opportunities in Emissions-free Electricity Generating Resources*, Ray noted that nuclear power must increasingly be considered a central source of energy for sustainable development if global energy demand continues to grow exponentially.

"Fossil fuel dependency is not a long-term option," said Ray. "The challenges posed by global climate change, together with the availability and price of oil and gas, have raised serious concerns about energy independence, sustainability, competitiveness, and security."

A new national initiative is being considered, referred to as the Global Nuclear Future Initiative, which is designed to position the United States to have international influence over the expanding global use of nuclear energy. This is a state as well as a national issue because state legislation on spent nuclear fuel waste disposal currently precludes any new construction of nuclear power plants.

"Nuclear power will be a major tool for greenhouse gas abatement," said Ray.



The General Electric ESBWR (Economic Simplified, Boiling Water Reactor) under development constitutes an evolution and merging of several earlier designs, the intent of the new design is to cut construction and operating costs significantly. Image courtesy of the UC Berkeley Department of Nuclear Engineering.

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