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WIRED in the
California Innovation Corridor:
An Opportunity for Partnership with
the Department of Defense

STEM CAP meeting
Westin Los Angeles International Airport
December 9, 2006

Background

US DOL “WIRED” Project Workforce Innovation through Regional Economic Development

California Innovation Corridor

“Workforce Transformation: Innovation Support, Industrial Rejuvenation, Talent Development”

- 13 county economic regions, 60+ partners and supporters

Project Lead: California Space Authority
Hon. Andrea Seastrand, Executive Director



California Innovation Corridor

- From Alameda County in the north
- To San Diego County in the south
- Inland Empire, Antelope Valley and Kern Country



Project Goal

“Develop a collaboration and a strategic action plan to increase the number and support the development of science, technology, engineering and math (STEM) students, graduates, teachers, professors and mentors within the California Innovation Corridor and the State of California, leveraging the resources and efforts not only of education and academia (K-20, public and private), but of industry and the informal science network”

The Labor Challenge

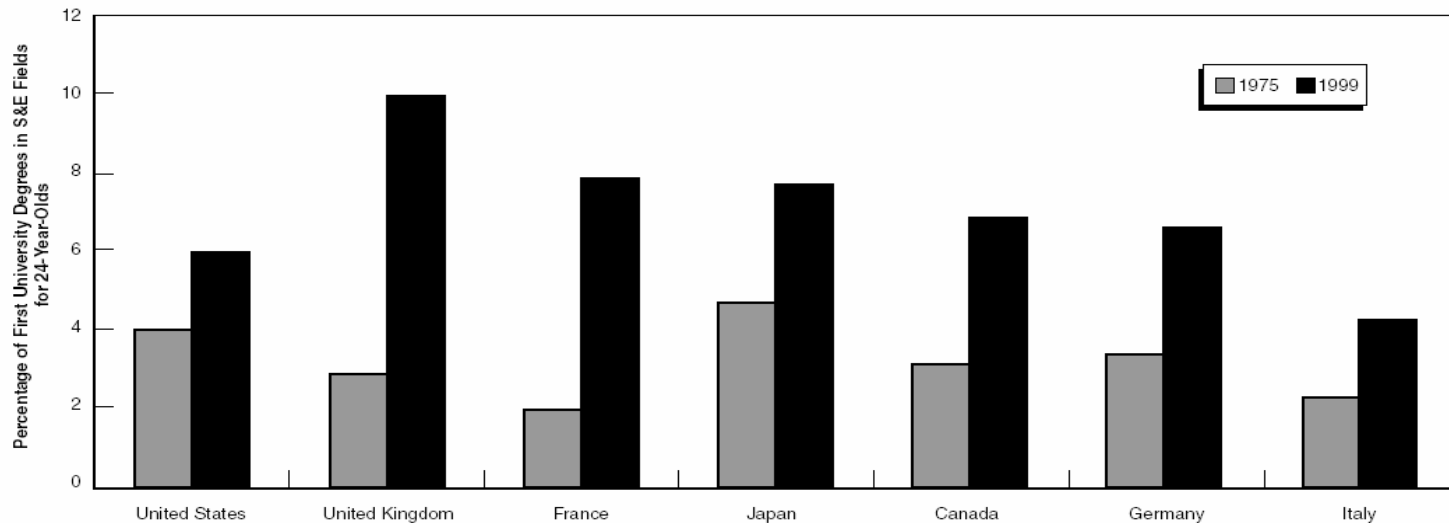
- Jobs requiring science, engineering and technical training will increase 51% nationally through 2008, leading to 6 million potential job openings for scientists, engineers, and technicians.
- In CA., fewer than 20,000 STEM graduates are produced annually.
- To make up for the shortfall, the number of such degrees produced in the state would need to increase by nearly 70%

The Academic Challenge

- The number of engineering degrees awarded in the U.S. in 2005 was down 20% from the peak year of 1985. From 2003 to 2004, the number of engineering doctorates dropped 22%.
- Out of 1.1 million high school seniors in the U.S. who took a college entrance exam in 2002, just under 6% indicated plans to pursue a degree in engineering.
- Nearly a 33% decrease in interest from the previous decade.

US and its Competitors: Science & Engineering Degrees

A YOUNG ADULT'S PROBABILITY OF GETTING AN S&E DEGREE HAS RISEN MUCH LESS IN THE UNITED STATES THAN ABROAD



Source: *Science and Engineering Indicators* (2002).

Figure 3. Ratio of Natural Science and Engineering First University Degrees Awarded to 24-Year-Old Population, by Country, 1975 and 1999 (Rand study, 2003)

The US graduates proportionately fewer science & engineering BS students than its international competitors

California needs...

- To develop well-trained technical workforce at all levels comprised of U.S. citizens for high-tech industries located here that support U.S. defense
- To build on existing partnerships and programs that are now starting to collaborate because of the WIRED grant

Current California STEM Assets

- Industry
- DOD-funded assets
- Higher Education
- Informal Learning Centers
- P-20 partnerships

Defense: The Second Largest Industry in CA

- **Defense is California's second largest industry, surpassing even agriculture.**
- **Annual defense spending on payrolls and contracts approximately \$39 billion.**
- **279,000 personnel employed in CA by DoD including active-duty military, civilians, Reservists and Nat'II Guard**
- **Employed at 30 major and dozens of minor installations**
- **Many prior DoD (retired, separated etc) end up working for CA Space industry**
- **Serving DoD's STEM needs a high priority for CSA/CSEWI and CIC (WIRED) partners**

CA's Technological Expertise and Resident Human Capital are Critical to Military

- **DoD R&D complex highly integrated in CA**
 - **CA has been center of U.S. Aerospace industry since before WWII to serve the military**
- **Defense and aerospace industries supported by CA**
Higher Ed – CalTech, USC, Stanford, UC system, Naval Postgraduate School and Lawrence Livermore Nat'l Lab are as inextricably linked to nation's aerospace superiority as are companies like Boeing, Lockheed Martin, Northrop Grumman, and Raytheon.
- **The link between these universities and their research to technology from Silicon Valley is critical to military transformation, as part of the network-centric approach to military operations and command and control.**

CA's Technological Expertise and Resident Human Capital are Critical to Military - cont.

- **Military presence throughout state of CA contributes to recruiting, not only military personnel but also new engineers and researchers**
- **From this network of of civilian and military, private and government resources in CA has come such innovations as stealth aircraft, reconnaissance satellites, and unmanned aerial vehicles.**
- **HR data from leading aerospace companies identifies an attrition rate in excess of 45%, regardless of incentives, when senior managers and engineer are required to move from CA locations**

List of Main DOD and DoD-Related Assets

- **Air Force 30th Space Wing**
- **Air Force Flight Test Center**
- **Air Force Space & Missile Systems Center**
- **Air Force/AFRL- Propulsion Directorate**
- **Army Aeroflightdynamics Directorate**
- **Army Defense Language Institute Fisheries**
- **DOD- Defense Microelectronics Activity**
- **DOE Lawrence Berkeley National Laboratory**
- **DOE Lawrence Livermore National Laboratory**
- **DOE Oakland Operations Office**
- **DOE Sandia National Laboratories**
- **DOE Stanford Linear Accelerator Center**
- **NASA Ames Research Center**
- **NASA Jet Propulsion Laboratory**
- **Naval Air Warfare Center- Weapons Division**
- **Naval Facilities Engineering Service Center**
- **Naval Health Research Center**
- **Naval Medical Center- San Diego**
- **Naval Postgraduate School**
- **Naval Surface Warfare Center- Indian Head Div.**
- **Naval Surface Warfare Center- Port Hueneme Div.**
- **Navy Drug Screening Laboratory**
- **Navy SPAWAR Systems Center, San Diego**

Higher Education

- Universities
 - 76 Private colleges and universities
 - 10 campuses of the University of California
 - 23 campuses of California State University
 - 109 community colleges
- Data re STEM degrees per year

40+ Informal Science Learning Centers

- **Ag Science Center**
- **Bay Area Discovery Museum**
- **Birch Aquarium at Scripps**
- **CA Academy of Sciences**
- **CA Science Center**
- **Castle Science and Technology Center**
- **Chabot Space & Science Center**
- **Children's Discovery Center of San Jose**
- **Children's Museum of La Habra**
- **Columbia Memorial Space Science Learning Center**
- **Coyote Point Museum for Environmental Education**
- **The Discovery Center for S&T**
- **Discovery Museum, Sacramento Museum of History, Science, Space & Technology**
- **Discovery Science Center**
- **Downey Planetarium**
- **The Exploratorium**
- **Explorit Science Center**
- **Fresno Metropolitan Museum of Art, History and Science**
- **Hall of Health**
- **Happy Hollow Park & Zoo**
- **Humbolt State Univ. National History Museum**
- **Huntington Botanical Gardens**
- **Jet Propulsion Laboratory**
- **Kern County Museum**
- **Kidspace Children's Museum**
- **Lawrence Hall of Science**
- **LLNL – Discovery Center**
- **Lindsay Wildlife Museum**
- **Natural History Museum of Los Angeles County**
- **Palo Alto Junior Museum and Zoo**
- **Randall Museum**
- **Reuben H. Fleet Science Center**
- **San Diego Natural History Museum**
- **Santa Barbara Museum of Natural History**
- **The Tech Museum of Innovation**
- **Turtle Bay Exploration Park**
- **U.S. Army Corps of Engineers – Bay Model Visitor Center**
- **World of Wonders Science Museum**
- **Zeum**

CA Intersegmental STEM Programs for Students and Teachers

- **Mathematics, Science, Engineering Achievement – MESA**
 - Partners include UC, CSU, Community Colleges, independent colleges and universities, community organizations, industry
- **California Science and Mathematics Projects**
 - Professional development at CSU and UC campuses around the state

The California Science Project

Science Inquiry: Advancing the Frontiers of Knowledge

- The central mission of the California Science Project (CSP) is to develop and enhance teachers' science content knowledge to improve the teaching and learning of science for all students in grades K-12.
- At the core of every CSP program are a set of common goals.
- The California Science Project (CSP) is part of the California Subject Matter Projects (CSMP), a statewide professional development network comprised of the nine disciplines required for graduation from high school and admission to California universities. The CSMP is administered by the University of California Office of the President and has convenient sites at the campuses of the University of California, California State University, and independent colleges and universities.

Founded: 1989

Key Numbers

- Sites: 18
- Programs: 384
- Participants: 4,154
- Contact Hours: 99,283

The California Science Project

Science Inquiry: Advancing the Frontiers of Knowledge

- “To reform education, to make a bold move toward closing the achievement gap, we have to come together as one mind and develop reading, writing, and thinking skills within each subject area. Imagine the power of students experiencing the same high expectations in every subject!”
- Seana Condit-Gordon, Teacher, Anthony W. Ochoa Middle School, Hayward Unified School District

The California Mathematics Project

Mathematics: The Power Within

- The mission of the California Mathematics Project (CMP) is to develop and enhance K-12 teachers' content knowledge and instructional strategies aligned with the California Board of Education adopted *California Mathematics Content Standards and Framework*.
- All nine disciplines under the CSMP share common goals and program elements to further their mandate in providing professional and leadership development for K-12 teachers throughout the state.
- The CMP supports regional sites located on college and university campuses to provide programs that strengthen teaching and learning in mathematics. The CMP is one of the nine subject matter disciplines under the California Subject Matter Project (CSMP). The CSMP is supported by the State of California and is administered by the University of California, Office of the President.

Founded: 1983

Key Numbers

- Sites: 19
- Programs: 941
- Participants: 7,943
- Contact Hours: 279,464

The California Mathematics Project

Mathematics: The Power Within

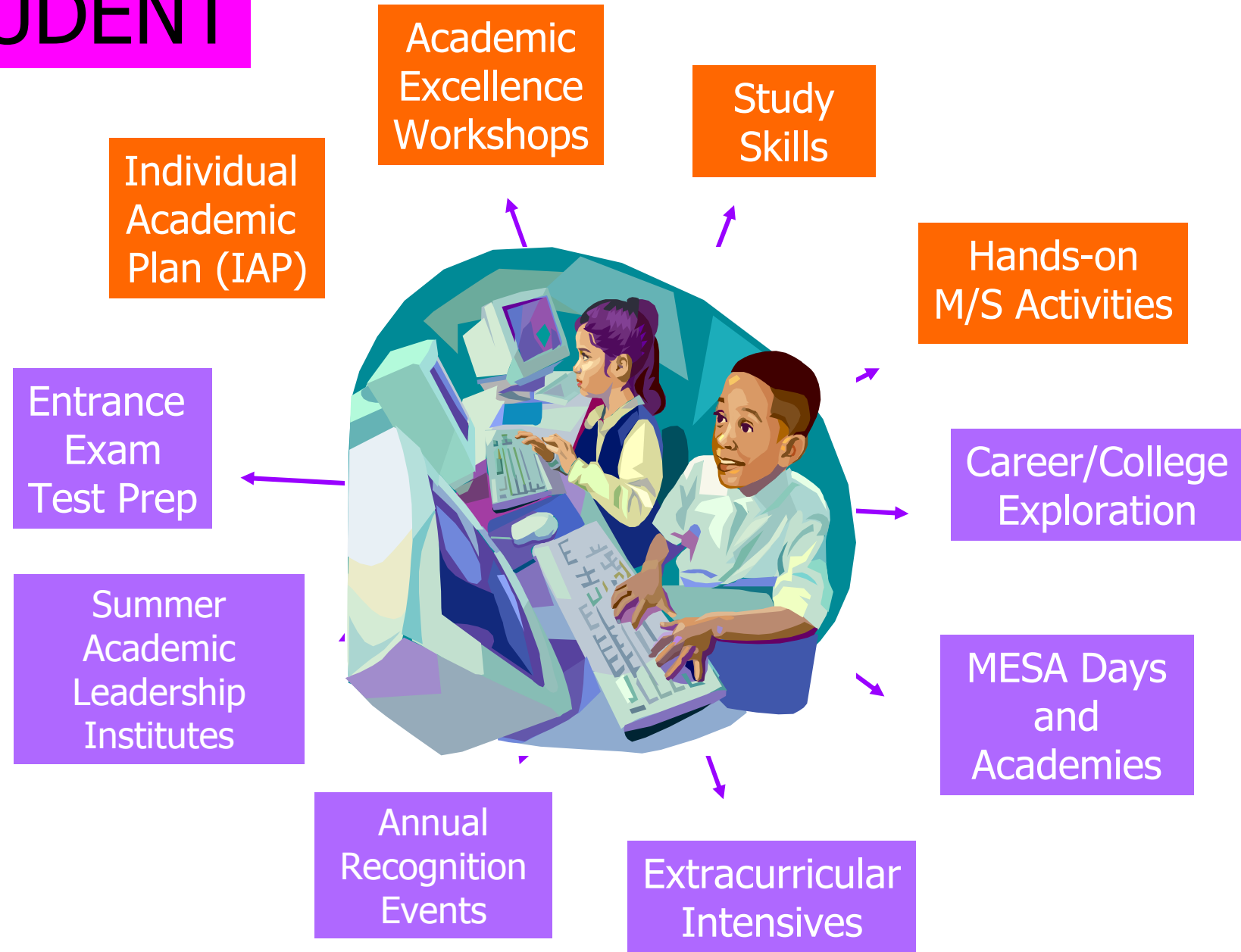
"All students can be successful in mathematics, and they need to be, in our ever-changing technological world. I must provide access to the mathematics, help students to build confidence in themselves and facilitate the growth of students' abilities to communicate mathematically. I believe in the professionalism of education, and I am proud to be a teacher."

- Juliana Jones, Teacher Leader

MESA'S VISION

- To support the national science and mathematics educational agenda by ensuring that all MESA students excel in mathematics and science so that they can play a leadership role in an increasingly technological world.

STUDENT



TEACHER

Annual
Advisor Training
Institute

On-going local
Teacher
Training

MESA
Curriculum

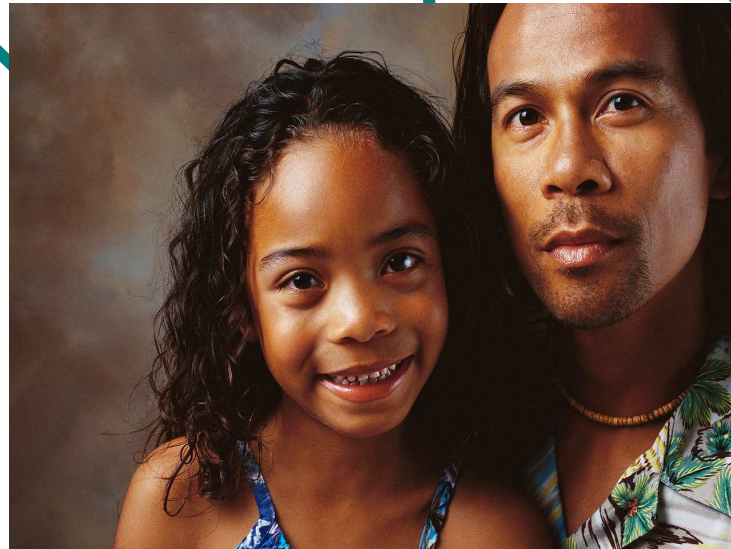


PARENTS

MESA Family
Conference

Parent
Leadership
Training

Volunteer
Opportunities



Moving Forward

- **Scale Successful Models**
 - High school to college transition
 - Community colleges
 - Industry
 - Professional Development
 - Experiential learning
- **Build more collaborations**
- **Ongoing evaluation**
 - Critical Path Analyses of STEM Talent
 - Community College to University
 - Workforce at all levels
- **Disseminate Results**