



# Cal TAC UPDATE

Bringing the voice of teachers and the wisdom of their classroom practice to those who can use this information to improve science and math education in California: researchers, policymakers, and fellow teachers.

MARCH 2010 VOLUME 1, ISSUE 1

## Welcome to Cal TAC Update

Welcome to the first Cal TAC Update! The intent of this newsletter is to summarize Cal TAC members' activities through the year as they give voice to Science, Technology, Engineering and Math (STEM) educational issues. This year, as we welcomed three new members, we launched our first symposium to bring policy, business, and educational leaders together to continue to work to improve STEM education. Cal TAC members attended important gatherings to analyze and discuss mathematic educational links between United States and China, helped to advise the newly forming CSI-Net, and learned about the status of K-12 Engineering at the National Academies of Science in Washington, D.C. We also caught the *Imagine It!*<sup>2</sup> spirit as we engaged with Richard Tavener's innovative project to change the conversation about STEM education.

At the same time, Cal TAC is directly experiencing the effect of budget cuts on our students, teachers and school communities. Reduced teaching staff and increasing class sizes as well as reductions in pay have left our school communities uneasy and stressed. One of our Cal TAC members, though Nationally Board Certified and nationally recognized, was in jeopardy of losing her job. Due to staff reductions, many teachers have been moved into grade levels in which they have little or no experience. More and more combination classes make teachers juggle two curriculums for students with varying ability levels. Professional development monies are depleted and



Cal TAC member Sue Pritchard participates in professional development, learning new approaches to physical science at the Exploratorium

opportunities for teachers to attend professional development activities are limited or denied. Not knowing what the future holds for the next month or the next year adds even more challenges in preparing our students for STEM related occupations, to be life-long learners, and to participate as informed members of our society.

Still, Cal TAC members continue to see opportunities where doors seem shut with little hope for improvement. With new leadership and renewed energy at her middle school site, Sue Pritchard just coordinated an incredibly successful Family Science Night with 220 attendees observing the microscopic world as well as the telescopic world beyond. Despite "zero dollars for field trips, limited materials, and other losses ... there is an excitement in the air as we work to meet challenges, and accept that real-life learning of 'shared problem solving' is good education," explained Cal TAC's Jeff Foote.

So, we move forward despite the heaviness of the current budget in California, hopeful and excited for new opportunities in STEM education for our students, our teachers, and our state!

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California Teacher Advisory Council (Cal TAC) is a statewide group of 12 outstanding K-14 science and math classroom teachers and is modeled after the successful National Teacher Advisory Council (NTAC), 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. They serve as the teachers' voice in addressing critical needs in math and science education.

Cal TAC members are appointed for 3-year terms. The California Council on Science and Technology (CCST) and the Center for the Future Teaching and Learning (CFTL) jointly support Cal TAC.

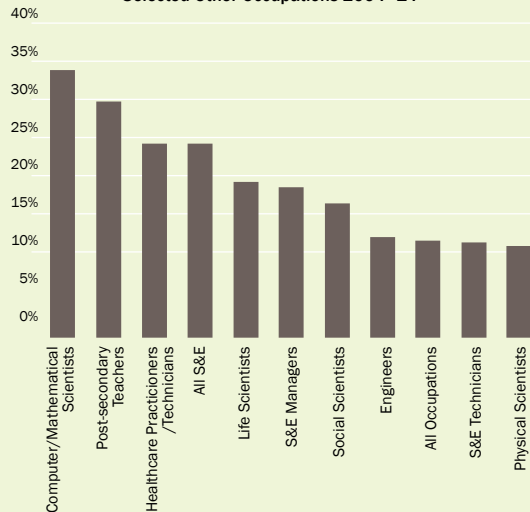
## Creating a Well-Prepared STEM Workforce: How Do We Get From Here to There?

A group of California science and mathematics teachers, policymakers, researchers, and representatives from business, industry, and higher education met to consider how California could do a better job of preparing today's students for the future STEM workforce. The symposium was organized by Cal TAC and co-sponsored by CCST and CFTL. This was Cal TAC's first symposium addressing the preparation of California students for the future STEM workforce. A detailed summary of the symposium, *Creating a Well-Prepared STEM Workforce: How Do We Get From Here to There?*, was published in April 2009. This report is available on the CCST website. This symposium was the first of three and helped to launch ongoing STEM education conversations throughout the year as well as to direct the topic for Cal TAC's next symposium in 2010: assessment.

For more information please visit:

[ccst.us/news/2009/20090218CalTAC.php](http://ccst.us/news/2009/20090218CalTAC.php)

Projected Increase in Employment for Science and Engineering and Selected Other Occupations 2004–14



Source: Bureau of Labor Statistics – Science and Engineering indicators 2008

## Integrating Science Technology and Mathematics Education

The National Research Council (NRC) Center for Education and the National Academy of Engineering (NAE) convened a strategic visioning meeting to address integrating STEM education through an innovation and learning network in California. The meeting was designed to guide and inform the work of leaders from CCST and the California State University (CSU) who are planning a process to establish a California STEM Innovation Network (CSI-Net) and framework for advocacy in the state. The meeting gave CCST a unique opportunity to distill a decade of analysis into a practical planning project. Currently CSI-Net is moving forward with new program director Stephanie Couch. Cal TAC member Jeffery Foote participated in a meeting in Sacramento to give input to the draft plan or blueprint that will guide the CSI Network's efforts over the next three to five years.

## Building a Village: Learning From and Sustaining Successful Programs in Elementary Science Education

The National Academy of Science (NAS), NAE, NRC's Center for Education, and CCST collaborated with the Arnold and Mabel Beckman Foundation, the S. D. Bechtel, Jr. Foundation, and other supporters to organize and host a convocation at the Beckman Center in Irvine, California, that brought together key stakeholders in California's science education system. This event enabled participants to explore ways to more effectively and efficiently support, sustain, and communicate statewide about promising research and practices in K-6 science education. The convocation served as the launch of a longer-term statewide discussion of ways for multiple communities to sustain and grow effective science education programs within California. This third STEM symposium resulted in a proposed joint National Teachers Advisory Council (NTAC) and Cal TAC symposium for 2010 that will focus on the professional development of teachers in STEM as well as informal science education.

## ACTIVITY OVERVIEW & UPCOMING EVENTS

Cal TAC Symposium: Creating a Well-Prepared STEM Workforce: How Do We Get From Here to There?

Strategic Planning: Integrating Science Technology and Mathematics Education

Symposium: Building a Village—Learning From and Sustaining Successful Programs in Elementary Science Education

China-U.S. Mathematics Education Workshop

Cal TAC Teleconference with NTAC

August 15, 2010  
 Cal TAC-NTAC Collaboration: *Imagine it!*<sup>2</sup>

The first week of May 2010 is **National Lab Day** – a national barn-raising for hands-on learning. For more information, visit:

<http://www.nationallabday.org>

## CCST October Council Meeting

For over a year, Cal TAC has had a representative at each of the CCST Council meetings to provide a connection between Cal TAC and CCST as well as to voice the teaching perspective as needed. Cal TAC members Sue Pritchard, Barbara Shannon, and Anne Marie Bergen attended the dinner meeting featuring Elon Musk, CEO and CTO of SpaceX Corporation. His creative mind and entrepreneurial spirit were quite evident as we dined and then listened to details about SpaceX Corporation, a company that is creating a new model to develop launch vehicles that will ultimately reduce the cost and increase the reliability of space access and re-ignite humanity's efforts to explore and develop space.

The following day focused on NASA's 50th Anniversary. CCST Executive Director Susan Hackwood first provided an overview of CCST activities that included the launching of the California Science and Technology Policy Fellowship and educational projects in which Cal TAC has played a key role.

Throughout the day, CCST council members and Cal TAC members Barbara Shannon and Anne Marie Bergen listened to and participated in presentations focusing on California's space industry. The final presentation focused on Space Engineering Education, highlighting programs at USC's Viterbi School of Engineering and Cal Poly's Aerospace Engineering Department. Students from USC shared information about their CubeSat satellite projects, which really captured the audience's attention, especially the Cal TAC members!



An example of a CubeSat built by Cal Poly San Luis Obispo

Attending CCST Council meetings provides a great opportunity for Cal TAC to interact with scientists, mathematicians, leaders of higher education, and politicians and bring the voice and perspective of teachers to the decision-making process.



## Change the Conversation with *Imagine it!*<sup>2</sup>

Ask questions...I have an idea...It's possible...Be curious, Be imaginative, Be creative! These messages and many more are at the forefront of the Imagine it!<sup>2</sup> movement, intended to spark creativity and innovation in Science, Math, Engineering and Technology. Creators Richard Tavener, Rudy Poe, and Jim Martone met with Cal TAC members at Cal State Los Angeles to discuss the impact, direction, and use of the Imagine it!<sup>2</sup> movie and interactive website as well as the future of education. Later that same day, NTAC joined the discussion by video conference. As a result, several Cal TAC members have collaborated with Richard Tavener to create inspirational and personalized video productions using the Imagine it!<sup>2</sup> website. Cal TAC members joined with Richard Tavener at the CSTA Annual Conference in Palm Springs to present the innovative and exciting project to California's science teachers. More details about Cal TAC's collaboration with Imagine it!<sup>2</sup> and Richard Tavener will appear in the next Cal TAC Update.

## 2010 CALIFORNIA TEACHER ADVISORY COUNCIL

Anne Marie Bergen  
Chair  
District Science Teacher  
Oakdale Joint Unified School District

Barbara Shannon  
Vice Chair  
Director, Synergy Kinetic Academy  
Los Angeles

Peg Cagle  
Mathematics Teacher  
Lawrence Middle School and  
Gifted Magnet

Lewis Chappellear  
Engineering Teacher  
James Monroe High School

Caleb Cheung  
Program Manager of Science  
Oakland Unified School District

Jeffrey Foote  
Multi Subject Teacher  
Kermit McKenzie Jr. High

Diana Herrington  
Mathematics Teacher  
Clovis High school

Juliana Jones  
Mathematics Teacher  
Montera Middle School

Suzanne Nakashima  
Elementary School Teacher  
Lincrest Elementary School

Sue Pritchard  
Science Teacher  
Washington Middle School

Brian Shay  
Mathematics Teacher  
Canyon Crest Academy, San Diego

Katrina Williams  
Elementary School Teacher  
Steinbeck Elementary School

### Emeritus Members

John Peter Arvedson  
La Puente High School

Janet English  
KOCE-TV, PBS

Sandie Gilliam  
Mathematics Methods Instructor

Javier González  
Pioneer High School

Sandie Gilliam  
San Lorenzo Valley High School

Stan Hitomi  
San Ramon Valley USD

Tracy Pearce  
Fremont Middle School

Mark Stefanski  
Marin Academy

## Pete Arvedson Shares Experience at NAE Symposium

The NAE and NRC held a symposium to release a new report emphasizing the importance of introducing engineering into K-12 education. The report examines the status and nature of efforts to teach engineering in U.S. schools. Cal TAC member Pete Arvedson attended the symposium to participate in the discussion with the committee.

“This was a great experience and a wonderful opportunity to share the Cal TAC message and perspective with a broader audience from industry, education, and government,” said Arvedson.

The committee found that engineering education opportunities in K-12 schools have expanded considerably in the past 15 years. Since the early 1990s, the report estimates, about 6 million children have been exposed to some formal engineering coursework. However, this number is still small compared with the overall number of students in K-12 schools (approximately 56 million in 2008).

Arvedson notes that while the emphasis on introducing an additional focus on math and science skills and graduating more engineers is positive, the study demonstrated a lack of familiarity with certain realities of the K-12 classroom.

“There was a lot of focus on the importance of introducing more problem-based learning,” said Arvedson. “K-12 educators already know that problem-based learning is needed. Practical application, though, is often hindered by district,

state, and federal mandates that focus only on test scores. Problem-solving cannot occur without time to explore — time not allowed by district-developed standards calendars created to help boost test scores.”

Likewise, Arvedson noted that symposium participants did not seem to recognize the increasing tendency of math and science teachers to work together, suggesting that engineering could serve to integrate separated curriculum ‘silos.’


“Small learning communities are already an important part of many middle and high schools,” said Arvedson. “A substantial paradigm shift does need to take place in K-12 engineering education, but it is not necessarily the one indicated here.”

The report’s recommendations include funding research to determine how science inquiry and mathematical reasoning can be connected to engineering design in curricula and professional development, and the commencement of a national dialogue on preparing K-12 engineering teachers.

“This report is likely to have an impact on release of funds from government and private agencies, as well as industry,” said Arvedson.

“This would be a good time to promote research on those topics mentioned in the recommendations, as well as plan and implement the kind of well-designed, effective teacher professional development that Cal TAC has been discussing for so long.

For more information please visit:

 [ccst.us/news/2009/20090930caltac.php](http://ccst.us/news/2009/20090930caltac.php)

The Cal TAC Update focuses on Cal TAC activities and highlights innovative science and mathematic education and research in California. The Update is written by Anne Marie Bergen and Danny DeCillis, who welcome information from readers. Newsletter design is by Wendy Brown. The Update thanks Cal TAC members for their generous assistance in providing material for this issue. If you would like more information about Cal TAC initiatives, please contact us at:

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