Partnership: Everyone Really Does Benefit!

Kimberly Tanner’s Report on Scientist-Teacher Partnerships

The UCSF Science & Health Education Partnership was founded on the philosophy that scientists and teachers working together in partnership provide a powerful mechanism to support high quality science education for all students. Key to this philosophy of scientist-teacher partnership is that everyone in the partnership has something to offer and everyone has something to learn. However, the successes of partnerships that are most often emphasized are those that benefit teachers and students. Teachers gain insight into experimentation and the process of science, expand and deepen their knowledge of science content, and establish relationships with professional colleagues in science and health. Students come to understand that scientists are normal people just like them, kindle or renew their enthusiasm for science, and see the relevance of their studies in science class to the real world. As a National Science Foundation Postdoctoral Fellow in Science Education, I have been studying the impact of SEP’s scientist-teacher partnerships on all participants: teachers, students, and scientists. I am specifically interested in the benefits to scientists, an issue that has gone relatively unstudied and underemphasized. In addition to the oft-touted benefits to teachers and students, I am finding that scientists do indeed reap a variety of benefits from their partnership experiences, benefits that relate both to their work as scientists and their knowledge of teaching and education. Insight into partnership benefits to scientist participants, which includes graduate students, postdoctoral fellows, health professional students, and research staff, comes from data collected through observations and interviews with UCSF volunteers participating in several of SEP’s partnership programs, specifically STAT, MedTeach/HealthTeach, and the Triad Alliance for Gender Equitable Teaching.

The most striking benefits described by scientists relate to how participation in a scientist-teacher partnership influences their attitudes towards science and their work as scientists. Many volunteers report that through partnership they become scientific generalists again, expanding their field of inquiry from the characteristics of one particular protein or one specific disease to a variety of topics in science ranging from plant biology to geology to studies of electricity. Through working with teachers and students, scientists leave behind the daily life of a specialized researcher, often rediscovering why they pursued a science or health career in the first place. In addition, many volunteers report that the opportunity to work with teachers and students shows

(Benefits continued on page 7)
SEP Financial Manager Linda Boyd says she is “jazzed” to be working at SEP. She arrived this summer to devise new solutions for keeping track of the unique and increasingly complex web of funding sources and program budgets that makes SEP function. Aside from handling finances, Linda also makes sure that many programs and events such as the SEP Fall Kickoff, the Lesson Plan Contest and Equipment Donations keep going.

Linda is a 15-year veteran at UCSF, having previously worked with the Department of Dermatology. Her first contact with SEP came when she arranged laboratory equipment donations from Dermatology. She realized that SEP was a unique program and jumped at the chance to come here.

Linda has a Bachelors degree in Psychology and did graduate work in Program Development and Evaluation at Sonoma State University. She remembers most of her science classes as dry and tedious, full of memorized taxonomy and boring lectures. An exception was a geology field trip where she was fascinated to see what formations of rock could tell about the history of the Earth. That trip stimulated her love of the natural world and led to further adventures including a trip to the Burren, a unique region of Karst Limestone in Ireland. Linda explains, “Experiences like that have given me a reverence for nature and a sense that we exist in a large and complicated entity in which our actions have consequences beyond ourselves.”

Linda’s son, who has always enjoyed science, attended Hoover Middle School in San Francisco and is now a sophomore at Boston University. Linda says that her experience as a parent has taught her that “It is important for parents and teachers to model respect toward all life so they will carry that with them for the rest of their lives.” —EW
Renovation Completed at SEP

When SEP Core Programs Coordinator Tracy Stevens took on the job of planning the renovation of the Science and Health Education Partnership offices in January of 1999, she knew that it would be a hard job. She even knew that "hard" was probably an underestimation. What she didn’t know was that it would be even more difficult and time consuming than that. Luckily Tracy persevered through the renovation process and everyone at SEP thinks that the results, particularly the new and expanded Resource Center, were worth the effort.

For all of its existence SEP has operated with hand-me-down equipment, old office furniture and obsolete computers. An opportunity to change things arrived late last year when UCSF Legal Support Services, which had shared the upper floor of the Woods Building with SEP, moved to new quarters. The long standing lack of space and the impending arrival of new Triad staff gave SEP priority for the recently vacated space. For the first time, SEP staff could draw up a wish list for new equipment and furniture. The list for the Resource Center included doubling the total space, designing and building a lab bench with a sink and vented cabinets for the preserved specimens, and installing adequate glass cabinet space where microscopes, models and other equipment would be easily visible and protected from dust.

Tracy launched into an eight-month process of collecting information, planning and coordinating. She worked with the UCSF Facilities Management Department, an office designer, office furniture vendors, storage system vendors, a computer consultant, a structural engineer, flooring specialists, contractors, electricians, plumbers, telephone installers, movers, ceiling installers, various UCSF administrators and many others. Tracy felt that she had almost bitten off more than she could chew - especially when the structural engineer informed her that the floor could not support the weight of some of the planned storage systems. However, Tracy did enjoy tackling the steep learning curve necessary for taking on an entirely new type of project and learning to work with a variety of new and interesting people. She found it especially edifying to oversee the construction as it progressed during the month of August. Tracy’s long hard odyssey finally paid off when the construction proceeded quickly and smoothly. Unfortunately, a totally unforeseen glitch occurred at the last moment. The third party responsible for ordering the new office furniture left the order lying on a desk for two months so the SEP staff ended up moving back into a beautiful but completely barren new space. The old furniture had long since gone to UCSF surplus. People were sitting on the floor and bringing folding chairs from home until temporary furniture was procured. The new furniture was installed at the end of October and finishing touches are now complete in the Resource Center. The next step, coordinated by Helen Doyle and Kimberly Tanner, is to order new lending materials to be circulated from the Resource Center.

Tracy doesn’t plan on coordinating any more construction projects in the near future but she does admit to still feeling a thrill when she walks into the Resource Center, an emotion that is shared by the rest of the SEP staff. The new Resource Center is quite a change from the old and cluttered half-as-large space that did double duty as an office. It is also a much more comfortable place to hold small meetings as well as just to browse through equipment and materials. We would be very happy to show you around if you would like a tour of the new Resource Center. Regular hours are 3:00 pm - 5:00 pm Monday, Wednesday, Friday and 4:00 pm - 6:00 pm Tuesday and Thursday. A “Grand Re-opening” is planned sometime during January or February — stay tuned for details! ▲ —EW
Teachers Join High School Students in UCSF Labs

This summer’s High School interns had a somewhat different experience than in years past. When they got up to talk about their research at the end of the eight-week summer program, there were teachers in the audience. And when they stood by their posters at the reception, not only were their families and labmates there, but there were those teachers again, standing by posters of their own. Three of the interns even had teachers join their labs for the last half of the summer. What was going on?!!

What was going on was the Links Summer Institute, the first phase of a new California Science Project. Five SFUSD middle and high school teachers and six UCSF scientists worked together for four weeks this summer, doing research in the scientists’ labs and developing related investigations for the teachers’ classrooms. When they joined their scientist-partners in the lab, several of the teachers found knowledgeable high school students to help show them the ropes. Having a student and a teacher in the same lab gave the students an opportunity to share their newly acquired expertise, but more importantly, gave the teachers a chance to see these students struggling with and mastering some very sophisticated ideas that emerged from the Links teachers’ and scientists’ collaborative investigation of CO\textsubscript{2} during the Summer Institute.

This is just a portion of Galileo teacher Curtis Chinn’s concept map, representing the rich ideas that emerged from the Links teachers’ and scientists’ collaborative investigation of CO\textsubscript{2} during the Summer Institute.

SEP would like to extend its appreciation to all the teachers, scientists, and laboratory colleagues who made these programs possible through their hard work and generosity:

High School Summer Interns and Mentors

Galileo Academy of Science and Technology student Vandor Hill with Kim Topp, Physical Therapy. Abraham Lincoln HS students Yong Lu, Oscar Tsai, Miku Morimune, Gillian Madill, and Arpi Siyahian with Kevin Laugero and Mary Dallman, Physiology; Geno de Hostos, Tropical Disease Research Unit at the VAMC; Laszlo Komuvez and Corey Largman, VAMC; Chris Patil and Peter Walter, Biochemistry; Kirk Riemer, Reproductive Endocrinology. Lowell HS students Max Fudym, Jacky Wong, and Dandan Liu with Manish Butte, Peter Hwang, and Bob Fletterick, Biochemistry; Russ Baldocchi, Joe Gray, Cancer Center at Mount Zion; Saleh Adi, Nanyan Wu, and Steve Rosenthal, Pediatrics. Thurgood Marshall Academic HS students Sharawn Elamin, Quressa Robinson, Chloe Jackman, Kevine Boggess, and Sharlene Wu with Clay Johnston, Neurology; Lisette Gilchrist and Maria Pallavicini, Cancer Center at Mount Zion; Andrew Uhl and Sandy Johnson, Microbiology; Roger Cooke and lab, Biochemistry; Supriya Shivakumar and Karen Smith-McCune; Cancer Center. George Washington HS student Tory Francisco with Lanying Li and Mort Cowan, Pediatrics.

Links Summer Institute Teachers and Mentors

Galileo teachers Curtis Chinn and Francie Chu with Russ Baldocchi, Joe Gray, Cancer Center; Betsy Bennett and Francis Brodsky, Microbiology. Marshall teacher Laurel Reitman with Geno de Hostos, Tropical Disease Research Unit at the VAMC. Aptos MS teacher Matt Chapman with Irene Yun, Paul German, and Howard Field, Physiology. Benjamin Franklin MS teacher Richard Delwiche with Maria Pallavicini, Cancer Center.
SFUSD Awarded New NSF Urban Systemic Program Funding

Only five school districts across the country were selected by the National Science Foundation (NSF) to receive an Urban Systemic Program (USP) grant to enhance math, science, and technology education in the public schools. Impressively, the San Francisco Unified School District (SFUSD) was one of those five and the only district in California. SFUSD was awarded the grant based on its past success in building system-wide capacity for improving achievement in math and science for all of its students. With $10 million to spend over the next five years, SFUSD has developed an ambitious plan for articulating its Math, Science, and Technology (MST) education programs across grades K-12.

The USP grant will allow SFUSD to address many areas of need related to MST. Primary areas of focus include enhancing teachers’ scientific understanding; providing direct support to school sites; increasing the number of under-represented students in advanced MST courses at the high school level; and embarking on research projects that look at the effectiveness of these efforts across the school system. One strategy for leveraging the resources necessary for such an endeavor is to build on the District’s long history of working with partners including local institutions of higher education, research centers, informal education centers, and business and industry.

UCSF’s own Jim McKerrow, Professor in the Department of Pathology, is one of the co-Principal Investigators on the grant. As part of the USP management team, he is working to coordinate the efforts of the District’s major institutional partners, including UCSF, UC Berkeley, San Francisco State University, City College of San Francisco, the Exploratorium, the California Academy of Sciences, and businesses such as Intel and Genentech. Each of these partners is rich in resources and/or has programs that can serve to support District efforts to enhance MST education for students and teachers. Jim’s role is to communicate across institutions to help ensure that these programs complement one another and address District needs and priorities.

So, how does a UCSF professor become so deeply involved in local science education? Jim’s initial involvement with SFUSD began in 1989 through SEP’s high school programs. Beginning with lab tours and guest lectures, Jim has gone on to contribute to a variety of activities. He hosts high school interns in his lab every summer; he helped organize a group of UCSF scientists to support SF Base, the District’s Biotechnology education program, by providing plasmids, bacteria, flies, and a variety of lab equipment; and he helped recruit twenty Spanish-speaking volunteers from UCSF to tutor Latino students in biology at Lowell High School. When the District contacted him last Spring to participate in the grant-writing process and serve as co-PI on the USP grant, Jim, unsurprisingly, responded with an enthusiastic “yes.”

In the past, UCSF and SEP have collaborated extensively with SFUSD through programs such as City Science, MedTeach, Triad, and SF Base. The role of UCSF in USP efforts is exciting and evolving. The new USP efforts in MST will provide many opportunities for UCSF, SEP, and SFUSD staff to work together to coordinate goals and funding, intensify existing programs for students and teachers, and embark on new initiatives that build on the rich partnership that has developed over the past 12 years.

When asked what this increase in opportunity means for the UCSF community at large, Jim replied, “I would like to make a plea to the UCSF community. You have been great in the past in your support of SEP programs. You have encouraged student and post-doc participation, taken students and teachers into your labs as interns, donated equipment and supplies, and served as advocates within the scientific community. The need now is to increase what we do and involve more labs in the effort. Given the financial support from NSF and the District’s commitment to enhancing learning opportunities for its students and teachers, the potential benefits are extraordinary.”

SFUSD Teachers-on-Special-Assignment are already starting to support the USP. City Science TSAs Nancy Schlenke (left), Margo Fontes (second from left) and Patti Harmon (right), are shown here at the SEP Fall Kick-Off with Cynthia Gusman (second from right).
A Partnership Community Evolves Through Triad

Triad Community Deepens Through Collaborative Inquiry and Mentoring

“Time and time again, in the course of a few hours, I would watch the girls’ squeamishness give way to courage, or their frustration evolve into triumph... We became good collaborators in the project of learning.” Delia Garigan’s reflection as a Triad scientist echoes the goals and experiences of the Triad Alliance in promoting gender equity in science education. The goals for girls include being resilient to failure, persisting through confusion, exploring with confidence, and defending positions through data—all habits of mind necessary to science. The challenge for the Triad community is to not only foster these for students participating in the female-friendly science clubs, but to learn more about teaching strategies that promote these kinds of experiences for all students, especially girls, in regular co-ed classrooms.

Now in its sixth year, Triad is approaching this work quite differently than in the past. The community has identified three core themes in which the program’s Professional Development Strands will be focused. Triad participants have chosen one of these strands through a proposal process.

**Introductory Program**

This fall, Triad welcomed 14 new scientists and 15 new teachers as well as three new schools—Ben Franklin MS, 21st Century Academy K-8, and Alvarado ES as a pilot elementary school—into the Introductory Program. As the scientist-teacher teams work together sponsoring Triad Science Clubs, they design activities for students based on girl-goals and gain a basic foundation in managing the club. “I found that trying to maintain control of a room of sixth through eighth graders to whom I was unfamiliar,” recalls SF Community scientist Steve Ribisi, “was not easy.” It is a steep learning curve for first-year participants. Looking back on their first year of Triad, the Marina team observed, “We struggled with issues of time commitment, setting realistic expectations for both ourselves and the girls, and the basic structure of the club.” Devin Perry, a scientist on the Aptos MS team, noted, “It took me a while to really figure out what kinds of activities were successful and how best to encourage kids to explore.”

Through the professional development days in the Introductory Program, teams receive additional support in implementing gender equitable teaching. This is not only a challenge to the Triad community, but to educators everywhere concerned with gender issues. “It is hard to recognize gender equitable teaching,” commented the Mann MS team in this year’s proposal. “Women teachers, as well as men, have unconsciously learned teaching and facilitation behaviors that continue to cause inequities in the classroom.” The Triad framework for gender equitable teaching strategies includes encouraging student voices, maintaining high expectations, delegating authority and responsibility, and being explicit about equity.

**Mentorship & Leadership Group**

Through the Mentorship & Leadership Group, Triad can more effectively engage the leadership that already exists within its community. “During my first year,” Mann scientist Julie Blake lamented, “I wished I had a Triad mentor, and I would like to be there for the new people.” Mentors are providing support to teams by developing planning guides that incorporate the core themes, sitting in on team planning sessions, visiting other clubs, and debriefing lessons with them. The mentors will also work closely with the Triad staff to compile Triad activities and facilitate sessions in the Introductory Program. “Probably the most beneficial experience is the opportunity to work with and learn from other dedicated teachers,” reported the Visitacion Valley MS team. “Learning how other teachers deal with certain issues and situations in their classes relating to gender inequalities has been very useful.”

**Collaborative Inquiry Group**

Since inception, Triad participants (Continued on page 7)
have been interested in improving their own practice and in assessing the impact of the program. This keen interest in pursuing studying the impact of Triad on adults and youth alike is at the core of the Collaborative Inquiry Group. Several group members want to learn more about strategies for gender equitable teaching in both mixed-sex and same-sex settings. “This year, Burbank MS has begun experimenting with same-sex classrooms. Questions to consider for the single-sex strands are: How do they compare to mixed-sex classroom settings? Does this affect their learning or achievement? In relation to Triad, what strategies can be gleaned from the club and implemented in the classroom and vice-versa?” Other schools, like SF Community School, are interested in looking at these questions within classes. “As a part of the inquiry process, we are very interested in seeing how different arrangements of groupings will have an impact on the success of students doing the activities.”

Members of the Collaborative Inquiry Group will define a general area of questioning that will be the focus of their observations and learn various techniques involved in qualitative research. They will then analyze these observations and share what is learned in context of professional development sessions and at large.

One scientist found that her facility with concepts like cooperative learning, authentic assessment, inquiry-based learning, and classroom equity strategies was key in landing a faculty position at a small liberal arts university. To be heard, just as he had seen his partner teacher do in the classroom.

In addition, scientists learn a great deal about teaching and education from their participation in partnerships. Most feel that through working with teachers and students, they have learned to explain science simply by carefully choosing their words (e.g. heart and lungs, not cardiovascular system) and using analogies and references to real world examples (e.g. yeast are fungi, just like mushrooms that we eat). Scientists express that this skill serves them well not only in classrooms, but also in the laboratory, at cocktail parties, and over the holiday table with relatives and friends. From their teacher partners, scientists learn about a variety of teaching strategies, expanding their repertoire from standard lecturing, the only teaching strategy many know, to hands-on approaches that more actively engage students. Also, much in the way teachers learn the language of science from their scientist partners, many scientists learn the language of education from their teacher partners. One scientist found that her facility with concepts like cooperative learning, authentic

In conclusion, the benefits to scientists working in scientist-teacher partnerships are numerous and varied. If you’re a scientist considering participating in an SEP partnership program, remember that partnership is about more than sharing your expertise in science and that you have lots to learn from teachers and students. If you’re a teacher participating in partnership, remember that you have specialized skills and knowledge in education to share with your scientist partner. That everyone has something to offer and everyone has something to learn is part of what makes scientist-teacher partnerships a powerful and adaptable model to support high quality science education for all students in a variety of settings. Come see what you can learn from working in partnership!
Events

SEP Resource Center closed
December 18 – January 2

Association for Science Education Meetings
January 6, February 3, March 2, April 6, May 4, June 1

Martin Luther King, Jr. Day
January 17

UCSF/SFUSD Holiday
(No school, SEP closed)

Triad Professional Development Days
January 20, February 23, & March 28

Washington’s Birthday
February 21

UCSF/SFUSD Holiday
(No school, SEP closed)

Expanding Your Horizons Conference
March 18

UCSF Midwinter Holiday
March 24 (SEP closed)

City Science Lab Day at UCSF
April 1

Having a student and a teacher in the same lab gave the students an opportunity to share their newly acquired expertise, but more importantly, gave the teachers a chance to see these students struggling with and mastering some very sophisticated ideas and techniques.

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