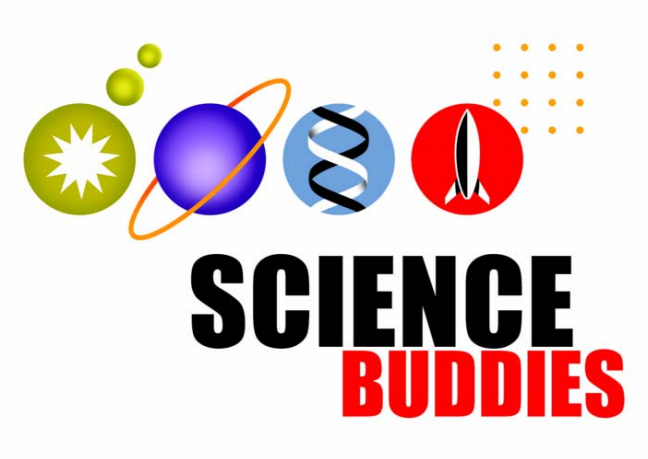


2003-2004
Science Buddies Annual Report
June 30, 2004

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Executive Summary

Organization

The Kenneth Lafferty Hess Family Charitable Foundation is a 501(c)(3) tax-exempt organization founded in 1995. In 2001, the Foundation began its sole operating program: Science Buddies. Science Buddies is located in the San Francisco Bay Area, but serves students from all over the United States.

Purpose

Science Buddies empowers students from all walks of life to help themselves and each other develop a love of science and an understanding of the scientific method. Our innovative online programs encourage, acknowledge, and reward student research projects, and aim to increase science fair participation. With the help of the scientists and engineers who volunteer their time and expertise, we help kids improve their science literacy, and we inspire them to consider additional study or careers in science and engineering.

Overview of Programs

Science Buddies offers a pyramid of online programs that maximize the value and student enjoyment of science research projects. Building on a solid base of content that describes how to do a science fair project, Science Buddies engages science and technical professionals in student mentoring. Science Buddies uses its knowledge of specific student needs to develop sophisticated online tools that enable students to "reach higher" as they prepare their projects. Employing all these tools, techniques, and volunteers, the pinnacle of our pyramid is an online, one-on-one mentoring program that is now in its third year. Our programs focus on:

- Involving science and technology professionals to interact directly and indirectly with the students, making science "real."
- Leading students to projects that are more challenging and have a higher science content than projects they might otherwise choose on their own.
- Saving students time and frustration: students WANT to use our tools because they save them time and make science research more fun and engaging.

Description of Programs

Figure 1. Science Buddies Pyramid of Programs

Est. Cost (per student)	Number of Students	Programs				
High	100's		Online Mentoring Program			
Medium	1,000's		Ask an Expert	Book & Supply Store (coming soon)	Cutting Edge Projects	
Low	100,000's		Topic Selection Wizard	Wizard B (coming soon)	Wizard C (coming soon)	
Very low	1,000,000	How-To	Science Fair Map	Tips for Success	Science Fair Op-Ed	Teacher Resources

Note: 2004 usage estimates are based on 2003 actual usage statistics

At the base of our pyramid of programs are clever software-based productivity tools and easy-to-use "how-to" materials that will reach hundreds of thousands of students during 2004. At the top of the pyramid is our one-on-one mentoring program that will reach fewer than 1000 of the most serious and deserving science students. The common theme running among all Science Buddies programs is the

goal of identifying specific student needs (e.g. "I need help selecting a topic for my project") and creating solutions (not just reading material) that actively engage students and scientific professionals.

Top of the Pyramid: Individualized, personal help for students through online mentoring

- The Science Buddies' flagship **"Online Mentoring Program"** recruits professional scientists and engineers to become volunteer mentors to students working on science research projects (typically science fair projects). Participants interact over a 12- to 14-week period in the Science Buddies online mentoring environment, called the "Command Center," which is an online bulletin board system designed specifically for mentoring and preparing a science fair project. The "Command Center" includes features such as a personalized and structured bulletin board for each mentoring team, team progress tracking, archives of completed assignments, and e-mail alerts to make it easy for team members to give timely responses. The site is password protected and secure, ensuring that only participants, teachers, parents and program staff can access the students' work and view their discussions. Contact is more personal, deeper and more sustained than in other traditional outreach activities (e.g. classroom visits) and far easier, with less inherent risk, than in-person mentoring.

Middle of the Pyramid: Interactive and engaging tools and resources

- **"Ask an Expert"** is an online bulletin board staffed by volunteer scientists and talented science students who offer their help with anyone and everyone's science fair project questions.
- **"Cutting Edge Projects"** are complete starter kits for exploring the work of today's prominent scientists and engineers. Each one includes a description of the subject matter, bibliographic references, locations of Internet-based public domain tools and real-time scientific data, and suggestions for experiments. The goal of Cutting Edge Projects is to enable scientists to engage students in scientific dialogs as well as investigations that deepen and enrich their knowledge of cutting edge research.
- The **"Topic Selection Wizard"** helps students explore different topic areas for their science fair project. Over 22,000 U.S. students utilized this helpful tool. Other tools will debut in 2004.

Base of the Pyramid: Online tools and resources for students and teachers

- **"How-to"** info includes step-by-step guidance, actual sample assignments, photos of science fair projects, and self-grading guides for students who want to do the best possible project.
- **"Tips for Success"** offers a concise checklist for success at the science fair.
- **"Teacher Resources"** include a planning guide and printable copies of our how-to information.
- The **"Science Fair Map"** and the **"Science Fair Op-Ed"** keep the pulse of the science fair scene in communities across the nation.

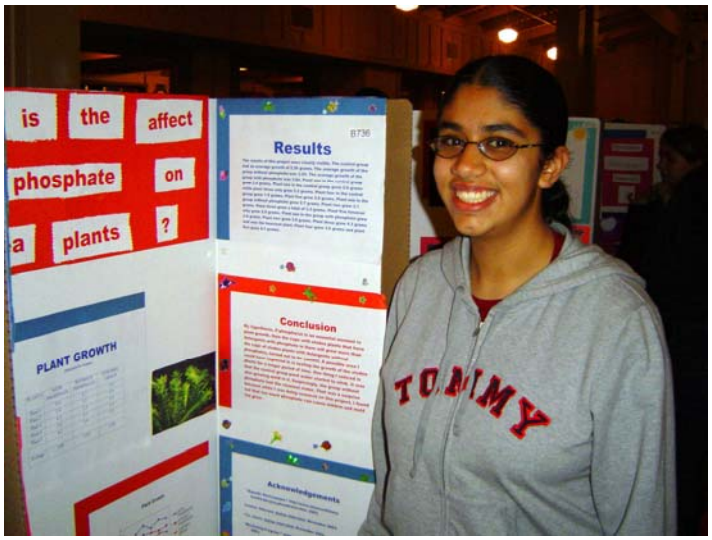
Summary of the 2003-2004 Program Year

The 2003-2004 academic year was an exciting time of growth for the Science Buddies organization. After a successful 2-year pilot study of the flagship Online Mentoring Program, we grew the program slightly for its first non-pilot program year and had excellent overall results.

We also branched out from the Online Mentoring Program, offering several new programs for the first time. It was clear from the very beginning of Science Buddies that there is a huge need from both students and teachers for help doing science fair projects. In the process of conducting the Online Mentoring Program for the past 3 seasons, we collected many details about what kind of help students really need (and want), and we responded by creating "Ask an Expert" and "Cutting Edge Projects" and by opening up our "Topic Selection Wizard" tool to students nationwide as well as by making improvements to our "How-to" information and other resources.

- Having opened up several new programs and done some online advertising, we experienced enormous gains in web site traffic with over 9 times more visitors to our web site than the prior year. We went from serving a few thousand students primarily in California, to serving tens of thousands nationwide.
- We conceived, set up, and staffed an advice bulletin board called "Ask an Expert" as a test of a new program idea. The test was successful and we will grow the program substantially for 2004-2005.
- We conceived, set up, and collaborated with two partners to create the first set of "Cutting Edge Projects" that helps students explore leading-edge research. This is a promising new content offering that offers great potential for growth and improvement in the future.
- Our lean organization continued to operate very efficiently and at a much lower cost per student than other prominent mentoring organizations.
- We operated the Online Mentoring Program smoothly, and with modest planned growth from 490 students engaged in 2002-2003 to 625 students engaged this year. We welcomed students from other states in addition to California students.
- Online Mentoring Program participants again showed a high degree of satisfaction. We also made modest gains in the number of students who fully engaged in the program.
- 13 new corporations and 1 private research institution joined our group of sponsors/partners. More than 270 science and engineering professionals volunteered their time as "Advisors," "Experts," or authors of "Cutting Edge Projects."
- Dozens of Science Buddies participants received prizes and/or awards for their science projects or their participation in the Science Buddies Online Mentoring Program. Award listings begin on page 16 of this report.

In the following pages, we report in greater detail the challenges, accomplishments, results, and feedback about our key programs during the 2003-2004 season. Overall, our programs were very successful. Of course we did find room for improvement in each of our key programs, but we were able to execute the programs smoothly and meet our major annual goals. We continue to learn a lot about how to better serve our "customers," who include the students we are helping to improve their science skills and interest, the teachers we are supporting, and the many companies and professionals who serve as our partners in this mission. We are excited to embark upon the 2004-2005 season and implement our many ideas for improvement.



Investigator Sanjit Rai poses with her project board at her school science fair in January 2004.

Results of 2003-2004 Programs

Overall Web Site Traffic

Primarily as a result of some very limited advertising on Google, traffic to the Science Buddies Web site exploded during the 2003-2004 program year:

- Visits to the site by individuals not involved in the Online Mentoring Program increased nine-fold to over 257,000.
- The total number of Web pages viewed by our users increased to over 1.8 million.

Figure 2. Science Buddies Web Site Traffic Summary

	'02-'03 Program Year	'03-'04 Program Year
Total Logins by Mentoring Program Participants	73,511	114,448
Percentage of Visitors from Mentoring Program	72%	31%
Total Visits by People Not Involved in Mentoring Program	28,749	257,604
Total Visitors to Web Site	102,260	372,052
Total Page Views	506,560	1,861,360
Pages Viewed per Visitor	5.0	5.0
Bytes Transferred (GB)	7.9	40.1
Avg Session Length (Min:Sec)	4:40	5:07
Visitors Completing the Topic Selection Wizard	387	22,445
Page Views of Cutting Edge Projects (abstracts & complete projects)	NA	18,603
Downloads of Teacher Resource Material	NA	11,738
International Traffic (approx. percentage of total)	--	5%

The Topic Selection Wizard

The Topic Selection Wizard addresses the first and often the largest problem facing a young scientific investigator: What project should I do? The Wizard is the first in a series of tools that will make it easier for students to do good science.

During the past year, the number of students completing the Topic Selection Wizard increased 58 times to over 22,000, including individuals from every state in the union.

Topic Selection Wizard Assessment & Future Plans

Upon completion of the Topic Selection Wizard, students have the option of completing a brief survey. Approximately 18% of users did so. In spite of the fact that the Wizard is the first version of a novel idea, these students gave it an overall rating of 3.5 out of 5 stars. Here are some specific comments:

> "It helped me get on the right track and made me realize what I like to do in science"
> "It gave me a topic I was interested in that I didn't even think of before"
> "It is very accurate and it gave me some ideas of what I'd like to be when I grow up"
> "It gave me more of a selection to do. I went to other web pages and did not find how to do a project that was what I was looking for. Other pages just gave me a topic."

"It generates your brain...gets you thinking about what you want to do"
"THEY GIVE YOU LOTS OF IDEAS"
"It helps you brainstorm ideas and inspires you with past science fair projects"

We have an aggressive enhancement plan in place for the Topic Selection Wizard that will occur in several phases. The first phase will be ready for the start of the 2004-2005 school year. While the current version helps students identify a broad area for their project, the first enhancement will help students zero in on a specific sub-area of science, if not an actual project to tackle.

Figure 3. Students Completing the Topic Selection Wizard (TSW) by State or Region (in descending order by usage)

State	Students Completing TSW	% of Total	Index of Usage Per Capita (100 = Avg)	Population
Southern California	1,895	9.20%	127	21,076,463
New York	1,575	7.60%	116	19,157,532
North & Central California	1,222	5.90%	123	14,039,570
Texas	1,101	5.30%	72	21,779,893
Ohio	1,076	5.20%	133	11,421,267
Florida	1,016	4.90%	86	16,713,149
Massachusetts	821	4.00%	181	6,427,801
Indiana	662	3.20%	152	6,159,068
Maryland	634	3.10%	165	5,458,137
Georgia	593	2.90%	98	8,560,310
Illinois	570	2.80%	64	12,600,620
New Jersey	557	2.70%	92	8,590,300
Virginia	539	2.60%	105	7,293,542
Pennsylvania	488	2.40%	56	12,335,091
Kentucky	469	2.30%	162	4,092,891
Michigan	452	2.20%	64	10,050,446
North Carolina	415	2.00%	71	8,320,146
Tennessee	365	1.80%	89	5,797,289
South Carolina	298	1.40%	103	4,107,183
Louisiana	295	1.40%	93	4,482,646
Minnesota	286	1.40%	81	5,019,720
Washington	278	1.30%	65	6,068,996
Oklahoma	267	1.30%	108	3,493,714
Mississippi	265	1.30%	131	2,871,782
Missouri	259	1.30%	65	5,672,579
Alabama	244	1.20%	77	4,486,508
Rhode Island	238	1.20%	315	1,069,725
Connecticut	233	1.10%	95	3,460,503
Arizona	211	1.00%	55	5,456,453
New Mexico	196	0.90%	150	1,855,059
Puerto Rico	162	0.80%	57	4,000,000
Arkansas	161	0.80%	84	2,710,079
Wisconsin	158	0.80%	41	5,441,196
Colorado	156	0.80%	49	4,506,542
Iowa	143	0.70%	69	2,936,760
Utah	141	0.70%	86	2,316,256
Alaska	138	0.70%	304	643,786
West Virginia	127	0.60%	100	1,801,873
Kansas	126	0.60%	66	2,715,884
Maine	125	0.60%	137	1,294,464
Nevada	122	0.60%	80	2,173,491
District of Columbia	107	0.50%	266	570,898
Hawaii	102	0.50%	116	1,244,898
New Hampshire	94	0.50%	104	1,275,056
Oregon	92	0.40%	37	3,521,515
Vermont	76	0.40%	175	616,592
Montana	50	0.20%	78	909,453
South Dakota	50	0.20%	93	761,063
Delaware	36	0.20%	63	807,385
Nebraska	32	0.20%	26	1,729,180
Idaho	29	0.10%	31	1,341,131
Wyoming	22	0.10%	63	498,703
North Dakota	21	0.10%	47	634,110

Ask an Expert

"Ask an Expert" is an online bulletin board staffed by volunteer scientists, engineers, and talented science students who offer their help with anyone and everyone's science fair project questions. This program was an experiment to determine the demand for answers to "walk up" questions—answers which can be provided to a larger number of students at a much lower cost than our Online Mentoring

Program. At the same time, Ask an Expert presents a volunteer opportunity that offers even more convenience and takes less time than our Online Mentoring Program. The first year results were very positive.

Figure 4. Summary of Ask an Expert Traffic

	Count	Percentage
Number of Unique, Registered Uers	390	
Number of Registered Users Making Post(s)	108	28%
Total Number of Questions Asked	122	
Total Number of Replies	206	
Total Number of Times Posts Viewed (one view of one post counts as one)	7664	

Figure 5. Summary of Questions in Ask an Expert

Category of Question Asked	Count	Percentage
Need topic for their project [We redirect these to Topic Selection Wizard.]	10	8%
Is <blank> a good topic idea?	3	2%
Need topic within a certain category/help narrowing down the topic	19	16%
Need help locating information about topic	9	7%
Specific question about an aspect of their project	52	43%
Help with technical/logistical aspect of putting together the project e.g. boards and supplies	5	4%
Need folks to interview or fill out a questionnaire for their project (sometimes they just directly posted the interview questions)	4	3%
Other	5	4%
Duplicate questions by the same person, other user errors	15	12%

Ask an Expert Assessment & Future Plans

There was no formal assessment of Ask an Expert this year; however, we plan to expand the program during the 2004-2005 program year and as part of that expansion, we will be looking for a way to measure student satisfaction. We will also establish an online training program for our volunteers who will staff the program.

Cutting Edge Projects

"Cutting Edge Projects" are complete starter kits for exploring the work of today's prominent scientists and engineers. Each one includes a description of the subject matter, bibliographic references, locations of Internet-based public domain tools and real-time scientific data, and suggestions for experiments. The goal of Cutting Edge Projects is to enable scientists to engage students in scientific dialogs as well as investigations that deepen and enrich their knowledge of cutting edge research.

This program is one of the many ways we are trying to address the issue of improving "science content" in student science fair projects. Teachers, science fair judges, and others lament (and we agree) that the quality of the science content in student projects could use a lot of improvement. This is an area where an intense, high-contact program like the Online Mentoring Program can be a great help…but only to a few hundred students. But Cutting Edge Projects, like Ask an Expert, is a program that can provide outstanding help, though not personalized attention, to tens of thousands of students at a much lower cost than our Online Mentoring Program.

The program is also a new way to get students truly excited about science. Because of a lack of media coverage and a general lack of awareness, there are many scientific discoveries and fields of cutting edge research that have the potential to excite a generation (e.g. the unraveling of the human genome, the Cassini-Huygens mission to Saturn) but haven't yet been able to do so. We dare not hope

to recreate the level of fascination and interest generated by the race to the moon of the late 60s, but with the right "marketing" to science students, we can certainly have a very positive influence. If we can help science students get easy access to real-life data and public domain tools, and somebody could explain, at their level, what it all means and how to use it, kids could aspire to studying topics that are far more interesting and novel than the stale experiments and topics many of them they settle for without guidance or inspiration.

Cutting Edge Projects Assessment & Future Plans

We developed 2 of our first 5 Cutting Edge Projects (CEPs) with the help of the Molecular Sciences Institute and some Stanford University graduate students (who were already on our team of Advisors). These projects were designed for advanced high school students and are in the area of genomics. Bio-Rad Laboratories contributed 2 additional CEPs for a younger audience in the area of biology. Going forward, we aim to develop a large selection of CEPs in many different fields of science and in so doing help research scientists in many exciting fields reach out to and inspire young people with their work.

The prototype CEPs we developed got over 18,000 page views on our web site; and we had several entries to a contest run for the best work on a genomics project (sponsored by the Molecular Sciences Institute). One of the students who used a CEP to guide her work took "Best of Fair" at her regional science competition. We have not implemented a tracking system yet, so there was no formal assessment of Cutting Edge Projects this year; however, we plan to expand the program during the 2004-2005 program year and as part of that expansion we will be looking for a way to measure student satisfaction, impact, and usage.

Online Mentoring Program

For the 2003-2004 program year the Online Mentoring Program saw moderate growth according to plan, and as a result of a number of program improvements, we saw substantially higher engagement among all participants.

The table below details improvements and objectives we identified at the close of the previous year as well as our results during the just completed program.

Figure 6. Online Mentoring Program Improvements

Issue or Objective Identified at the Conclusion of the 2002-2003 Program	Changes Implemented During 2003-2004
Expand geographically to increase our knowledge of science fair "best practices" and to expand our potential donor base.	We welcomed 31 Investigators from New York and Virginia, as well as 22 Mentors from Southern California and the East Coast. More importantly, we advertised our online tools such as the Topic Selection Wizard and How-to Info on Google, resulting in over 250,000 unique visitors from outside the Online Mentoring Program. More than 22,000 students from every state in the union completed the Topic Selection Wizard.
Post tools for teachers supervising science fair participation among their students.	We posted a scheduling worksheet and printable copies of our how-to information. Teacher response has been enthusiastic with over 11,700 downloads.
Moderate growth in the Online Mentoring Program size.	At the close of this year's program we had 361 active Investigators compared with 276 last year. (See Figure 7 for more detailed information.)
We found a clear correlation between age and success as a Science Buddies Investigator.	A year ago our average Investigator was a 7th grader, and there were no high school students as Investigators. This past year the average Investigator was raised a full grade level to 8th grade, and we recruited 127 high school students as Investigators. We feel this contributed to our students' higher level of engagement compared to last year. (See Figure 8.) The average team completed 6.3 assignments and uploaded 1.5 MB of material, compared to 5.4 assignments and 0.75 MB of material last year.

Issue or Objective Identified at the Conclusion of the 2002-2003 Program	Changes Implemented During 2003-2004
The mentor is only a role model or a good influence if there is a bond, a relationship.	We implemented three online team-building exercises to help participants get to know each other before actually starting their science fair project. This had mixed results: by necessity it lengthened the program which created scheduling difficulties with some teachers.
Another way to develop stronger bonds among teammates is to make sure that we match participants with like objectives.	We asked Mentors and Advisors about their preference for mentoring someone in need of remedial help as compared to someone who is an overachiever, and then we matched him or her accordingly. In most cases we were able to honor their requests.
Increase participation at city / county science fairs	We enlisted teacher commitments to encourage student participation in city / county science fairs and trained Mentors and Advisors on the application deadlines. We also provided guidelines and help with the paperwork, which is extensive at some fairs. While more than twice as many Investigators entered city / county fairs this year, the increase was the result of a single new school which required such participation. Unfortunately, at most schools our changes had no impact on participation in city / county science fairs. Post-program focus groups indicated that a primary impediment to participation at city / county science fairs is a lack of parental support. We feel that a parental education plan is required to effect a change in outcome—something we hope to begin at a later date.
Increase the level or amount of science content in each Investigator's project.	Our focus was to improve training of all participants (Investigators, Mentors, and Advisors) with a completely revised how-to section on library research. We also provided examples of the appropriate level of science by grade level. We don't as of now have an objective way to measure "science content," but our opinion is that there was a modest improvement.
Make only modest changes to the Command Center mentoring environment.	As during its first year, the new Command Center performed admirably. One highly requested improvement which we implemented to the satisfaction of our Advisors and Mentors was to include the contents of a teammate's posting in the notification email sent to other teammates. This lets them know whether they need to log in.
Improve administrative procedures.	We implemented a number of administrative improvements to streamline our operations during the year.



Teacher Seth Seavey, Advisor Cathryn Mullen, and Investigator Shelbi Luchini pose by Shelbi's award-winning project at a May 2004 awards ceremony at Bio-Rad Laboratories.

Online Mentoring Program Recruiting and Training

We screened the teachers of the Investigators for commitment, responsiveness, and the other criteria listed above. If a prospective Mentor met our basic requirements for science education, we relied on our online training and qualifying test as a screen.

For our adult Advisors we required a science or technical undergraduate degree. In addition, every Advisor had to pass a background check performed by the firm VolunteerSelect, a division of ChoicePoint, and complete our online training.

Figure 7. Summary of Recruiting & Screening (see Participating Schools & Employers for additional info)

	Investigators				Mentors				Advisors			
	2002-2003		2003-2004		2002-2003		2003-2004		2002-2003		2003-2004	
	Count	% Apps	Count	% Apps	Count	% Apps	Count	% Apps	Count	% Apps	Count	% Apps
Applicants	416	100%	465	100%	262	100%	461	100%	241	100%	386	100%
Rejected	76	18%	2	0%	0	0%	0	0%	2	1%	0	0%
Failed "hurdle" step (topic selection, training)	52	13%	30	6%	41	16%	135	29%	13	5%	43	11%
Active status but not assigned to a team	--	--	21	5%	--	--	23	5%	--	--	45	12%
Total assigned to a team	288	69%	412	89%	221	84%	303	66%	226	94%	298	77%
Removed from program	4	1%	16	3%	2	1%	35	8%	4	2%	22	6%
Voluntarily dropped out	8	2%	35	8%	5	2%	4	1%	12	5%	4	1%
Active status at end of program	276	66%	361	78%	214	82%	264	57%	210	87%	272	70%
				% of Active				**% of Active**				**% of Active**
Public school	138	50%	190	53%	183	86%	203	77%	--	--	--	--
Private school	138	50%	171	47%	28	13%	61	23%	--	--	--	--
Charter school	0	0%	--	--	3	1%	--	--	--	--	--	--
Male	113	41%	157	43%	72	34%	99	38%	134	64%	171	63%
Female	162	59%	204	57%	142	66%	165	63%	76	36%	101	37%
6th Grade	89	32%	--	--	--	--	--	--	--	--	--	--
7th Grade	86	31%	153	42%	--	--	--	--	--	--	--	--
8th Grade	100	36%	81	22%	--	--	--	--	--	--	--	--
9th Grade	--	--	79	22%	12	6%	15	6%	--	--	--	--
10th Grade	--	--	48	13%	51	24%	48	18%	--	--	--	--
11th Grade	--	--	--	--	101	47%	118	45%	--	--	--	--
12th Grade	--	--	--	--	50	23%	81	31%	--	--	--	--
Other / Not Applicable	--	--	--	--	--	--	2	1%	--	--	--	--
Previous Fair Experience	121	44%	--	--	157	73%	188	71%	--	--	--	--
Average GPA	3.49	--	--	--	3.8	--	3.86	--	--	--	--	--

Online Mentoring Program Results

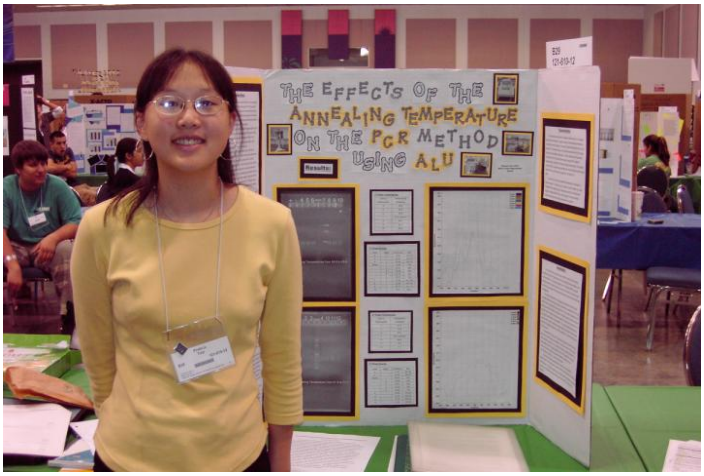
Having just completed its third year, the Online Mentoring Program began hitting its stride in many ways. It saw higher levels of engagement by all participants, a higher percentage of students completing their project, more participants entering city/county-wide science fairs (as compared to school science fairs, although this result was primarily due to a single school), and more students

winning awards at science fairs. The higher level fairs offer students a chance to meet others with the same interests, compare their work to others, win prizes, and progress to even more prestigious fairs. They also offer a hook to keep students involved in science through high school. Consequently, we will continue to make an effort to increase the number of students that enter these city/county-wide fairs.

Figure 8: Science Fair Results and Level of Engagement

	Investigators				Mentors				Advisors			
	2002-2003		2003-2004		2002-2003		2003-2004		2002-2003		2003-2004	
Science Fair Results	Count	% of Active	Count	% of Active	Count	% of Active	Count	% of Active	Count	% of Active	Count	% of Active
Completed project (Note 1)	256	93%	361	100%	--	--			--	--	--	--
Entered city/county-wide science fair (Note 2)	20	7%	51	14%	--	--	18	7%	--	--	--	--
Won an award at city/county-wide fair	9	3%	46	13%	23	11%	16	6%	--	--	--	--
Reached regional fair	1	0%	3	1%	--	--	0	0%	--	--	--	--
Competed at California State Science Fair	2	1%	0	0%	5	2%	1	0%	--	--	--	--
Competed at the Intel International Science & Engineering Fair (ISEF)	--	--	0	0%	3	1%	2	1%	--	--	--	--
Competed in the Intel Science Talent Search (STS)	--	--	0	0%	--	--	1	0%	--	--	--	--
Competed in the Siemens Westinghouse Competition	--	--	0	0%	--	--	2	1%	--	--	--	--
Level of Engagement (Note 3)												
Never engaged (0 postings)	15	5%	2	1%	20	9%	1	0%	18	9%	0	0%
Minimally engaged (1-10 postings)	84	30%	87	24%	41	19%	54	21%	54	26%	55	20%
Highly engaged (>10 postings)	177	64%	269	75%	160	75%	206	79%	154	73%	217	80%
Average number of postings	21.0	--	25.5	--	13.8	--	23.3	--	12.9	--	25.0	--

Note 1: An Investigator did not need to be an "actively engaged" participant in order to finish his or her project.
Note 2: The majority of participants entered school science fairs rather than city/county science fairs.
Note 3: Level of Engagement is an indicator of whether participants actively and productively communicated with teammates, measured by the count of messages and assignments posted. The large number of Investigators who minimally or never engaged can be traced to four specific schools where the teacher did not "push" to make sure students met their commitments. To be highly engaged, a participant had to initiate a minimum of 11 postings. Some participants exceeded 100 postings.



Mentor Pamela Tien stands next to her project, "The Effects of the Annealing Temperature on PCR Methods," which won a 2nd Place Category Award and two special awards at the 2004 Synopsys Silicon Valley Science and Technology Championship in San Jose, CA.

Online Mentoring Program Assessment and Future Plans

For the second consecutive year, we administered a science knowledge assessment test both at the beginning as well as at the end of the program. The test measured knowledge of the scientific method and experimental procedures, allowing us to assess what students learned during the program.

Results show that the students involved in the program improved their science knowledge over the course of the program, with an 11% overall improvement. The average score for the post-season assessment was 80% compared to 71% in the pre-season. 7th graders made the greatest improvement in their acquisition of new knowledge, with an average score of 75% in the post-season compared to just 63% in the pre-season, an 18% boost. Also, the school-by-school analysis shows that students from Carquinez Middle School and Hill (Andrew P.) High School, which are both located in underserved communities, made significant improvements. Carquinez Middle School made the largest improvement overall (30%) while Hill (Andrew P.) High School made the third largest improvement overall (19%).

Figure 9: Results of Science Knowledge Assessment

	Pre-Program Science Knowledge (0-12)	Post-Program Science Knowledge (0-12)	% Improvement
Overal Average	8.6	9.5	11.3%
By Gender:			
Male Average	8.5	9.5	12.1%
Female Average	8.6	9.6	10.7%
By Grade:			
7th	7.6	9.0	18.5%
8th	8.9	9.5	7.6%
9th	10.6	10.8	2.2%
10th	7.5	8.8	17.3%
By School:			
Bohannon Middle (Note 1)	9.0	9.3	2.8%
Carquinez Middle	7.2	9.3	30.2%
Chaboya Middle	7.2	8.8	21.9%
Hill (Andrew P.) High	7.0	8.4	19.3%
Junction Avenue Middle (Note 2)	8.3	7.3	-12.1%
Langley High School	11.4	11.4	0.0%
Monte Vista High (Danville)	10.7	10.7	0.4%
Piedmont Hills High	10.0	9.7	-3.3%
Plainview - Old Bethpage John F. Kennedy	9.9	11.0	11.4%
St. Victor Elementary School	8.0	9.4	17.3%
Valley Christian Schools	8.1	9.2	14.1%

Note 1: Bohannon Middle School has only 4 active participants in the program.
Note 2: Junction Avenue Middle School has only 3 active participants in the program.
Note 3: The table above compares identical data sets in the pre-season versus post-season with a sample size of 254 Investigators. Nine data points were eliminated due to these students failing to complete half of the assessment quiz (the back side of the paper).

Because of its expense, we expect to reduce the size of the Online Mentoring Program during the 2004-2005 school year in order to allow us to increase our resources in other program areas that reach a much larger number of students.

Online Mentoring Program Mentor & Advisor Survey

Fifty-six percent of all Mentors and Advisors completed an online survey at the conclusion of the 2003-2004 program year (this compares with 39% last year). The survey measured overall satisfaction as well as desired areas of improvement. There was very little difference between the responses of Mentors (high school students) and Advisors (adult science & engineering professionals). The table below summarizes some key responses:

Figure 10. Selected Mentor and Advisor Survey Responses

	Mentors			Advisors		
Question	**2001-2002**	**2002-2003**	**2003-2004**	**2001-2002**	**2002-2003**	**2003-2004**
Why did you sign up for Science Buddies?						
Enjoy science	75%	70%	71%	--	78%	77%
"Give back" to the community	50%	74%	79%	--	82%	83%
Fun	100%	81%	76%	--	78%	63%
Enjoy young people	--	83%	84%	--	80%	80%
Help on college apps	58%	70%	62%	--	--	--
Would participate again	92%	95%	88%	100%	94%	83%
Would recommend Science Buddies to a friend	92%	92%	94%	100%	89%	88%
How much time did you spend on average?	80 min/wk	78 min/wk	67 min/wk	107 min/wk (Note 1)	55 min/wk	54 min/wk
Skill level of Investigator greater than expected	--	13%	16%	--	11%	12%
Skill level of Investigator less than expected	--	35%	27%	--	41%	45%
Science Buddies training was adequate	--	81%	79%	--	87%	81%
Investigator's project was better than it would have been w/o your help?	58% yes	87% yes or maybe	91% yes or maybe	67% yes	85% yes or maybe	83% yes or maybe
Overall experience	--	3.7 on 5.0 scale	3.4 on 5.0 scale	--	3.5 on 5.0 scale	3.2 on 5.0 scale

Note 1: All Advisors had more than one team during the 2001-2002 program.

Online Mentoring Program Other Feedback

"Thank you both very much for the help that you have provided me. I never thought that I would make it to the San Francisco Science Fair and even place. I have had a great time doing this program with you guys and I look forward to doing it again next year!" — Thank you note from an Investigator.

"Thank you [Advisor] for helping me out so much along the way. I can easily say that I would not have been as successful or enjoyed myself so much if you had not been there to give advice and provide assistance. Once again, thank you so much." — Thank you note from an Investigator.

"The best thing is having people with experience help you and support you." — Comment from an Investigator.

"I just wanted to thank you guys so much for all your help on my project. I couldn't have done it without you. It was so much fun working with you and struggling through all of this. I learned so much and had a BLAST! […]" — Thank you note from an Investigator.

"I would like to thank you for recognizing me as an Outstanding Mentor and giving me a $300 college scholarship. I have enjoyed working with Science Buddies these past two years as it has given me the opportunity to not only give back to my community, but also the chance to share with someone younger then me the importance of science and allow them to gain a better understanding and enjoyment of it. I greatly enjoyed my team and my Investigator and Advisor were both great people to work with. Although there were several problems that my Investigator encountered while doing her science fair, I enjoyed seeing her learn from her experiences and I hope that my positive encouragement and feedback helped her to enjoy her science project. Again, thank you for everything that you have given me. As I go off to college in the fall I wish to continue my education in science as well as my involvement in the community. Again, thank you." — Thank you note from a Mentor.

"I really had a wonderful experience and I am going to try to persuade others to join because it was very fun and exciting." — Comment from a Mentor.

"The program rocks. I would definitely recommend it to anyone doing a science fair project for the first time." — Comment from a Mentor.

"I just wanted to bring to your attention a reflection on one great young student, Andrew Datu. I don't know how much the adult advisors have monitored this project but it started to run into trouble about half way through the process. Andrew had trouble thinking his project thru and as it turns out he couldn't do what he set out to do because of logistics or other factors. It was going to be difficult for him to turn in a first rate team Catesby project. I tried to point him in the correct direction but for some unknown reason, he was hesitant to do what needed to be done to adequately conduct his project. I tried and tried to get him to change, reflect, or take the correct measure. Time started to run out. Even the team overseer chimed in telling him just to do it. Of course this decision would have been flawed because his data wouldn't have been satisfactory. Finally after hanging in there with him I convinced him to redo the project, which to my great satisfaction he did! Now it is finally heading in the right direction and it should end up as being a real first class effort. I just wanted to let you now as you have many to monitor and perhaps this one slipped by your watchful eyes. He is really a champ in my eyes. One fine young student! This will be a great project when it is finished and one which will provide much satisfaction to all concerned!" — Comment from a Mentor.

"Overall view of science buddies was a very positive experience. It is nice knowing that I was able to help someone and I hope I will be able to be a mentor again next year and the following years to come." — Comment from a Mentor.

"Thank you for continuing this good work and helping students learn to enjoy science. I'm appreciative to have this forum that allows me to give back to the science community by encouraging kids to find the rewards and benefits of exploring science." — Comment from an Advisor.

"I really enjoyed the opportunity to participate. The program is very well run and the web access made it easy to get started and stay in touch with the student." — Comment from an Advisor.

"This year has been a very positive experience with the Science Buddies program. I feel very fortunate to have had the pleasure and honor to work with a great Investigator and a great Mentor. At times I was just monitoring the conversation in the background because the Mentor was doing an excellent job on her own ....." — Comment from an Advisor.

"I really think that this is a wonderful program and look forward to seeing more successes in the future!" — Comment from an Advisor.

Student Awards & Recognition

Science Buddies Awards to Investigators

Each Outstanding Investigator Award and Honorable Mention Award winners received a personalized certificate and an award letter from Science Buddies. All other participants who completed their projects received Science Buddies Certificates of Appreciation in recognition of the time and effort they put into their projects. In addition, three students (two Online Mentoring Program participants and one independent participant) won awards in the openly publicized 2004 Best Genomics Presentation Competition, sponsored by the Molecular Sciences Institute.

School	Student Name	Award
California High School	Sylvia Aranda (Team Bowditch 2)	Molecular Sciences Institute Honorable Mention Award
Carquinez Middle	Sanjit Rai (Team Bothe)	Honorable Mention Award
Chaboya Middle	Alan Tran (Team Thompson)	Honorable Mention Award
Greene Scholars	Kathryn Daniels (Team Leibniz)	Outstanding Investigator Award
	Kristina Daniels (Independent)	Molecular Sciences Institute Best Presentation Award
Langley High School	Preeti Krishnan (Team Bragg)	Honorable Mention Award
	Grace Tran (Team Hyatt)	Honorable Mention Award
Monte Vista High (Danville)	Drew Campion (Team Whitehead)	Outstanding Investigator Award
	David Dreshfield (Team White)	Outstanding Investigator Award
	Elizabeth Fay (Team Alvarez 2)	Outstanding Investigator Award
	Katrina Haus (Team White)	Outstanding Investigator Award
	Kayla Hofstetter (Team Angstrom-b)	Outstanding Investigator Award
	Nina Vertlib (Team White)	Outstanding Investigator Award
	Lisa Chow (Team Zeeman)	Honorable Mention Award
	Amanda Lee (Team Zeeman)	Honorable Mention Award
	Michel Tam (Team Zeeman)	Honorable Mention Award
	Kjersten Nordmeyer (Team Brattain 2)	Molecular Sciences Institute Best Presentation Award
Murphy (Martin) Middle	Jessica Poon (Team Doppler)	Outstanding Investigator Award
Plainview - Old Bethpage John F. Kennedy	Kyle Bloecker (Team Mandelbrot)	Honorable Mention Award
	Gregg Kaplan (Team Mottelson)	Honorable Mention Award
	Ryan Linden (Team Mottelson)	Honorable Mention Award
	Ben Weinert (Team Mandelbrot)	Honorable Mention Award
St. Victor Elementary School	Kristine Dela Cruz (Team Lawrence)	Outstanding Investigator Award
	Carolyn Ho (Team Cherenkov)	Outstanding Investigator Award
	Joseph Lee (Team Burroughs)	Outstanding Investigator Award
	Alexandra Tee (Team Gibbs)	Outstanding Investigator Award
	Rochelle Ata (Team Dalton)	Honorable Mention Award
	Alyssa Caampued (Team Darwin)	Honorable Mention Award
	Candianne David (Team Laplace)	Honorable Mention Award
	Annie Khong (Team Ditmars)	Honorable Mention Award
	Carlea Luna (Team Frank)	Honorable Mention Award
	Rosemary Pham (Team Fitch)	Honorable Mention Award
Valley Christian Schools	Alexandria Benanti (Team Penrose)	Outstanding Investigator Award
	Gregory Chen (Team Pupin)	Outstanding Investigator Award
	Kristyn Dilley (Team Pythagoras)	Outstanding Investigator Award
	Elizabeth Fleming (Team Van Vleck)	Outstanding Investigator Award
	Kimberly Kawamoto (Team Oppenheimer)	Outstanding Investigator Award
	Priscilla Shen (Team Vernier)	Outstanding Investigator Award

Science Buddies Awards to Mentors

Each Outstanding Mentor Award winner received a personalized certificate, an award letter, and a $300 scholarship sponsored by the Hess Family Foundation and the Science Buddies Advisors' Scholarship Fund. Each Honorable Mention Award winner received a personalized certificate, an award letter, and a $20 gift certificate to Old Navy, sponsored by GAP, Inc. All other Mentors who completed the program received Certificates of Appreciation to thank them for volunteering with Science Buddies for 2003-2004.

School	Student Name	Award
American High	Tsun Au Yeung (Team Burroughs)	Outstanding Mentor Award
Bellarmine College Prep	Matthew Durstenfeld (Team Hertz)	Outstanding Mentor Award
Burlingame High	Olga Mukha (Team Painleve)	Outstanding Mentor Award
California Academy of Mathematics and Science	Sara Liu (Team Ditmars)	Outstanding Mentor Award
	Vianni Luhrsen (Team Descartes)	Honorable Mention Award
California High	David Krolikoski (Team Richardson)	Honorable Mention Award
Carondelet High	Juliana Oronos (Team Thomson)	Outstanding Mentor Award
	Angie Andaya (Team Smyth)	Honorable Mention Award
College Preparatory School	Daniel Cohen (Team Pearson)	Outstanding Mentor Award
	Casey Horvitz (Team Russell)	Honorable Mention Award
	Katherine Romer (Team Penzias)	Honorable Mention Award
De La Salle High	William Milcovich (Team Catesby)	Outstanding Mentor Award
	Ryan McCreery (Team Fermat)	Honorable Mention Award
Foothill High	Spencer Behm (Team Rabi)	Honorable Mention Award
	Christine Sutu (Team Hyatt)	Honorable Mention Award
Los Altos High	Lu Hong (Team Thompson)	Honorable Mention Award
Mills High	Michelle Chiu (Team Giaever)	Honorable Mention Award
	Jennifer Sham (Team Laplace)	Honorable Mention Award
Mission San Jose High (Fremont)	Jessica Lin (Team Doppler)	Honorable Mention Award
	Negar Pirooz (Team Dalton)	Honorable Mention Award
Monta Vista High (Cupertino)	Evelyn Ling (Team Hudson & Neel)	Honorable Mention Award
Monte Vista High (Danville)	Patricia Lee (Team Lawrence)	Outstanding Mentor Award
	Anna Rankov (Team Tamm)	Outstanding Mentor Award
Oak Grove High	Terik Daly (Team Charpak & Weinberg)	Honorable Mention Award
Plainview - Old Bethpage John F. Kennedy	Rachel Davidowitz (Team Comte)	Outstanding Mentor Award
	Shivani Dhir (Team Frank)	Honorable Mention Award
Redwood High	Coco Rudy (Team Pythagoras)	Outstanding Mentor Award
	Cassandra Heron (Team White)	Honorable Mention Award
Santa Teresa High	Roshni Patel (Team Walton)	Outstanding Mentor Award
	Duy Dao (Team Pupin)	Honorable Mention Award
Saratoga High	Grace Hsu (Team Oppenheimer)	Outstanding Mentor Award
Silver Creek High	Vy Pham (Team Bloembergen)	Outstanding Mentor Award
Stevenson School	Amber Hess (Team Cherenkov)	Outstanding Mentor Award
	Amanda Berry (Team Gibbs)	Honorable Mention Award
	Amanda Laska (Team Wallace)	Honorable Mention Award

City and County Science Competition Winners

Zubana Ali, Adela Chung, Investigators from Team Alfven 2 (Mentor-Leigha Winters, Advisor-Frank Heile)
"Does Coliform in water affect the nutritional content and growth of a kidney bean plant?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

John Appel, Investigators from Team Yukawa (Advisor-Steve Bryson)
"How many years of rain will it take to fully dilute the salt, which is killing the trees, in the soil along Highway 80 near Tahoe?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category and Special Award

Drew Campion, Investigator from Team Whitehead (Mentor-Jacky Tse, Advisor-Jennifer Paulson, Advisor-Linda Leong)
"Is it possible for yeast to produce the necessary enzymes in order to break down various carbohydrates (sucrose and starch) as well as an artificial sweetener (sucralose) into glucose if the yeast is contained in a sterile bioreactor where necessary conditions are met?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 1st Place in Category

Antonio Cardenas, Stacey Cortes, Yuliza Gonzalez, Investigators from Team Ampere (Mentor-Jenny Ly, Advisor-Eileen Tsai)
"Do different types of UV radiation affect plant growth?"
Sciencepalooza, Santa Clara, CA
- Galileo Award, Second Prize

Peter Chiang, Investigator from Team Wilson (Mentor-Christopher Chan, Advisor-Matt Lippert)
"Can Vibrio Harveyi be used as an environmental biosensor?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- Honorable Mention

Lisa Chow, Amanda Lee, Michel Tam, Investigators from Team Zeeman (Mentor-Claire Wainwright, Advisor-Chana Palmer)
"Does Coenzyme Q10 increase the athletic performance of a recreational adult athlete by lowering the heart rate?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Jacqueline Cowden, Investigator from Team Anderson 2 (Mentor-Victoria Chu, Advisor-Alan Yoder)
"Does developing land help the oceans by decreasing the amount of silt that is given off by the site?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category and Special Award

Kathryn Daniels, Investigator from Team Leibniz (Mentor-Lauren Wong, Advisor-Jenny Rustmann, Advisor-Keith Gudger)
"Odor Today, Gone Tomorrow"
Synopsys Silicon Valley Science and Technology Championship, San Jose, CA
- Honorable Mention in Category
- 2nd Place Award - $75 Cash, California Water Environment Association
"What happens to cells when they come into contact with Amatoxin? Is it possible to counteract?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category

Kayla Hofstetter, Investigator from Team Angstrom-b (Mentor-Kelly Svoboda, Advisor-Bradley Shanrock-Solberg, Advisor-David Vogt)
"Water Bottles' Content in Sun"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Helen Huang, Investigator from Team Archimedes 2 (Advisor-Stephen Robie)
"How will fuel extracted from different types of 'water' affect the efficiency of a hydrogen car (hydrogen fuel cell)?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category and Special Award

David Dreshfield, Katrina Haus, Nina Vertlib, Investigators from Team White (Mentor-Cassandra Heron, Advisor-Heinz Hemken)
"We want to know if high protein foods can be grown through hydroponics so that the theory may be used should there be food shortages and not enough fertile land to grow them, hydroponics can be used to grow an adequate food supply."
Tri-Valley Science and Engineering Fair, San Ramon, CA
- Honorable Mention

Chelsea Ellis, Chelsea Snyder, Investigators from Team Wollaston (Mentor-Lisa Ball, Advisor-Leslie Waite, Advisor-Cecilia Craig)
"Under what conditions and at what rate does bacteria grow on unused brands of liquid foundation make-up?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- Honorable Mention

Liane Fang, Erica Rosen, Amy Tsuchiyama, Investigators from Team Wolff (Mentor-Natalie Cheung, Advisor-Gabriel Desjardins)
"What is the effect of pet urine in water runoff on the ecosystem?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category

Elizabeth Fay, Investigator from Team Alvarez 2 (Advisor-Alison Davis)
"Does learning a musical instrument increase a young students math scores?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category

John Flores, Investigator from Team Bohr (Mentor-Sunil Patel, Advisor-Herman Gill)
"What factors make the fire more devastating?"
West Contra Costa County Science Fair, San Pablo, CA
- 2nd Place in Category
San Francisco Bay Area Science Fair (SFBASF), San Francisco, CA
- Participant

Sophia Giang, Investigator from Team Block (Mentor-Nasrin Shakib, Advisor-Alyssa Quon)
"Can the extracts of plants that do not get eaten by snails help prevent snails from eating plants they like?"
West Contra Costa County Science Fair, San Pablo, CA
- 3rd Place in Category

Andrew Ha, Investigator from Team Bardeen 2 (Advisor-Ramesh Chandra)
"If DarkBASIC is computer language that creates programs, can I create a game?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- Honorable Mention

Esther Han, Connie Yee, Investigators from Team Yallow (Mentor-Rachel Bond, Advisor-Geoff Bruton, Advisor-Kamni Vijay)
- 2nd Place in Category

Andrew Jones, David MaKieve, Investigators from Team Wigner (Mentor-Manisha Manmohan, Advisor-Annette Borchers, Advisor-Hayley Lam)
"How closely related are two different species?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category

Shelbi Luchini, Investigator from Team Beebe (Mentor-Joan Khuu, Advisor- Cathryn Mullen)
"What is the effect of different types of light on the concentration of chlorine in water?"
West Contra Costa County Science Fair, San Pablo, CA
- 2nd Place in Cateogry
San Francisco Bay Area Science Fair (SFBASF), San Francisco, CA
- 3rd Place in Cateogry

Taylor May, Investigator from Team Arrhenius 2 (Mentor-Angelina Altshuler, Advisor-Kelley Herndon-Ford)
"Do magnets affect athletic performance?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Amanda Minguillon, Investigator from Team Banks 2 (Mentor-Neeru Goyal, Advisor-Lesley Chamberlain)
"What is the affect of an every day multi-vitamin have in a cohort of 9th graders against viral illnesses?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Mike Moynihan, Investigator from Team Boyle (Mentor- Conway Teng, Advisor- Steven Rodrigues)
"How does housing development affect the nutrient levels in local waterways?"
Fairfax County Regional Science and Engineering Fair, Fairfax, VA
- 3rd Place in Category
- Plaque and a one-year student membership from the American Society of Naval Engineers

Patricia Nguyen, Investigator from Team Andrews 2 (Mentor-Jennifer Acojedo, Advisor-Diane Ward)
"How much protein is being lost in the processing of milk?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Alexandra Noonan, Investigator from Team Avogadro 2 (Mentor-Jenny Hsu, Advisor-John Breneman)
"At what level do typical beach products brought into the ocean have a toxic effect on brine?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category and Special Award

Kjersten Nordmeyer, Investigator from Team Brattain 2 (Advisor-David Greenwood)
"Does DNA sequence effect function of myoglobin in humans, dolphins, and tuna?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- Honorable Mention

Morgan Oliver-Allen, Investigator from Team Appleton 2 (Mentor-Sylvie Pham, Advisor-Carolyn Barton)
"Does lyme disease affect a deer tick's physical appearance, blood, and genetics, and how if it does?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- Honorable Mention

Nili Ovaici, Investigator from Team Wilkins (Mentor-Renna Khuner-Haber, Advisor-Dior Kelley)
"How does common pollution affect the photosynthesis pigments in freshwater algae"
- 3rd Place in Category

Kavita Prabhakar, Investigator from Team Lemaitre (Mentor-Cortney Simmons, Advisor-Emily Silverman)
"What type of water is most contaminated?"
Sciencepalooza, Santa Clara, CA
- Galileo Award, Second Prize

Sanjit Rai, Investigator from Team Bothe (Mentor-Jason Liu, Advisor-Edouard Leneus)
"Do detergents with phosphates affect the growth of plants such as Elodea plants?"
West Contra Costa County Science Fair, San Pablo, CA
- 3rd Place in Category

Elise Running, Alex Slomowitz, Christina Wiesendanger, Investigators from Team Altman 2 (Mentor-Tracy Chang, Advisor-PJ Iranitalab, Advisor-Benjamin Ma, Advisor-David Wilder)
"Are Antioxidants really effective in the reduction of free radicals and the prevention of cancer?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category

Will Skrip, Investigator from Team Wiener (Mentor-Rao Fu, Advisor-John Wallace)
"Does taste change as you get older?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Amanda Berry, Mentor from Team Gibbs
"Mathematical Analysis of Stock Options"
Monterey County Science and Engineering Fair, Seaside, CA
- 2nd Place Senior Division Mathematics/Software
- Certificate of Achievement, Mu Alpha Theta (National High School and Two-Year College Mathematics Club)
- Alternate for the California State Science Fair

Sienna Brown, Mentor from Team Bothe 2
"Chlorophyll, Contaminants, and Chromatography"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Bryan Bruno, Mentor from Team Galvani
"Doctors' Appointments Using the Internet"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 2nd Place in Category

Terik Daly, Mentor from Team Charpak (Advisor-Chris Green)
"The Effect of Shape on an Unreinforced Masonry (Grade D) Building's Structural Integrity in Earthquakes"
Synopsys Silicon Valley Science and Technology Championship, San Jose, CA
- First Place Technical Paper

Matthew Durstenfeld, Mentor from Team Hertz
"The Effect of Launch Angle on Projectile Dynamics"
Synopsys Silicon Valley Science and Technology Championship, San Jose, CA
- First Place in Category
- Certificate of Achievement and VIP Tour of NASA, NASA Ames Research Center
- Alternate for the California State Science Fair

Garrett Hayes, Mentor from Team Salam
"Hydrogen Production in Chlamydomonas Reinhardtii Effects of Media Parameters"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 1st Place in Category and Special Award

David Krolikoski, Mentor from Team Richardson
"Download Speed and Data Collisions"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- Honorable Mention

Joan Khuu, Mentor from Team Beebe
"Got Iron Enriched Soil?"
Sciencepalooza, Santa Clara, CA
- Einstein Award, First Prize

Sharon Liao, Mentor from Team Archimedes
"Ideal Conditions of Electroporation on Yeast"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 1st Place in Category

Jatinder Sandhu, Mentor from Team Gay-Lussac
"The Essence of Fluorescence"
Synopsys Silicon Valley Science and Technology Championship, San Jose, CA
- Honorable Mention in Category
- 3rd Place Award - $100, American Chemical Society, Santa Clara Valley Local Section

Christine Sutu, Mentor from Team Hyatt
"E. Coli Concentration in Alameda Creek Watershed Over Time"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Pamela Tien, Mentor from Team Debye
"The Effects of the Annealing Temperature on PCR Methods"
Sciencepalooza, Santa Clara, CA
- Einstein Award, First Prize
Synopsys Silicon Valley Science and Technology Championship, San Jose, CA
- Second Place in Category
- $50 Cash Scholarship, Armed Forces Communication and Electronics Association (AFCEA), Silicon Valley Chapter
- 1st Place Award - $50 Cash and a Certificate of Excellence, American Association for Clinical Chemistry

Mona Vakilifathi, Mentor from Team Darwin
"Can Chemicals Do Your Dirty Blood Work?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

Jonathan Wu, Mentor from Team Bloembergen 2
"IQ Vs. GPA, Is There a Correlation?"
Tri-Valley Science and Engineering Fair, San Ramon, CA
- 3rd Place in Category

State and National Science Competition Participants & Winners

An Ho, a Mentor, participated in the Intel International Science & Engineering Fair (ISEF) in Portland, OR, which is often known as the Olympics of science fairs. Mentors Steve Bennett and Grace Hsu were named Semifinalists in the highly competitive Siemens Westinghouse Competition, and furthermore, Grace was a Semifinalist in the Intel Science Talent Search in addition to winning the Outstanding Young Scientist Award from the California Association of Professional Scientists (CAPS). One Science Buddies Mentor, Amber Hess, participated at the California State Science Fair in Los Angeles, CA where less than 15% of participants win awards, and took home 3rd Place in the highly competitive Chemistry Category. This is the third time Amber has placed at the State Science Fair.

Steve Bennett, Mentor from Team Euler
"The developement of Thermophotovoltaic nanocrystalline Thin Films utilising femto-second laser ablation techniques: a new approach to 'Smart Coatings'"
Siemens Westinghouse Competition
- Semifinalist

Amanda Berry, Mentor for Team Gibbs
"Are Stock Options Congruent with Maximizing Share Holder Value?"
Monterey County Science & Engineering Fair
- 2nd Place Mathematics and Software
American Association for the Advancement of Science–85th Annual Meeting of the Pacific Division, Logan, UT
- Presidents' Award for Excellence
- 1st Place Social, Economic, and Political Sciences

Amber Hess, Mentor from Team Cherenkov
"Enhanced Color Thin-Layer Chromatography: A Novel, New Technique to Extend the Chemist's Venerable Chromatography Tool"
Monterey County Science and Engineering Fair, Seaside, CA
- 1st Place Senior Division Chemistry
- Certificate of Achievement, U.S. Army
- Certificate of Achievement, U.S. Air Force
California State Science Fair, Los Angeles, CA
- 3rd Place in Senior Division Chemistry
American Association for the Advancement of Science–85th Annual Meeting of the Pacific Division, Logan, UT
- Best Poster Award
- 1st Place Chemistry

An Ho, Mentor from Team Pauli
"The Ghost Effect on Viruses"
Sciencepalooza, Santa Clara, CA
- Einstein Award, First Prize
Synopsys Silicon Valley Science and Technology Championship, San Jose, CA
- First Place in Category
- One Year Subscription to Scientific American, Scientific American
- Grade 11 Individual Project - $500 cash award, Genencor
Biotechnology Awards
- Grand Prize - Best of East Side Union High School District
Intel International Science & Engineering Fair (ISEF), Portland, OR
- Participant

Grace Hsu, Mentor from Team Oppenheimer
"Simulated Global Changes Alter Decomposition Rates Through Species Dynamics in a California Grassland Ecosystem"
Intel Science Talent Search
- Semifinalist
Siemens Westinghouse Competition
- Semifinalist
California Association of Professional Scientists (CAPS)
- Outstanding Young Scientist Award



Mentor Amber Hess wins 3rd Place in Senior Division Chemistry at the 2004 California State Science Fair in Los Angeles, CA.


Mentor Grace Hsu receives the 2004 Outstanding Young Scientist Award from the California Association of Professional Scientists (CAPS).

Fundraising Summary

Science Buddies is the sole program of the Kenneth Lafferty Hess Family Charitable Foundation which itself provided major start-up funding for the program. In addition to funding from the Hess Family Foundation and from a few private individuals, Science Buddies has received grants from 26 corporations and 1 private research institution.

Since Science Buddies first began its development program in May of 2002, earning corporate support has been the primary focus of our fundraising strategy. During the 2003-2003 program year, we prioritized seeking support from Bay Area companies. One reason this approach made sense was that we were already building relationships with local companies because they were a primary source of adult volunteers for the flagship Online Mentoring Program, which served mostly Bay Area students. Another reason we put more emphasis on corporate giving was that the time and effort required to research and write grant proposals for governmental sources of funding was too great for our limited staff to accomplish that year, especially considering how few applicants are actually awarded such grants.

We continued to focus on corporate fundraising during the 2003-2004 program year, but we were able to broaden our search for partners to include companies based outside the Bay Area. Programs such as Topic Selection Wizard, Ask an Expert and Cutting Edge Projects allowed Science Buddies to reach and serve thousands of students nationwide, rather than the several hundred students we served in the Bay Area alone during the two phases of the pilot program. As a national organization, we are able to be a great community outreach partner for companies interested in science education no matter in what state they are based.

But even as our base of possible corporate partners increased rapidly, we also began laying the foundation for developing other sources of funding. We executed two small annual campaigns directed at individual donors (friends, early supporters, and volunteers of the organization). Although the results of these campaigns were modest, we did succeed in establishing an individual giving program and have systems in place to grow this effort next year.

We also began a successful effort to develop partnerships with academic and research organizations working under government grants. Our first such partnership is with the Molecular Sciences Institute in Berkeley, California, with whom we signed a contract to help them fulfill the outreach requirements of one of their NIH grants. Based on the success of this partnership, we have a campaign underway now to identify several new partners for the 2004-2005 school year, and the Molecular Sciences Institute plans to extend our partnership through next year.

With start-up funding from the Hess Family Foundation essentially depleted, the majority of financial support for Science Buddies in 2004-2005 will come from grants.

The Hess Family Foundation is a private foundation with 501(c)3 status. In the spring of 2004, we asked the Community Foundation for Monterey County to establish a restricted purpose fund on behalf of Science Buddies and they agreed. Because the Community Foundation for Monterey County is a public benefit corporation (a category of charity under the IRS tax code that differs slightly from private foundation), their restricted purpose fund will allow Science Buddies to apply for grants from various grant makers who normally exclude private foundations from grant eligibility. This will be a great help in achieving our 2004 fundraising goals.

Calendar Year 2003 Financial Summary

Science Buddies is a very lean organization. The president, Ken Hess, takes no salary, and all other employees operated from home offices or donated office space during calendar year 2003, keeping overhead expenses at an absolute minimum. Our efficiencies allowed us to operate at an expense level (after deducting nonrecurring startup expenses) of just $344 per student completing the Online Mentoring Program (down from $473 during calendar year 2002). As a point of comparison, the per student cost of an in-person mentoring program such as Big Brothers Big Sisters is in the range of $2,500. MentorNet, a prominent online mentoring organization for women pursuing technical careers, operated at an average cost of $639 per student. MentorNet is now in its sixth year of operation.

Figure 11. Calendar Year 2003 Expenses

Operating Expense Category	Expense	Comments
Employee wages, taxes, & benefits	$197,656	
Other professional fees	$ 2,372	Legal, accounting, graphic design, administrative
Miscellaneous office expenses	$ 8,053	
Volunteer screening fees	$ 3,242	
Participant awards	$ 3,150	
Other miscellaneous expenses	$ 775	
Total	$215,248	
per Student applicant to the Online Mentoring Program	$232	926 students applied to be Investigators & Mentors
per Student assigned to a team	$301	715 students were assigned to a team
per Student completing Online Mentoring Program	$344	625 students completed the program

Note: Data for Big Brothers Big Sisters of San Francisco and the Peninsula at http://www.sf-bbbs.org/6_result.htm and data for MentorNet is at http://www.mentornet.net/Documents/About/Organization/growth.html ($1,800,000 operating budget divided by 2,816 students = $639 per student).



Mentor Matt Durstenfeld, whose project "The Effect of Launch Angle on Projectile Dynamics" won 1st Place in Upper Division Physics at the 2004 Synopsys Silicon Valley Science and Technology Championship, participated in both the Online Mentoring Program and the Ask an Expert forum, which debuted this year.

Conclusions & Implications for Next Year

Program Focus

Since its founding three years ago, Science Buddies' focus has been on its Online Mentoring Program. During this time we have learned the many strengths and weaknesses of such a mentoring program, including the tremendous satisfaction of all parties when a team works well together on a successful project, as well as the frustration when an Investigator disappoints our volunteers with a lack of interest. We've found that the key to maximizing program success is a teacher who trains his or her students in the concepts that will be important, insists on excellence from his or her students, and doesn't undercut advice provided by our Advisors and Mentors. In short, the Online Mentoring Program can make a great teacher even better by augmenting his or her skill with those of our volunteers. However, without the energy and management skills of a great teacher, program results will suffer. Young students need a great deal of support and sometimes a "push" from someone on the other end of the Internet connection.

While most of our energy has been spent with the Online Mentoring Program, we have nonetheless carved out time for several experiments such as the Topic Selection Wizard, Ask an Expert, and Cutting Edge Projects. These programs can and already have reached a much a higher number of students than the Online Mentoring Program at a much lower cost. Their success measured by overall usage and satisfaction has greatly exceeded our expectations, possibly because these programs also start out with a strong advantage: students come to them, making first contact because the student has already decided that he or she needs help.

Because programs like the Topic Selection Wizard, Ask an Expert, and Cutting Edge Projects give us a national reach, touching tens of thousands of students, we plan to give them a larger portion of our resources during the coming year. The Online Mentoring Program will continue, but at a smaller size, retaining the schools that have proven to be the very best ones we have worked with.

With our new programs like the Topic Selection Wizard, our objective is to make it easier for students to do good science. In essence, we're developing productivity tools for science projects, and importantly, our staff has many years of experience developing award-winning software of a similar nature. Hence, we think this focus is a good match for our student users and our organization.

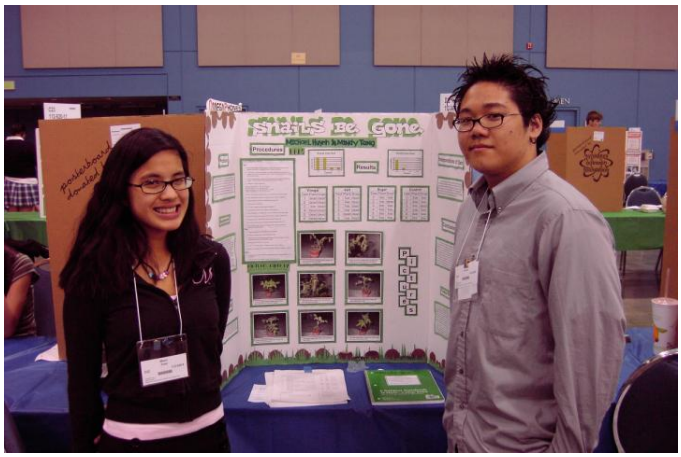


Kristina Daniels, who did one of the Science Buddies Cutting Edge Projects, "Protein Sequences and the Tree of Life," won 1st Place in Upper Division Biochemistry and Microbiology at the 2004 Synopsys Silicon Valley Science and Technology Championship and went on to compete at the 2004 California State Science Fair. Kristina's project also won the Molecular Science Institute Best Presentation Award.

Online Mentoring Program Participating Schools & Employers

Schools of Participating Investigators

Participating Schools	County or [State]	Participants
Bohannon Middle School	Alameda	4
Carquinez Middle School	Contra Costa	14
Chaboya Middle School	Santa Clara	30
Greene Scholars	Santa Clara	6
Hill (Andrew P.) High School	Santa Clara	44
Junction Avenue Middle School	Alameda	3
Langley High School	[Virginia]	8
Lipman Middle School	San Mateo	2
Monte Vista High School (Danville)	Contra Costa	46
Murphy (Martin) Middle School	Santa Clara	1
Piedmont Hills High School	Santa Clara	8
Plainview Old Bethpage John F. Kennedy High School	[New York]	23
Saratoga High School	Santa Clara	1
St. Mary Elementary School (Los Gatos)	Santa Clara	62
St. Victor Elementary School	Santa Clara	64
Valley Christian Schools	Santa Clara	45
Totals by County or [State]		
	Alameda	7
	Contra Costa	60
	San Mateo	2
	Santa Clara	261
	[New York]	23
	[Virginia]	8
Total from Underserved Communities		
Students from schools with greater than or equal to 25% of students qualifying for free lunch program (we collect no such information from individual students)		64
Total Investigators		**361**



Mentor Mindy Tang (left) takes a break at the Synopsys Championship to pose for a shot with her partner. Both considered their project "Snails Be Gone" to be "fun and interesting with a very smelly twist."

Schools with Participating Mentors

Participating Schools	County or [State]	Participants
Acalanes High	Contra Costa	3
Amador Valley High	Alameda	5
American High	Alameda	1
Arcadia High School	Los Angeles	1
Athenian School	Contra Costa	7
Bellarmine College Prep	Santa Clara	2
Beverly Hills High School	Los Angeles	1
Burlingame High	San Mateo	9
California Academy of Mathematics and Science	Los Angeles	5
California High	Contra Costa	11
Campolindo High	Contra Costa	2
Carondelet High	Contra Costa	8
Castro Valley High	Alameda	4
College Preparatory School	Alameda	14
De La Salle High	Contra Costa	6
El Cerrito Senior High	Alameda	7
Foothill High	Alameda	9
Granada High School	Alameda	1
Gunn (Henry M.) High	Santa Clara	2
Hayward High	Alameda	1
Hill (Andrew P.) High	Santa Clara	15
Hillsdale High	San Mateo	2
Independence High	Santa Clara	1
Langley High School	[Virginia]	1
Leigh High	Santa Clara	2
Los Altos High	Santa Clara	1
Marysville High School	Yuba	1
Mills High	San Mateo	11

Participating Schools	County or [State]	Participants
Mission San Jose High (Fremont)	Alameda	11
Monta Vista High (Cupertino)	Santa Clara	7
Monte Vista High (Danville)	Contra Costa	32
Mountain View High	Santa Clara	1
Murphy (Martin) Middle	Santa Clara	1
Oak Grove High	Santa Clara	2
Overfelt (William C.) High	Santa Clara	2
Palos Verdes Peninsula High School	Los Angeles	1
Piedmont High	Alameda	4
Piedmont Hills High	Santa Clara	5
Plainview - Old Bethpage John F. Kennedy	[New York]	2
Presentation High	Santa Clara	2
Queens Gateway To Health Sciences School	[New York]	1
Redwood High	Marin	15
Riverside High School (Greer SC)	[South Carolina]	1
San Ramon Valley High	Contra Costa	6
Santa Cruz High	Santa Cruz	1
Santa Teresa High	Santa Clara	4
Saratoga High	Santa Clara	2
Sherwood High School	[Oregon]	1
Silver Creek High	Santa Clara	5
Smithtown High School	[New York]	1
Stevenson School	Monterey	6
Terra Linda High	Marin	1
Trabuco Hills High School	Orange	1
University High School	Orange	5
Valley Christian Schools	Santa Clara	9
Woodside Priory School	San Mateo	2

High School Totals by County or [State]	
Alameda	57
Contra Costa	75
Los Angeles	8
Marin	16
Monterey	6
Orange	6
San Mateo	24
Santa Clara	63
Santa Cruz	1
Yuba	1
[New York]	4
[Oregon]	1
[South Carolina]	1
[Virginia]	1
Total Mentors	**264**

Advisor Employers

Advisor Organization	Participants
A. M. Fitzgerald & Associates	1
Actuate	6
Affymetrix	8
Agilent Technologies	1
ALZA Corporation	1
AMD	15
AOL	2
Applied Biosystems	9
Applied Materials	4
Atmel Corp.	1
Bayfinity	1
Beatnik	1
Berkeley Process Control	1
Bio-Rad Laboratories	23
Boston Scientific	4
Brown and Caldwell	1
BubbleSort Inc	1
Caliper Technologies	1
CEMEX	1
Cisco Systems Inc.	2
Clairvoyante Laboratories	1
Cogenia Partners, LLC	1
Corazon Technologies	1
Corgentech	1
CVRWQCB - State of California	1
Cybercopia	1
Danger Inc.	1
Del Monte Foods	1
Delphi Safety Systems	1
Druai Consulting	1
eBay	1
Eike Consulting	1
ELORET Corp./NASA Ames	1
Encore Technologies	1
ENVIRON	1
Environmental Science Associates	1
Evalve, Inc.	1
Exponent Failure Analysis Associates	1
Forensic Science Consulting	1
GE Financial Long Term Care Division	1
GE Medical Systems	1
Genentech	4
GNF	1
Green Environment inc.	1
Hewlett-Packard Company	2
Hill Research Associates, Inc.	1
Hines	1
Hyperion Solutions	2
IBM	2
Indigo Partners	1
Institute for OneWorld Health	1
Integrated Science Solutions, Inc	1
Ispiri	1
J&J Air Conditioning	1
KLA-Tencor	1
Kondra Systems, Inc	1
Lam Research	1
Lawrence Livermore National Lab	1
Lockheed Martin	9

Advisor Organization	Participants
MIRA	1
Monterey Bay Aquarium	1
Morgan State University	1
Motorola	1
NASA Ames Research Center	4
Network Appliance	2
NIST Ceramics Division	1
Oracle	2
Other	16
PerkinElmer	1
PGP Corporation	1
Physics Department	1
PosterDocs	1
Quinstreet Inc.	1
RFCO	1
Riverdeep - The Learning Company	1
Roches Diagnostics	1
San Francisco State University	1
San Jose State University	1
Sandia National Labs	2
Santa Clara Basin Watershed Management Initiative	1
SBC	2
Seagate Technology	2
Self Employed	4
SETI Institute (Contract with NASA)	1
SF Bay Area Rapid Transit	1
SF Public Util Commission	1
Sign and Post Co.	1
SRI International	1
Stanford Aerospace Robotics Lab	1
Stanford Linear Accelerator Center (SLAC)	4
Stanford University	17
Strategies Unlimited	1
Sun Microsystems	2
Synaptics Inc	8
Synopsys	6
Taj Technologies	1
The Source Group, Inc	1
U.S. Geological Survey	1
U.S. Navy	1
UC Berkeley	4
UC Irvine	1
UC Santa Cruz	2
UCSF	11
US Geological Survey	1
USDA ARS ANRI BGL	1
UT Austin	1
Ventura County Sheriff's Department	1
Vertical Networks	1
Vignette Corportation	1
Watsonsville Community Hospital	1
Wells Fargo	1
Xilinx	11
Total Advisors	**272**

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