



tackling today's world of environmental and medical challenges

## Developing Future Scientists – One Individual at a Time



Vanessa Machuca was one of four students from Oak Crest selected to present her research findings at the 2013 Southern California Conference for Undergraduate Research.

Gaining hands-on experience by participating in real-life scientific experiments that support cutting-edge research is an opportunity that most high school students don't have. While many would think this is wonderful in itself: being asked to share your findings in a professional setting is the icing on the cake!

As part of the organization's mission, Oak Crest provides opportunities for students from all academic levels to be immersed in high-impact research with the hope that the hands-on experience will cultivate their interest in a career in

science.

Recent participants in such a program are local high school students, Vish Rajiv, Lace Co Ting Hek, Lavan Raja, Vanessa Machuca and Devi Ganapathi from Pasadena, Glendale, La Canada and Pomona school districts. These students spent 12 weeks at Oak Crest working with Senior Research Scientist Manjula Gunawardana learning about microbiology and molecular biology techniques. Their studies included bacterial fermentation, nucleic acid extractions, protein purification and quantitative real-time PCR. Not only did they learn about these techniques, they also applied them to ongoing research at Oak Crest, making their experience even more relevant.

In addition to working with high school students Oak Crest offers research opportunities to community college and university students as well. Fonter Loera, a participant in the Citrus College RACE to STEM program, also performed research at Oak Crest as part of his studies. Fonter was responsible for screening plant extracts from Oak Crest's natural products project for bioactivity using the brine shrimp toxicity assay.

## News & Events

### UPDATE ON THE ROSE HILLS FOUNDATION FELLOWSHIPS

Eight students from Pasadena City College and other San Gabriel Valley area community colleges have been selected to participate in an environmental science research program supported by The Rose Hills Foundation. The students will work in teams of two for either six or 12 months, and they will receive individualized mentoring by Oak Crest scientists.

These Fellowships are based on 20 hours per week of work so that students are able to concurrently enroll in classes at their home institutions without having to seek outside employment.

Their research topics will span three broad subject areas, including microbial ecology in extreme environments, isolating and characterizing natural products in plant extracts, and pollutant analysis in vehicle exhaust.

### RESEARCH, PUBLICATIONS AND EVENTS

#### Community Outreach –

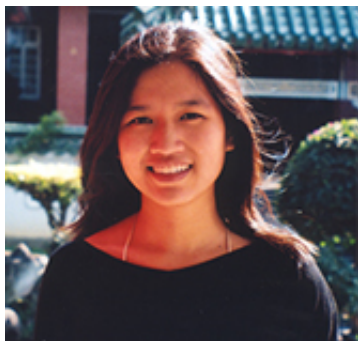
Pasadena Engineering and Science Expo – June 1, 2013, Pasadena, CA. *"Showcasing Innovation and Opportunities to the Next Generation."* Oak Crest exhibit coordinated by Sherry Tsai.

Because of their outstanding work, Lavan, Vanessa and Fonter were selected to present their research projects last month at the 2013 Southern California Conference for Undergraduate Research (SCCUR) in Whittier, CA. Additional SCCUR conference presenters included Antony Aziz (in photo below), a 2013 Oak Crest Summer Research Connection (SRC) participant who presented his group's findings on *Biochemical and Genomic Analysis of the Arroyo Seco Water Shed*.

Since their internships at Oak Crest, Vish and Fonter have transferred to Duke and UC Irvine respectively. Lavan, Vanessa, Devi and the six other high school seniors from the SRC program are currently applying to college. Lace, who is a junior, and Vanessa will be continuing a year-round internship at Oak Crest focusing on purifying RNA from natural asphalt seeps and evaluating bioactivity of the natural products against *Mycobacterium tuberculosis*. It is clear that the future looks bright for these young scientists as they continue advancing their education in the world of science thanks in part to the experience they gained at Oak Crest.

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## Oak Crest Faculty Busy With Biotech Education Program



Dr. Sherry Tsai, Los Angeles Area Site Director of the Amgen Biotech Experience.

It's been a very busy six months for Dr. Sherry Tsai, Assistant Faculty and Director of Educational Outreach at Oak Crest. In addition to her multi-faceted role at Oak Crest, Dr. Tsai began a new position as the Greater Los Angeles Site Director of the Amgen Biotech Experience (ABE), formerly known as the Amgen-Bruce Wallace Biotechnology Lab Program) on July 1, 2013. As site director, Dr. Tsai provides direction, coordination, and leadership for her region of the ABE program.

ABE is an international program that provides free training to teachers on an engaging, inquiry-based biotechnology lab curriculum, and then provides, at no cost, the equipment, supplies, and technical support needed for teachers to successfully implement the curriculum in their classrooms. The Greater Los Angeles site is the largest in the program, serving more than 200 teachers and more than 20,000 students last year in a service area that includes schools in Los Angeles, Orange, Ventura, Santa Barbara, Riverside and San Bernardino Counties. The site is funded by the Amgen Foundation, with additional support from the California Community Colleges Life Sciences/Biotech Initiative.

During her first six months, Dr. Tsai has overseen a number of activities for ABE, including:

- Three teacher professional development workshops, at the Huntington Gardens (July 8-11), Fullerton College (October 12-13), and Pierce College (October 26-27);
- Program Open House at Amgen in Thousand Oaks to introduce ABE to Amgen staff (July 12);
- Annual teacher meeting at Pierce College (September 7);
- Grant proposal submission and receipt of nearly \$58,000 from the Amgen Foundation for the establishment of a new ABE program distribution center at California State University, Channel Islands.

In addition, she has overseen major program changes for the site, such as the rollout of a new program name, new national program office, and

### High School Outreach Program

– June 8, 2013, Pasadena, CA.

*“Speed Networking and Mentoring with Scientists and Engineers.”*

Coordinated by Sherry Tsai. Co-sponsored by the Caltech Classroom Connection.

### Published Paper – “Boosting

*Student Interest in Science,”* by

Pamela R. Aschbacher, Marsha

Ing, and **Sherry M. Tsai**, *Phi Delta*

*Kappan*, October 2013.

### Published Paper – “Global

*Expression of Molecular*

*Transporters in the Human Vaginal*

*Tract: Implications for HIV*

*Chemoprophylaxis”*

**Gunawardana M, Mullen M,**

**Moss JA**, Pyles RB, Nusbaum RJ,

Vincent KL, Wang C, Guo C, Yuan

Y-C, Warden CD, **Baum MM.**

2013. PLoS One 8:e77340.

### Annual Meeting of NIH U19

**Project Team**, October 16-19,

2013, Boston, MA. Internal

seminars, workshops, and

discussions on major, multi-

institutional initiative aimed at

developing novel HIV prevention

strategies based on monoclonal

antibodies. Attendees: John Moss

and Marc Baum.

### Panel Expert - 2013 STEM

**Roundtable** – October 23, 2013,

KPCC 89.3 Radio Station,

Pasadena, CA. *“Connecting the*

*Los Angeles STEM Pipeline,”*

panel presentation by Sherry Tsai.

Event sponsored by the Los

Angeles County Alliance of Boys &

Girls Clubs.

### Professional Development

**Workshop for STEM Teachers**,

September 28, 2013, and

November 2, 2013, Glendale, CA.

*“Story Maps for STEM: Geospatial*

*Technologies to Support Common*

*Core Learning.”* Coordinated by

Sherry Tsai.

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## End of Year Giving - 'Tis the Season

As the year draws to a close it's time to reflect on all that has been accomplished in 2013. At Oak

new curriculum. "I am thrilled to be involved with this wonderful program at such an exciting time," said Dr. Tsai. "We are helping to inspire and educate students directly, while also enhancing science education through teacher professional development," she adds.

More information about the Amgen Biotech Experience can be found at [www.amgenbiotechexperience.com](http://www.amgenbiotechexperience.com).

## Oak Crest Hosts Sixth Year Of the Annual SRC Program



While many local high school students spent last summer hanging out with friends and going to the beach, a very select handful of students spent their time doing hands-on scientific research. For the sixth year in a row, Oak Crest, in collaboration with the Caltech Classroom Connection, offered the Summer Research Connection (SRC). The SRC offers high school students and K-12 science teachers paid research internships at Caltech or Oak Crest. The program is highly competitive, with more than 180 students applying for just 13 spots and more than 30 teachers applying

for seven positions.

This year's participants conducted mentored research for over five weeks on one of six teams, including projects in chemistry, microbiology, materials science, earth science, and chemical engineering. New this year, the program included an "SRC Affiliates" program, which provided research opportunities for an additional two teachers and two students for a three-week period. Of the 24 participants, seven students and three teachers conducted their research at Oak Crest on one of two research projects.

Unlike in school, where students are usually given "cookbook" lab procedures to follow with the goal of arriving at known answers, SRC participants gain first-hand knowledge of scientific research. Students are inspired to pursue science or engineering majors and careers, and teachers are inspired to incorporate hands-on learning and authentic research processes in their classrooms while becoming reinvigorated to teach science. In addition to their research, participants also attend workshops on topics related to science and college. For the first time this year, the SRC students were given an extremely valuable opportunity to learn about how to afford college when Oak Crest board member David Levy volunteered his time to present a special workshop and share with the students his expertise on the topic.

"This experience showed me how exciting exploring science can be, as we were able to do experiments that have never been done and get results that have never been found. I anticipated that I would gain research experience, but I had no idea that it would be such an incredible learning experience," said Marissa Glidewell, a rising senior who conducted atmospheric photochemistry research at Oak Crest during the summer.

The SRC is just one way in which Oak Crest is increasing student interest in science within the greater Los Angeles County area. More information about the Summer Research Connection can be found at [www.src.caltech.edu](http://www.src.caltech.edu).

Crest, dozens of high school, community college and university students were able to experience high-impact scientific research first hand by taking part in one of many Oak Crest programs. Unlike in traditional laboratory courses in a classroom setting, Oak Crest students do not recreate experiments that have been previously performed by others. Rather, they conduct exciting, cutting-edge research projects in the environmental and biomedical sciences, each project new, unique and relevant to societal well-being.

The year was also highlighted by groundbreaking HIV research conducted by Oak Crest scientists who are developing an innovative drug delivery system in collaboration with Auritec Pharmaceuticals. The pod-IVR has the potential to not only protect women from sexually transmitted HIV and herpes simplex virus, but can also prevent unintended pregnancy at the same time.

As an independent research facility, Oak Crest relies upon continued support from the community. Your financial generosity helps us to maintain the highest standards of research and education, and directly provides advanced research equipment, supplies, salaries, scholarships, and stipends to our teams of faculty and students so that they can continue working to solve the environmental and medical challenges affecting our global community.

Your donation can have a significantly larger impact on a single researcher's or student's work at Oak Crest than at a larger institution. As one of our philanthropic partners, you will be playing a crucial role in helping Oak Crest to fulfill its mission of benefiting humanity. During this season of giving, why not take time today to make a donation that has the potential to impact individuals around the world for generations to come?

The Oak Crest Institute of Science is a 501(c)(3) nonprofit organization, and most donations are fully tax deductible. There are many ways to support Oak Crest. For more information, please contact [giving@oak-crest.org](mailto:giving@oak-crest.org) or call 626-817-0883. Thank you for your generosity!

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## ANNOUNCEMENTS

### NEW OAK CREST WEBSITE

Work on the redesign of the Oak Crest website has been completed. The new site went live in late August and has received great feedback from our visitors. The website features a new look and revised navigation so that information is easier to find. Check it out at [www.oak-crest.org](http://www.oak-crest.org).

### PROMOTIONAL VIDEOS

Final production has been completed on a series of eight new videos, which tell the Oak Crest story. The videos feature founder, Dr. Marc Baum, along with Dr. John Moss, Dr. Sherry Tsai, and Dr. Tom Smith. Several students and teacher researchers from the Summer Research Connection were also interviewed. The videos will be posted on the Oak Crest website as well as on YouTube. They will also be used at educational outreach events, conferences and fund-raisers. Watch for details about the premier of our videos in the next Oak Crest newsletter.