

Silicon Valley Chemist

Santa Clara Valley Section

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OCTOBER 2012 NEWSLETTER TOPICS

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Chair's Message



We are entering one of the busiest times for the Santa Clara Valley section. In October and November, we join chemists across the country in National Chemistry week (NCW). NCW occurs annually and is ACS's biggest community outreach event. This year is the 25th anniversary of NCW, and the theme is "Nanotechnology, the smallest BIG idea in science." We will be running our popular program at Martin Luther King Jr. Library in San José on

continued on next page

November Dinner Meeting Science is Elementary

Dr. Tzipor Ulman, Executive Director and Founder at Science is Elementary

Abstract

Many of the issues facing the US and the world today can only be solved by science and engineering: global warming, access to clean water and air, and cures for cancer, diabetes, and other diseases. Yet according to a recent Index of Silicon Valley, local companies are having a hard time filling positions that require a science or engineering degree and many of the students who arrive to pursue advanced degrees in California return to their home countries. To sustain Silicon Valley's innovation culture, we need to "grow" our own scientists and engineers. But we are not meeting this challenge today. About half of Silicon Valley's 5th graders scored below proficient on the state science test (CST).

Additionally, only 20% of the college students surveyed for a recent study felt that their K-12 education prepared them extremely well for their STEM college courses. When asked what could have prepared them better, responses included "more application, less theory" and "more opportunities for hands-on experience and programs." How do we make science relevant and engaging, especially for the youngest students? What are some fun, inquiry based activities that can be done with students at the youngest age?

Biography

Tzipor Ulman, PhD, is the founder and Executive Director of Science is Elementary (SiE). Tzipor has a passion for science education along with solid experience in the corporate and non-profit sectors. While a graduate student at Stanford, Tzipor co-taught an interdisciplinary course in "science for non-scientists." While teaching, she realized that many students who had not already developed an interest in science were either lost or uninter-



ested in the subject matter. Sadly for them, science had come too late. If those students had been exposed to science at a younger age, perhaps they would have maintained a lifelong interest in the field. Thus, the idea for SiE was born.

Before founding SiE, Tzipor worked with Fortune 500 and startup clients as a business strategy consultant at Helmer & Associates, consulting on matters ranging

continued on next page

November Dinner Meeting

Date: Thursday, November 15, 2012

Time: 6:00 p.m. Social Hour
7:00 p.m. Dinner
8:00 p.m. Presentation

Speakers: Dr. Tzipor Ulman
Science is Elementary
Executive Director and Founder
at Science is Elementary

Location: Biltmore Hotel & Suites
2151 Laurelwood Boulevard
Santa Clara, CA

Cost: \$26.00, Broiled pork loin or
Vegetarian stuffed manicotti

Reservations: www.scvacs.org
Sally Peters 650-854-4614

Reservations should be made by November 12th stating your name, address, company/school affiliation, number of people in party. Watch the web site for more information. If you are unable to honor your reservation and do not cancel by Wednesday, November 14th, you will be invoiced following the dinner meeting.

Chair's Message, continued from front page
October 27.

In early November, we will also hold our "Teach the Teachers" event. This is a program we offer for middle school science teachers. We have an all day program where we elaborate on the NCW theme and provide the teachers with a series of experiments to use in their classrooms. We typically host 30-40 middle school teachers with this program. The teachers are given a chance to run many experiments and provided with instructions so that they can easily reproduce the experiments for their classrooms. In past years, this program has been supported by a generous grant from Gilead Sciences, Inc.

This is also the time of year when you are encouraged to renew your ACS membership and when you get to select the leadership for the local section. The section is run by an Executive Committee consisting of 5 officers (Chair, Chair Elect, Past Chair, Treasurer, and Secretary), 7 Councilors and 7 Alternate Councilors. We have nominated a slate of candidates. Petition candidates are also welcomed to involve new faces in the local section activities, although none were received this year. We would love to have elections where the positions are contested. The Executive Committee usually meets on the first Monday of the month, and the meeting minutes are posted on our website (www.scvacs.org). All section members are welcome to attend the Executive Committee meetings.

The ACS Division of Chemical Information has identified the winner of the 2012 Lucille Wert Scholarship. This award is usually presented at the Fall National ACS meeting. But this year, it will be presented at the Santa Clara Valley October dinner meeting since the recipient of the scholarship was not able to attend the National meeting and is available to attend the SCV dinner meeting. We are delighted to offer a venue and an audience for this award presentation.

Volunteers are welcomed for all SCV events. Please contact any of the section officers (listed on the SCV webpage) or simply show up at an event.



November Dinner Meeting, continued from front page

from technology spin-offs to corporate business opportunities. She has also served on the boards of several non-profit organizations. In college, Tzipor was a mentor/tutor and later a site coordinator for Project Step-Up, a mentoring and tutoring program in some of Cleveland's toughest inner city schools. She was also a volunteer math and science tutor at

Mountain View High School and a private tutor for public and private school students.

Tzipor is the proud mother of two boys in whom she has instilled a curiosity about the world and the way things work. She holds a PhD in physical chemistry from Stanford University and a BSc in Chemistry from Case Western Reserve University.

Reminder

October Dinner Meeting

Reminder

Tools of Nanotechnology

Dr. Tobias Beetz, Stanford University

Abstract

The properties of matter are fundamentally different at the nanoscale in ways that are both useful and interesting. During the past years we have seen rapid advances in the way materials are fabricated, studied and controlled at the nanoscale. Developed tools can visualize and manipulate individual atoms and structures about one hundred thousand times finer than the diameter of a human hair. The talk will cover the basic principles of working at the nanoscale as well as showcase some research examples of advancing the applications of nanotechnology in a wide range of fields from the physical sciences to applications in medicine and energy.

Biography

Tobi Beetz is the Associate Director of the Stanford Nano Shared Facilities and has overall responsibility for leading all operational functions for the Nano facilities, including finance, research administration, facilities and property administration, human resources and health and safety. The Stanford Nano Shared Facilities provide the tools, training and support to enable cutting-edge nanoscale science and engineering research for researchers from Stanford University and other academic institutions as well as industry.

Tobi received his Ph.D. in Physics from Stony Brook University in 2004 after transferring from the Universität Würzburg. His thesis research focused on high-resolution x-ray imaging with and without lenses, as well as x-ray radiation damage studies. He spent two years as a Research Associate at the Center for Functional Nanomaterials at Brookhaven National Laboratory where he studied carbon nanotubes and other nanomaterials using advanced electron imaging and diffraction



techniques. Tobi spent two years at Xradia, Inc. where he led a team to develop novel high-resolution x-ray microscopes for the investigation of nanoscale objects. He joined Stanford University in 2008 as the Associate Director of the National Science Foundation-funded Center for Probing the Nanoscale before becoming the

Associate Director of the Stanford Nano Shared Facilities in 2011.

October Dinner Meeting

Date: Thursday, October 18, 2012

Time: 6:00 p.m. Social Hour
7:00 p.m. Dinner
8:00 p.m. Presentation

Speakers: Dr. Tobias Beetz
"Tools of Nanotechnology"
Associate Director, Stanford Nano Shared Facilities, Stanford University

Location: Biltmore Hotel & Suites
2151 Laurelwood Boulevard
Santa Clara, CA

Cost: \$26.00, Teriyaki Steak and Eggplant Parmesan

Reservations: www.scvacs.org
Sally Peters 650-854-4614

Reservations should be made by October 15th stating your name, address, company/school affiliation, number of people in party. Watch the web site for more information. If you are unable to honor your reservation and do not cancel by Wednesday, October 17th, you will be invoiced following the dinner meeting.

Volunteer Co-Chair Needed for the 2013 Chemistry Olympiad

The U.S. National Chemistry Olympiad is a multi-tiered competition sponsored by the American Chemical Society since 1984. In July 2012, ACS in Washington, DC hosted the international competition. The Olympiad consists of the following:

- A Local Section Competition held at individual high schools in March to determine Santa Clara Valley's top 17 high school chemistry students.
- A National Examination that will be held at Santa Clara University on Saturday, April 13th to qualify to be one of the nation's top 20 students. (Stephen Teng from Monta Vista High was one of the top 20 in 2012!)
- A Study Camp for the top 20 national students held for 2 weeks in June at the Air Force Academy.
- The International Chemistry Olympiad (IChO) is a 10-day event that will be held in Moscow, Russia, in mid-July, 2013.

Most of the chair's work takes place behind the scenes in January and February

by U.S. Mail, email, and telephone. We have about 200 high schools in our area that need to be contacted about the Olympiad. A core of about 24 schools participates each year.

For the past 10 years, I have organized the schools for the Olympiad; however, in 2013, I will be unavailable from mid-January through mid-March, during the critical organizational time! The section needs help during that time! I will be available for the national exam.

This volunteer position does not require extensive chemical knowledge, but it does need someone who can deal calmly with parents who may be concerned about their child's preparation. We encourage the high schools that offer AP and honors chemistry to participate, but we do accept any teacher and school that wishes to participate in the local exam.

Margaret Thatcher, the ACS national staff person, is a marvelous support person and has the final answer to any questions that might arise. I will be available in mid-March, but the schools will have to be regis-

tered and exam copies (and answer sheets) mailed to the schools by then. Margaret will also need to know to whom the exams and information should be sent.

If you have never visited the website, please check national's Olympiad website: http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_TRANSITIONMAIN&node_id=528&use_sec=false&sec_url_var=region1&_uid=901d1065-17be-4b65-b107-86493ed16648

Click on "Coordinators" and then the "coordinator's handbook" link for a pdf. There is a lot of information there!

Please help the section, the area schools, the eager high school students, and me in 2013! Contact me ASAP for more information.

Sally Peters

Chair of the Santa Clara Valley section of the Chemistry Olympiad, 2001-2013
sallybrownpeters@gmail.com
650-854-4614



Fourth Annual Teacher-Scholar Award for Community College Chemistry Faculty

The American Chemical Society (ACS) gives awards at local, regional, and national levels for excellent teaching in high schools, colleges, and universities. This annual award, created by the ACS Santa Clara Valley (SCV) local section, fills a conspicuous gap. It is the first in the nation to specifically recognize the contributions of a community college chemistry teacher to science education.

In November, 2009, Jeanette Medina from Cañada College received the first award, including a stipend of \$500, a plaque and \$500 for her department. The second award in 2010 went to T.R. Dickson of Cabrillo College and the third in 2011 to Madeline Adamczeski of San José City College. This year we will again honor an exemplary faculty member from one of the 13 community colleges in the ACS-SCV local area that includes five counties around San José, CA.

This year's award will be presented at the November, 2012, dinner meeting in Santa Clara.

Welcome to the Santa Clara Valley Section of ACS

Each month the section receives a spreadsheet from national ACS with the names of members new to our section. The members are either new to ACS, have transferred in from other areas, or are the newest members -- students. To welcome you to the section and get to know you, the Executive Committee offers new members a free dinner!! To encourage you to attend a monthly section dinner meeting, we would like you to be our guest. When you register, make certain to mention that you are a new member and you and a spouse (or friend) will be our

guests. The dinner meetings are often the 3rd Thursday of the month at a local spot, somewhat convenient to the entire section. If you are unable to attend in the evening, perhaps you would join us for an outreach event, like judging a science fair, participating in the Chemistry Olympiad, or a National Chemistry Week event in October. Then, there is our annual wine tasting and awards picnic in July. The local section is a volunteer organization. Please attend an event, volunteer to help, and get to know your local fellow chemists. Welcome!!

New Members List for September

Jung-un Baek	Dr. Zhinan Jin	Allister F. McGuire
Samuel Bockenbauer	David J. Keenan	Dharmesh Patel
Dr. Andrey Bordenyuk	Dr. Donald James Keidel	Dr. Sumizah Qureshi
Mi Bui	Dr. Jennifer A. Kozak	Katharine Rice
Dr. Daniel J. Coady	William A. Kunkel	Dr. George Rosenkranz
George Cooper	Dr. Hilal Ahmed Lashuel	Jaelyn Schmitt
Dr. Ioana Cozmuta	Dustin M. Ledbetter	Nathan D. Shapiro
Dr. Scott Edward Fendorf	Dr. Xue Li	Vishal A. Verma
Shawn Xuyuan Gu	Sindy Liao	Lee-Ping Wang
Mallory Hammock	Dr. John Pauling McCormick	Ning Xu

Outreach to Children in Homeless Shelters

"Thank you for coming to do experiments with us. It was really fun"

"I did a science project about slime last year, but now I understand how it works."

These comments from homeless kids were typical in showing their appreciation for the hands-on experiments Section members did with them this summer.

Earlier this year, the Santa Clara Valley Section applied for an Innovative Project Grant to start a program for outreach to children in homeless shelters and farmworker families. We received the grant, and these funds, along with the hard work of section members, allowed us to begin our Section's newest project.

Partnering with the Shelter Network of San Mateo County helped us design a program suitable for the variety of settings and age groups. For this first series, we joined the science day camps for kids at four shelters in the bay area that serve families with children. The theme of our hands-on experiments with the kids was polymers, with activities including the "polymer dance," studying the properties of supersorbents, experimenting with different kinds of slime and flubber, and making bouncy balls. We also demonstrated freezing point depression by making (and eating) ice cream in plastic bags. Each child received a gift bag with chemistry-themed items including pencils, fuzzy moles, stickers, erasers, balls, copies of "Kids Discover Chemistry" and "Celebrating Chemistry," and cards that change color with exposure to UV light to measure exposure to sunlight. We also provided copies of the book "Apples, Bubbles, and Crystals" for each of the shelters' libraries.

Feedback from shelter staff included the following:

"The science activities you did with the children went over brilliantly! The parents and children still talk to me about it to this day. The children will not go on the field trips without bringing the sun cards you gave them, and they inform me throughout day how harmful the sun is! The children got a lot out of their afternoon with you; the activities were both really informative and interesting. We truly appreciate you taking the time out of your busy schedule to come and do these activities at our site!"

"I wanted to say a huge thank you from all of us here at Haven Family House for sending volunteers from ACS to work with our kids. Your volunteers were truly fantastic, they had great demos and experiments, and the kids really

enjoyed learning about science and how it can be fun. I have attached a photo of our kids working with your volunteers. All the children were so engaged and enthusiastic about the project, and they are still talking about it. Please let us know if you would like to come out again. We would love to have you."

Thanks go to the volunteers who made this possible. Jeanette Medina and her students helped assemble the gift bags. Volunteers who helped test the materials and carried out the experiments with children at the shelters were Gary Bullard, Roy Hayter, Chris Lipski, Sydnee Mardell, Natalie McClure, Bruce Raby, Susan Terry, Jessica Vargas, Carmen Velez, Diane Wu, and Nathaniel Zuckerman. Special thanks to Natalie and Carmen for acting as leads for two of the programs.

We're off to a great start, and we plan to continue this project during the school year by doing programs at these shelters on evenings and weekends. We also plan to expand the program to children at the Center for Farmworker Families near Watsonville and to homeless shelters in the other counties in our Section. There are many worthy projects done by our Section, but this one is especially designed to reach kids "off the grid"

who have the greatest need for support.

We need more volunteers to keep this program going and growing. If you have an interest in helping design experiments, put together the materials, work on communicating with individual shelters, or visiting the shelters to do experiments with the kids, please contact Bonnie Charpentier at charpentierbon@yahoo.com. There are opportunities to match any amount of time you can contribute to help these kids.

Bonnie Charpentier, Organizer



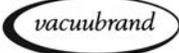


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Spinning Carbon Nanotubes Open Pores in Cancer Cells

by Prachi Patel from C&E News

Under a rotating magnetic field, carbon nanotubes form spinning bundles that drill into cell membranes, researchers have discovered (Nano Lett., DOI: 10.1021/nl301928z). The technique could create pores in tumor cells to destroy them or deliver drugs to them, its inventors say.

Dun Liu, a doctoral student in Alfred Cuschieri's laboratory at the University of Dundee, in the U.K., knew that carbon nanotubes align parallel to an applied magnetic field. To test how a rotating field would affect nanotubes, he used electron microscopy to observe the nanotubes forming rotating bundles while under such a magnetic field.

Since he knew that individual nano-

tubes could penetrate cell membranes, he and his colleagues wanted to investigate the interaction of the spinning nanotubes with cells. So they put nanotubes coated with a biocompatible polymer into a culture of breast cancer tumor cells along with a fluorescent dye. The researchers then took three samples of the cells and applied a rotating magnetic field, with strength of either 20, 40, or 75 millitesla, for 20 minutes.

Compared to cells in the lower fields, more cells took up the dye when exposed to higher fields: up to 25% for the 75-millitesla field. Within 24 hours of exposure to the two higher fields, about one-third of the cells died. The researchers used atomic force microscopy to find that exposure to the

nanotubes and magnetic fields made the cell surfaces rough.

The researchers speculate that at 40 millitesla, the tubes drill pores in the cells that can quickly reseal, making the cells more permeable but not killing them. At even higher fields, the nanotubes might destroy the cell membranes or create larger pores, the researchers think, so that the cells' components leak out, killing the cells.

The technique should affect healthy cells in the same way, says Cuschieri. To selectively kill tumors, he imagines using MRI to visualize a tumor so that doctors could inject nanotubes into the cancerous tissue before applying the rotating magnetic field.

Call for Volunteers: Teach the Teachers

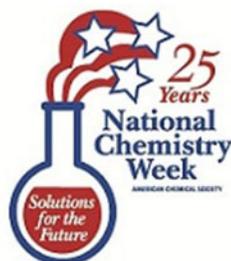
November 17th at RAFT in Redwood City

The annual workshop for teachers is scheduled for Saturday, November 17th at RAFT in Redwood City. This year we are celebrating the 25th year of National Chemistry Week with the topic of "Nanotechnology: the Smallest BIG Idea in Science." Our veteran teachers, Juanita Ryan and Laura Randall will return to present this great workshop.

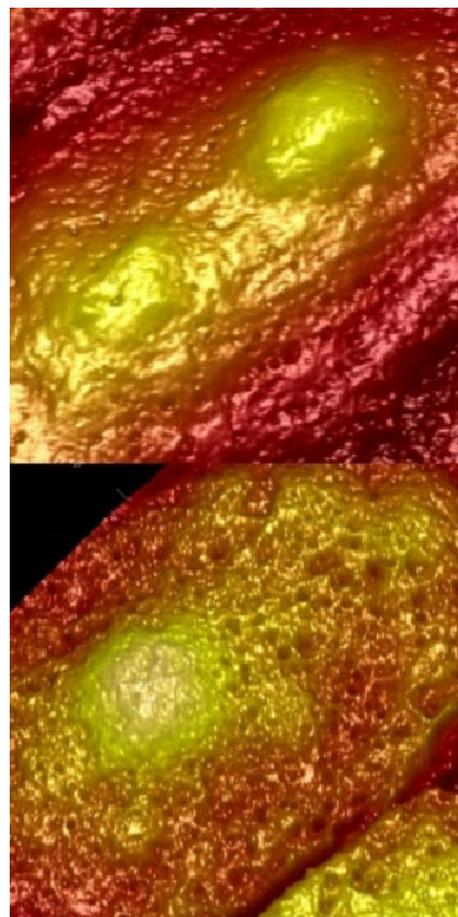
We need volunteers either before the workshop, or the day of, to arrange for food, prepare materials, set up and clean up, and work with the teachers during the workshop. If you would like to participate in this fun and worthwhile project to support our teachers and students, please contact Bonnie Charpentier at charpentierbon@yahoo.com

National Chemistry Week

Did you know an ant is 5 million nanometers long? And a water molecule is about a half a nanometer long! Here is your chance to come out for some hands-on exploration of this and other cool nano-sized chemistry. The Santa Clara Valley Section of the ACS will be celebrating National Chemistry Week at a free, hands-on public outreach event on Saturday, October 27th from 10 am to 1 pm at the Dr. Martin Luther King Jr. Library in



San José (150 E. San Fernando St). Local college chemistry clubs will run hands-on experiments with preschool and elementary school-aged children. Bring your kids, friends and neighbors to get slimed! Children of all ages can take a spin on the Chemistry Wheel of Fortune to win a prize and learn about this year's NCW theme, "Nanotechnology—The Smallest BIG Idea in Science!"--focusing on the chemistry of nanotechnology. Looking for a volunteer opportunity? Whether you're a college student or just a chemistry enthusiast, to volunteer--contact NCW Coordinator, Abby Kennedy at akennedycali2007@yahoo.com.



The smooth surface of a cultured breast cancer cell (top) becomes pock-marked with pores (bottom) after being exposed to carbon nanotubes under a rotating magnetic field. Images are atomic force micrographs. Credit: Nano Letters

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FUTURE MEETINGS

- Oct 18** Dr. Tobias Beetz, Stanford University
Tools of Nanotechnology
Biltmore Hotel & Suites
Santa Clara, CA
- Oct 21-27** National Chemistry Week
- Oct 27** NCW at Martin Luther King Library
San José State University
- Nov 14** BioScience Forum
www.biosf.org/programs.htm
- Nov 15** Tzipor Ulman, Founder and Executive
Director of Science is Elementary
Community College Teaching Award
Biltmore Hotel & Suites
Santa Clara, CA
- Jan 13-18** 21st Winter ACS Fluorine Conference
<http://fluorine.sites.acs.org/21stwfc.htm>