CALP ACS

The California Los Padres Section of the American Chemical Society Newsletter

Winter/Spring 2006

1996 10 years 2006

A Brief Message from Your Chair

Your executive committee is working hard at making our 10th Anniversary year a memorable one. We start off with a gala celebration and lecture by Sir Harry Kroto on April 8th. We will be having our recognition of 50 year members of the ACS in early October, our annual wine tasting towards the end of November, and the committee is currently planning plant trips and lecture events over the rest of the year. However, there is flexibility in the schedule and if you have something special you would like to see CALPACS do, drop any of the committee members a line. Our email addresses can be found at the CALPACS website (www.chem.ucsb.edu/~calpacs). We are always looking for interesting venues to visit and if you would like to host a trip, please get in touch with us. In fact, please let us know how we are doing. We cover such a large geographical area and we have a very diverse demographic so it would come as no surprise that we are overlooking your desires for a section event. Local sections are at the forefront of your interaction with ACS. Talk to us. We'd love to hear from you.

Dieter Klaubert
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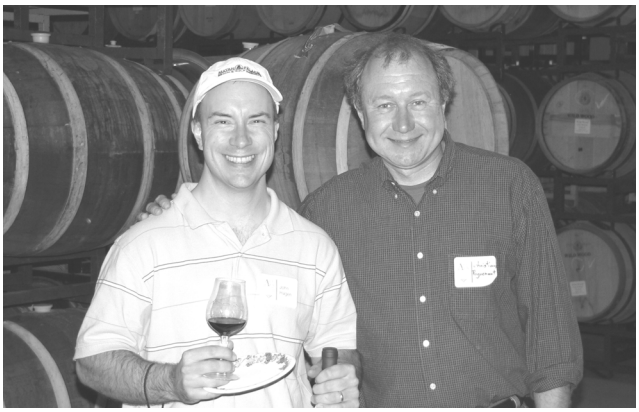
2006 CALPACS Chair Dieter Klaubert caught in the act of serving our members.

Fall Luncheon Features Biosensors

On Saturday October 1, CALPACS hosted the annual Fall Luncheon honoring our 50-year members. This year's luncheon was at the Firestone-Walker Taproom in Buellton. This venue offered an ideal informal environment for members to interact. To begin the event, local section chair Dieter Klaubert presented those members of our section having 50 years of service to the society with a certificate of recognition. 50-year members Anthony Moye and James Lagos were present to receive their certificates. The featured speaker at the event was Professor Kevin Plaxco of the Department of Chemistry and Biochemistry and the Program in Bio-Molecular Science and Engineering at UCSB. Dr. Plaxco presented his work on the development of biosensors for clinical applications. Dr. Plaxco's lab is developing optical and electronic biosensor platforms based on the binding-induced folding of peptides, proteins, and DNA. He presented data showing the detection of macromolecular analytes using protein folding-based optical sensors. The Plaxco lab is working to make this platform applicable to a wide range of analytes. He also presented his work on the development of reagentless, reusable electrochemical detection methods based on DNA conformational changes. By taking advantage of binding-induced conformational changes, his lab has been able to demonstrate picomolar detection of target DNA. In related work using DNA aptamers, his group has been able to detect thrombin in blood samples and low levels of cocaine in complex media. Dr. Plaxco suggests that these biosensors may provide a means for the inexpensive and convenient detection of clinically, defense, or environmentally important compounds.

Inside

CALPACS 2005 Holiday Wine Tasting at Baileyana Winery



Cal Poly Chemistry Professor John Hahen(left) and Baileyana Winery Wine Maker Christian Roguenant

The annual wine tasting event was held November 19 at Baileyana Winery. Winemaker Christian Roguenant was our host for the day. Roguenant grew up among the vineyards of the Burgundy region in France, and studied enology at the University of Dijon.

We began our tour in the vineyards, where we discussed aspects of viticulture in the Edna valley. Although the harvest was over, we sampled a few late grapes still clinging to the vines.

Roguenant then led us through the winery, explaining the chemistry of each step in the winemaking process. We stopped several times to sample wine at various stages of fermentation and processing. Roguenant had the participants compare the taste of two wines that had been fermented using different strains of yeast, but were otherwise identical. The difference was striking. There was also a noticeable contrast between two chardonnays, one aged in new oak and one aged in old oak.

We ended our tour in the wine cellar, where we tasted several finished wines, including the 2004 Sauvignon Blanc, the 2003 Chardonnay, the 2003 Pinot Noir, and the 2003 Syrah. We would like to thank Winemaker Christian Roguenant for an informative and entertaining tour. We would also like to thank Amy Nishimura for preparing hors d'oeuvres including an assortment of gourmet cheeses, breads, fruits, and a delicious homemade squash soup.

2006 National ACS Leadership Conference

Poncho Meisenheimer, Chair-Elect

I would like to thank the members of the Los Padres section for sending me to the 2006 ACS Leadership Conference in Baltimore last month. The three-day seminar is designed to give chair-elects from around the country a clue as to what the ACS is really working toward. The ACS has revenues of $0.42 billion/year and maintains non-profit status. The major expense is definitely information services (70%), but the most of the rest of the money is spent on membership benefit programs. That's about 95 different programs. The ACS is also a powerful organization and hopes to address issues from our local section on a national stage. For example, Katie Hunt, ACS President-Elect, has offered to meet with state legislators and CALPACS members in an effort to address local educational and research concerns. The ACS does not lobby issues, but it can create situations where individual members are heard loud and clear. If you have suggestions that you think need legislative attention, then please email me at pmeisenh@promega.com. Ann Nalley, ACS President, and many other members of the ACS Legislative Action Network have worked tirelessly to address diminished funding for "basic" research. In the last "State of the Union" address, President Bush specifically mentioned some of the innovative programs that these members have been pushing. All in all, we can take advantage of these efforts. My job this year is to schedule, as the CALPACS Executive Committee sees appropriate, a series of outstanding events for us all to engage in 2007.

CALPACS' Poncho Meisenheimer with ACS President Ann Nalley at the Baltimore meeting.

Santa Barbara County Science Fair Seeks Judges

The 51st Annual Santa Barbara County Science Fair is April 20-22, 2006. This is an exciting year for the fair, with a number of big changes occurring in venue, scheduling and judging format. First, a new partnership with UCSB has allowed the fair to move from its traditional venue at the County Education Office to Corwin Pavilion on UCSB's campus. We are hopeful that this new location will be inspirational for the students as well as exposing them to science at the university through hands-on activities and lab tours. The fair has also changed to a single day format with the judging, interactive activities and awards ceremony all taking place on Friday April 21, 2006. We hope this new format will prove more convenient for judges and participants alike. Finally, we are implementing a new judging procedure this year. Judges will use a score sheet to evaluate each project on its own merit based on defined criteria. Each member of a two-person team will judge a project and the scores will be averaged to determine the award. All projects achieving an adequate score will receive a bronze, silver or gold medal. We are looking for volunteers to serve as judges on Friday April 21, 2006. No experience is required! A guide will be posted on the science fair website describing the procedure and evaluation criteria in detail. You can volunteer for medals judging in the morning only or stay all day and assist in the advanced finalist judging in the afternoon. Experienced judges are particularly valuable during the second round of judging. Refreshments will be provided throughout the morning to all judges and lunch will be provided for those staying all day. Please register on our website www.sbsciencefair.org by April 10 if you are interested. Further information is also available on the website or e-mail Shawna McMahon at sbsciencefair@gmail.com.

61st Northwest Regional Meeting Convenes in Reno

The Northwest Regional Meeting, NORM, will meet in Reno, Nevada, June 25 – 28, 2006. It's a sure bet the program will be a winner! Symposia include molecular devices and motors, molecular probes and sensors, bioorganic chemistry and biosensors, and atmospheric science and mercury pollution. Advance registration is still open and may be accessed at www.chem.unr.edu/norm06/.

Profile:
Prof. Sir Harry Kroto

If the Nobel Prize in Chemistry were purely a matter of odds, then every chemist would have about a 1:200,000 chance of winning each year. But in an effort to execute Alfred Nobel's last will, the prize committee requires that the winner has "conferred the greatest benefit on mankind." Such stringent criteria makes winning the Nobel Prize seem less likely than the California Lottery. Then again, Nobel Laureate Sir Harry Kroto suggests that a little luck is just what a scientist needs. Lucky for us, he will be the keynote speaker at the CALPACS 10th Anniversary Gala in Santa Barbara this April 8.

Harold Kroto grew up the son of German immigrants in the north of England. He enjoyed learning subjects ranging from geography to woodworking. For reasons unbeknownst even to himself, Harry gravitated toward chemistry and art. In 1958, he attended the University at Sheffield.

"With hindsight I am sure that with the advice available today I would have done something like architecture which would have conflated my art and technology interests," described Sir Harry Kroto in his Nobel biography. Lucky for his many future students, by 1964 he had received his PhD for research with R. N. Dixon on high resolution electronic spectra of free radicals produced by flash photolysis. But Harry Kroto did not ignore his passion for art at the University. He was the art editor of the student magazine *Arrows* and described, "Whilst a research student I won a Sunday Times bookjacket design competition - the first important (national) prize I was to get for a very long time. Later my cover design for the departmental teaching and research brochure "Chemistry at Sussex" was featured in "Modern Publicity" (an international annual of the best in professional graphic design) - I consider this to be one of my best publications."

In 1967, after two years postdoctoral research at the National Research Council in Ottawa and one year at Bell Laboratories in New Jersey, Dr. Kroto started his academic career at the University of Sussex. By 1985, he became a professor, and in 1991 he was made a Royal Society Research Professor.

In 1995, together with Patrick Reams, a BBC producer, Professor Kroto inaugurated the Vega Science Trust to create science films of sufficiently high quality for network television broadcast. Their films not only reflect the excitement of scientific discovery but also the intrinsic concepts and principles without which fundamental understanding is impossible. The Trust also seeks to preserve scientific cultural heritage by recording scientists who have not only made outstanding contributions but also are outstanding communicators. The trust has now made some 20 films.

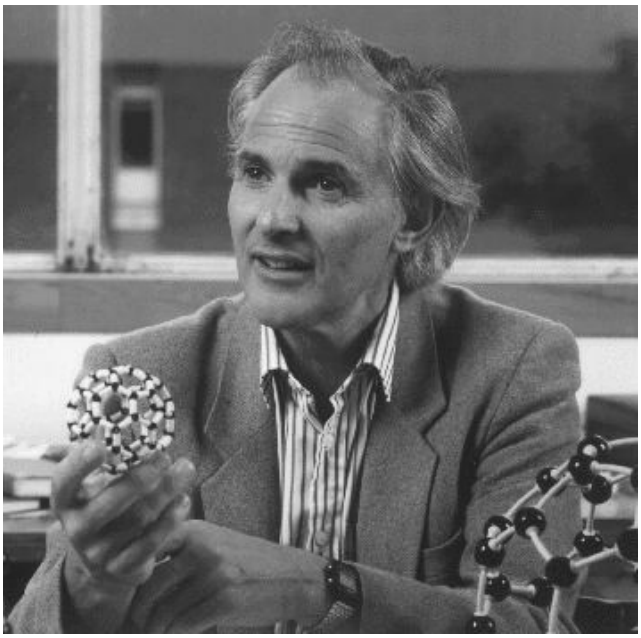
In 1996, Professor Kroto was awarded the 1996 Nobel Prize in Chemistry jointly with Robert Curl and Richard Smalley for their discovery of Fullerenes. In addition, Professor Kroto was bestowed Knighthood (appointed to The Order of the British Empire).

"I never dreamed of winning the Nobel Prize - indeed I was very happy with my scientific work prior to the discovery of C60 in 1985. The creation of the first molecules with carbon/phosphorus double bonds and the discovery of the carbon chains in space seemed (to me) like nice contributions and even if I did not do anything else as significant I would have felt quite successful as a scientist."

Professor Sir Harry Kroto is now the Francis Eppes Professor of Chemistry at Florida State University. In addition to his research, he tours the world speaking about science, education, art, and philosophy.

"My advice is to do something which interests you or which you enjoy (though I am not sure about the definition of enjoyment) and do it to the absolute best of your ability. If it interests you, however mundane it might seem on the surface, still explore it because something unexpected often turns up just when you least expect it."

Excerpts from Les Prix Nobel. The Nobel Prizes 1996, Editor Tore Frängsmyr, [Nobel Foundation], Stockholm, 1997



Professor Sir Harry Kroto will be the keynote speaker at the CALPACS tenth anniversary dinner on Saturday, April 8, 2006 at Hotel Mar Monte in Santa Barbara at 6 pm. For more information and a registration form go to www.chem.ucsb.edu/~calpacs.

Why Cotton Kills

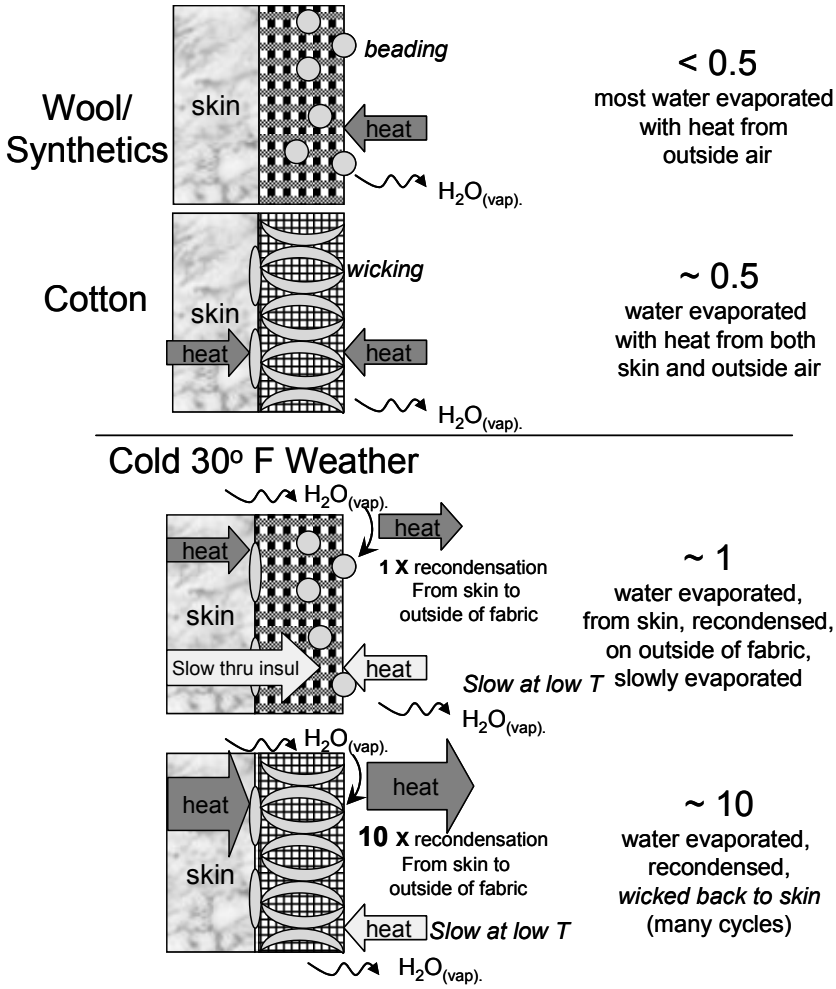
By Ivan Lorkovic

For decades, it seems, various partners in outdoors activities have been constantly telling me that "cotton kills." What they mean is that any time you can get wet outdoors, whether falling in a stream, getting rained on, peeing your pants, or sweating during vigorous exercise, the cotton, supposedly because of the way it dries, makes you colder. In the aftermath you stand the chance of dying of exposure, simply based upon your choice of fabric.

Here's how I, at first blush, tried to understood this phenomenon: Because the cotton is capable of wicking moisture to the skin, most of the heat required to evaporate the water and dry the cotton will come from your body heat, and not from the outside. Fabrics such as polyester, wool, and fancier perfluorinated fabrics are superior because once the layer of water near your body dries, it doesn't get wet again by wicking action, because there is no wicking. So eventually these other fabrics will dry too, but will not withdraw as much heat from your body. I've heard other oversimplifications, such as "cotton dries from the outside in, instead of from the inside out."

OK, so what? A few extra kilojoules, big deal. Would that really be the difference between life or death?

What just recently dawned on this chemist is that, the colder it gets, the slower water on the outside of your clothing evaporates. Near the skin, however, it evaporates as fast as always (remember, you're warm blooded; for now, anyway), cooling you down. The water vapor leaving your skin, however, can and does *recondense* on the outside surface of the fabric. In the case of wool, fleece, etc., that's the end, the inside stays dry, and the outside stays wet a little longer. With cotton, though, when the water vapor condenses, and sends your body's hard won heat into the universe, the condensed water can just wick right back to your skin to re-evaporate and draw even more heat away, and so on for many cycles. So a given amount of water on cotton can create a cooling effect on your body many times its evaporation enthalpy, because of this recycling potential.



When it's hot, cotton's wicking can help cool you down, of course, but this is a one shot deal, the air temperature outside of your shirt in this case is typically just as warm as your body, and so very little recondensation happens.

So the next time one of your more urban-legend prone ski-buddies repeats, glibly, "You know they say cotton kills," you can respond, "You bet your cold skinny a-- it does!"

SUSTAINABLE RESEARCH AT UCSB—
LabRATS lead the way

Did you know that one old-style fume hood use the electricity of three houses? Ultra-cold freezers use lots of electricity, and none have any efficiency ratings. What about alternate chemical methods to the toxic ones you have always used? Scientists at UCSB are trading ideas on how to conserve energy, water, and materials while reducing pollution at the same time. They do this through a network of career research staff (as well as motivated students and faculty) over the phone, in person and through a listserver. As a group of Research and Technical Staff they call themselves LabRATS, and they hope to support each other in innovation and everyday conservation practices, such as turning off ovens, re-using disposables when practical, and sharing equipment and instrumentation. The latter activity can save your grant thousands of dollars if you just ask around for someone willing to share or donate their unused spectrometer, vacuum pump or sonicator.

This group can also share knowledge of techniques in their field of study from organic synthesis, to gas analyses and nmr spectroscopy. All departments (physics, biology, geology, engineering, etc.) are connected through a few key lab managers and support staff, and they can direct inquiries to the appropriate researchers. Eventually this may be linked to research training and will broaden the graduate research experience at UCSB for many students. Of course the best strategy for gaining momentum with this group will be through donuts or pizza, and this is always the first item on the agenda. Researchers on other campuses are encouraged to start their own networks and can share ideas through the moderator at UCSB, Allen Doyle. Feel free to join at this site:
http://groups.yahoo.com/group/LabRATS_UCSB/.

Communities Plan Earth Day Festivities

April 22, 2006 marks the 36th anniversary of the original Earth Day which took place in 1970. The original Earth Day observance was the brain child of Gaylord Nelson, a U.S. Senator from Wisconsin, who had been a major advocate of environmental reform. The idea which became Earth Day is said to have occurred to Senator Nelson after viewing the aftermath of the devastating Santa Barbara oil spill of 1969. At that time he took a page from the playbook of war protestors who were staging "teach-ins" at campuses around the country to protest the U.S. involvement in Vietnam. The Senator felt that a similar protest on environmental issues would bring the country's attention to the dire threats to the environment that he was seeing.

In September of 1969, Senator Nelson proclaimed that April 22, 1970 would be a day for grassroots protest on environmental issues and invited everyone to participate. The results were beyond anything he could have dreamed. Coordination of the event soon overflowed his senate office and forced his staff to seek additional office space and volunteers just to handle the phone calls and inquiries that were generated by this call to action. The event that became known as Earth Day eventually saw the participation of 20 million people and thousands of schools all over the nation. It was the beginning of the modern environmental movement. The senator would later say that his staffers could not possibly have organized all those people and all those events, but that Earth Day organized itself.

While the original Earth Day was a one time event, in the 1990's the anniversary of that event became an annual observance and a day for education and spreading awareness of the environmental issues that continue to concern us. This year, communities nationwide will host festivities and activities on or around April 22.

Some of the local activities planned:

Saturday, April 8th:

- The City of Oxnard will host Earth Day festivities from 11 am to 3 pm at Plaza Park.

Saturday, April 22nd:

- Thousand Oaks will host their Arbor Day/Earth Day Celebration from 11 am to 4 pm at Conejo Creek Park North.
- In Santa Maria, The Natural History Museum will host Earth Day 2006 from 10 am to 2 pm.
- San Luis Obispo's Earth Day celebrations will take place at Mission Plaza from 10 am to 5 pm.

Sunday, April 23rd:

- In Santa Barbara, the Community Environmental Council will host Earth Day activities from 10 am to 5:30 pm in the Santa Barbara County Courthouse Sunken Gardens.

The ACS will be celebrating Earth Day 2006 on April 22nd. This year's theme is "Dig it" with the community event "Plant It for the Planet." Members interested in organizing an activity may contact Kathy Jimison at kjimison@cuesta.edu for support and supplies.

This Month in Chemical History

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Prepared for SCALACS, the Journal of the Southern California, Orange County, and San Gorgonio Sections of the American Chemical Society

A few years ago I obtained a number of volumes of a series "The Mallinckrodt Collection of Food Classics" published by that manufacturer in the mid-1960s. Most of the books are facsimile reprints of early classic cookbooks, but Volume II is different. It is a facsimile of an 1820 Philadelphia publication reprinting rapidly an English publication of the same year. This influential book, by the chemist Fredrick Accum, deserves to have its complete title, in the early 19th. century style given here: "A Treatise on Adulterations of Food and Culinary Poisons. Exhibiting The Fraudulent Sophistications of BREAD, BEER, WINE, SPIRITUOUS LIQUORS, TEA, COFFEE, CREAM, CONFECTIONERY, VINEGAR, MUSTARD, PEPPER, CHEESE, OLIVE OIL, PICKLES. And other articles employed in domestic economy. And METHODS OF DETECTING THEM."

So who was Fredrick Accum, and why this book? For the following biographical sketch I am greatly indebted to a substantial article on Accum by Lawson Cockroft which appears on the website of the Royal Society of Chemistry's Library and Information Service. Accum was born in Germany on March 29, 1769. His father was a merchant and soap-maker. After beginning his education at the local gymnasium Fredrick was apprenticed to a local pharmacist and became acquainted with the family of William Brande, who provided medicines to the court of George III in London. Accum moved to London in 1793, worked in Brande's laboratory, and extended his education by attending lectures. He got to know William Nicholson who edited a well-respected chemical journal (Nicholson's Journal) and helped to translate foreign articles for inclusion. In 1798 Accum began to contribute a series of articles to the journal on adulteration of medical preparations.

Accum set up his own establishment in 1800 as a supplier of chemicals and equipment and developed considerable expertise in analytical chemistry to ensure the quality of his products. For a year he assisted Humphry Davy as a demonstrator at the Royal Institution. Accum's first book, "System of Theoretical and Practical Chemistry" was published in 1803 and was well subscribed, and he began to offer the only laboratory course in experimental chemistry available in London at that time. Accum's American pupils included James Dana, the famous mineralogist, and Benjamin Silliman, first Professor of Chemistry at Yale. Not surprisingly Accum's equipment and chemicals found their way to the initial Chemistry Departments established in the United States.

Accum became interested in the novel prospect of providing coal gas commercially for heating and lighting and testified to government committees on the subject. By 1815 some fifteen miles of London streets were gas-lit, and Accum, always alert to new opportunities, published a book on coal gas manufacture. In 1817 he published a book "Chemical Amusement" describing experiments suitable for the drawing room, and created "Chests of Chemical Amusement" containing the necessary chemicals and equipment and selling for ten to eighteen guineas, a lot of money at the time.

By 1820 Accum was ready to publish his magnum opus mentioned above and concerned with adulterations of food products. It was reviewed in all the leading journals – not the chemical journals but the popular literary magazines such as Blackwood's and the Edinburgh Review. The first thousand copies sold out in under a month and a second edition appeared immediately. The book, and Accum, were vigorously attacked by food and drink manufacturers who alleged that they were unfairly smeared by the work. Meanwhile Accum was accused of mutilating books in the collection of the Royal Institution, and a warrant for a search of his rooms led to the discovery of some 30 pages removed from books in the Royal Institution's library. Accum was released on bail but never came to trial. Badly depressed he left England, forfeited his bail, and returned to Germany.

He soon obtained two posts related to applied chemistry in Berlin. He published in 1826 his only book in German on the properties of building materials. While he continued to publish in the journal of the Berlin Royal Academy of Sciences his articles were submitted either anonymously or under the rather transparent pseudonym of Mucca. New editions of his treatise on adulteration appeared in England without his name on the title page. And it was not until 1860 that food regulation was written into law in England in the Aduleration Act. But Accum had died in Berlin in June 1838.

Students from Westmont College and UCSB SAACS groups once again celebrated National Chemistry Week by providing chemical demonstrations at Paseo Nuevo Shopping Center in downtown Santa Barbara.

The So. Cal. Undergraduate Research Symposium at Westmont College

This year the annual Southern California ACS Research Symposium will be hosted by Westmont College in Santa Barbara on Saturday, April 22, 2006. All undergraduate students are invited to attend and present a paper on their chemistry related research. All two and four-year schools located in the greater Southern California area (Including the SLO, Santa Barbara, and Ventura areas) are eligible to have undergraduate students present their original work at this conference. The registration deadline is April 10, 2006. The conference this year is sponsored by CALPACS, The Southern California Section of the ACS, and Westmont College. For more information and registration forms go to http://www.westmont.edu/_academics/pages/departments/chemistry/Pages/SCACSURS/index.html.

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Remember to register for
the 10th Anniversary Gala Celebration
on **April 8, 2006** at the
Hotel Mar Monte in Santa Barbara.

*The reservation **deadline** is*
Monday April 3, 2006.
For more information go to
www.chem.ucsb.edu/~calpacs