

# Silicon Valley Chemist

Santa Clara Valley Section

American Chemical Society

Volume 25 No. 8

## – September Dinner Meeting – Chemistry at Nanopatterned Interfaces Surface Modification of Imprinted Polymers

Dr. Kenneth R. Carter

**Abstract**

Contact molding of thin films is an important lithographic technique and show great promise in the ability to transfer nanoscale patterns in an efficient, economic fashion. We have found that polymer networks composed of a mixture of photopolymerizable monomers (acrylates and methacrylates) can be molded and photocured, providing image transfer and we have demonstrated technologically interesting applications<sup>1</sup>. The use of these nanoscopically printed materials simply as sacrificial resist layers is obvious but does not take advantage of the chemistry presented at the surface of the patterned polymer. We have been exploring polymer interfaces of the patterned networks and subsequent modification of the molded network surface functionality. We add a functional comonomer to our photopolymer resin and after molding a fraction of this incorporated functionality is present at the surface of the polymer and available for subsequent reactions.

This concept of embedded functionality has been exploited in a number of ways. Earlier this year we reported the ability to tune the size, shape and chemistry of nanopatterned



surfaces by performing grafting reactions utilizing surface initiated "living" free radical polymerization techniques<sup>2</sup>. More recently, we have been exploiting the surface functionality to accommodate the attach-

ment of (1) metals layers by electroless chemical deposition, (2) semiconducting polymers and (3) bioactive materials. The synthesis, characterization and use of these new materials and related techniques are discussed.

**Notes:**

1. "Nanoscale Patterning of Magnetic Islands by Imprint Lithography Using a Flexible Mold", McClelland, G. M.; Hart, M. W.; Rettner, C. T.; Best, M. E.; Carter, K. R.; Terris, B. D. *Appl. Phys. Lett.*, 2002, 81(8), 1483.
2. "A Versatile Method for Tuning the Chemistry and Size of Nanoscopic Features by Living Free Radical Polymerization", von Werne, T. A.; Germack, D. S.; Hagberg, E. C.; Sheares, V. V.; Hawker, C. J.; Carter, K. R. *J. Am. Chem. Soc.*, 2003, 125(13), 3831.

**Biography**

Dr. Carter is a Research Staff Member at the IBM Almaden Research Center in San Jose, CA. He graduated (B.S. Chemistry) from the State University of New York-Oneonta in 1985. Dr. Carter received his Ph.D. (Inorganic/Polymer Chemistry) from the University of Vermont in 1991, having worked for Professor

*continued on next page*

## September Dinner Meeting

**Date:** Thursday, September 25, 2003**Time:** 6:00 Social hour

7:00 Dinner

8:00 Lecture

**Location:** Blue Pheasant Restaurant  
22100 Stevens Creek Blvd.  
Cupertino, CA 95014  
408-255-3300

**Speaker:** Dr. Ken Carter  
IBM Almaden Research  
Center, Materials Science

**Cost:** \$27.00, Broiled Salmon, London Broil, or Pasta Primavera.  
Includes wine with dinner

**Reservations:** [www.scvacs.org](http://www.scvacs.org)  
Shirley Radding  
408-246-2564  
408-296-8625 Fax

Reservations should be made by Sept. 22 stating your name, address, company affiliation, number of people in your party, and menu selection.

If you are unable to honor your reservation, you will be invoiced following the dinner meeting.



Chemistry, continued from next page

Christopher W. Allen on the synthesis and characterization of phosphazene ring-containing polymers. Dr. Carter did a year of postdoctoral research at the IBM Almaden Research Center in 1991 before joining the IBM Research Staff as a regular employee in 1992. Over the last 12 years, Dr. Carter has performed research related to the design and use of high performance polymers in microelectronics applications. He has over 70 papers and 20 patents on his research. His projects have included, non-linear optical polymers, high Tg packaging materials,

high performance printer toner resins, low dielectric constant nanoporous polymers, and more recently electroactive (OLED and bistable) polymers and the study of high resolution nanopatterning techniques. In addition to his position at IBM, Dr. Carter is also a principal investigator within the NSF Center on Polymeric Interfaces and Macromolecular Assemblies (CPIMA), an IBM/Stanford/UC Davis/UC Berkeley partnership. He has also served as Chair of the American Chemical Society Division of Polymer Chemistry (2001-2004).

## Chair's Message

This month's newsletter is full of information on upcoming events for Fall 2003. Please take a few minutes to read through all the activities, especially noting our dinner meeting on September 25, 2003 (speaker: Dr. Ken Carter, IBM-Almaden Research Center), as well as October's National Chemistry Week activities and volunteer opportunities. I hope you will join me at these upcoming events.

Speaking of volunteer opportunities, there are two areas in our Local Section that need some dedicated volunteers. One area is for a chemical demonstration outreach coordinator. As you know, the glowstick outreach activity was extremely successful last academic year. Our Section provided over 600 glowsticks to pre-K through high school science classrooms. Please note that glowsticks will continue to be available for upcoming academic year due to the generous donation from Pharmaceutical Outsource Solutions, Inc. However, this is only one possible outreach activity. Our Section could greatly expand our list of outreach demonstrations if one or two individuals would identify, test and post lesson plans on our website.

Every spring, I usually receive a few calls from chemistry teachers requesting information on possible summer internships for their students, many who are underrepresented in

chemistry. Unfortunately, I have not had any internship opportunities for these students. However, the ACS Project SEED Program would be one possible mechanism for providing such summer research opportunities. Now is the time to begin to plan for next summer. The ACS website ([www.chemistry.org](http://www.chemistry.org)) provides information for Project SEED on how to start such a program. I hope a few individuals will volunteer for this program. It does make a difference creating opportunities for careers in chemistry for underrepresented students.

If you are interested in any of these volunteer opportunities or would like to know how to become more involved in your local ACS section's activities, please e-mail me at [chair@scvacs.org](mailto:chair@scvacs.org).

Please note that your ACS-Santa Clara Valley Councilors and some Alternate Councilors will travel to the Fall 2003 ACS Meeting in New York in early September. If you have any concerns regarding ACS activities, please contact them. They represent your section at the national level.



## ACS - SCVS Nominations for 2004

CHAIR-ELECT	John Riley
SECRETARY	Karl Marhenke
TREASURER	Hong Gao
COUNCILORS (3)	Linda Brunauer Sally Peters Peter Rusch
ALTERNATE COUNCILORS (3)	George Lechner Carol Mosher Ernest Gargas



## A Volunteer Opportunity The Chemistry of Flight

As part of our National Chemistry Week celebration "Earth's Atmosphere and Beyond", we have the opportunity to do a cooperative project with the Hiller Aviation Museum in San Carlos. The idea is to develop information and displays concerning the chemistry that enables flight. This may be done by adding information to the existing exhibits or by developing some additional exhibits. Possibilities include the chemistry of fuels and materials utilized over the years for development of airplanes and rockets.

We need volunteers to brainstorm, do research for relevant information, and to create exhibits. We have an enthusiastic contact at Hiller Aviation Museum and now need ACS members with expertise in these areas, and/or with a willingness to help out. This opportunity promises to be a lot of fun – if you are willing to help (any amount of time or level of commitment is fine), please contact Bonnie Charpentier at [charpentierbon@yahoo.com](mailto:charpentierbon@yahoo.com).



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# 100 Years of Ford

*This year is the 100th anniversary of Ford. Have you heard these?*

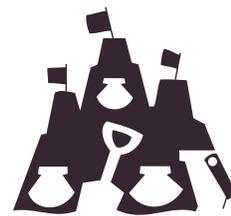
1. In 1903, Henry Ford (1863-1948) decided to incorporate the Ford Motor Company. There were twelve original financial backers. He went to the local attorney of his major backer, Alexander Malcolmson, the largest coal dealer in Detroit. The main attorney for the incorporation was Horace H. Rackham, a neighbor of the Fords. When Ford couldn't come up with the legal fees, he suggested that Rackham might make his fee by an investment in the new company. In an uncharacteristic move, the conservative Rackham borrowed \$5,000 (mostly from his mother) and became one of the twelve investors.
2. The Ford Motor Company paid no dividends for years. The profits were plowed back into the company. Around 1914, Horace and John Dodge (yes – the Dodge boys and early suppliers/investors of Ford who later started Dodge) finally sued Ford for an accounting and back dividends.
3. Rackham was on a trip to Europe when the Ford-Dodge suit was resolved and he received his check for back dividends of Ford for 15 years for over \$300,000.00. Rackham sent it back with the note that someone had misplaced the decimal point. The check was for real. Around 1919, Ford bought out all the remaining initial partners. Rackham received between \$15 and 20 million (in 1919 dollars) on his \$5,000 investment, becoming the darling for philanthropy in Michigan. The Horace H. Rackham School of Graduate Studies at University Michigan was one of his first and most visible donations. (Source: Dr. Robert Elderfield, the synthetic heteroatom organic chemist, was at the University of Michigan in Ann Arbor in 1961.)
4. The early Model-T and Model-A contained significant amounts of wood. Ford required his parts

suppliers to ship in wooden boxes having required tree type, specific dimensions, and thicknesses. Employees of Ford would then disassemble the boxes and the pieces would fit exactly into the cars on the assembly line. When I was in high school near Penn State 45 years ago, I had a 1930 Model-A Ford 4-door sedan. In our restoration to make the car road worthy (it still had mechanical brakes), we had to replace the wooden floorboards that had rotted after 25 years of Pennsylvanian winters.

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*The Patent Truths column by Howard Peters will continue in the Silicon Valley Chemist about every other month. The Peters' have a new granddaughter Megan Elizabeth Bhatt born June 27th in Carmel, Indiana – another*



*beautiful Hoosier granddaughter. Thus, there are more things on their plate.*

*The response to the second request of feedback from the readers was higher and both months' responses totaled about 36 – about 1% of the SCV membership. Sometimes writing to this ACS local section (or I believe any local section) and getting a response of any kind is like herding kittens or writing to a cemetery. The most biting comment was that I should be happy with at least 9 responses – that was probably more than the number of votes I received from local section members in the election last year to become a member of the ACS Board of Directors. Lawyers (even chemist-lawyers) are evidently still not popular.*



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## National Chemistry Week: Seminar Series Scientists

### Chris Dateo, Ph.D.

Dr Chris Dateo is a Senior Research Scientist with Eloret Corporation. Following his Ph.D. in Theoretical Chemistry at the University of California, Berkeley in 1987, he carried out postdoctoral work at Cambridge University, England and the University of California, Santa Barbara, before joining Eloret in 1991. He was the recipient of the NASA Group Achievement Award, Devices and Nanotechnology, in 2000. His research interests include chemical reaction dynamics using quantum and classical methods, ab initio electronic structure calculations, fitting of



molecular potential energy surfaces, molecular properties, molecular spectroscopy and chemical kinetics. His work has applications in many areas including combustion, atmospheric, astrophysical, and astrobiological chemical systems. His research

has led to 50 publications in peer-reviewed professional journals.

**ABSTRACT: Simulation of Prebiotic Processing by Comet and Meteoroid Impact: Implications for Life on Early Earth and Other Planets**

We develop a reacting flow model to simulate the shock induced chemistry of comets and meteoroids entering

planetary atmospheres. Various atmospheric compositions comprising of simpler molecules (i.e., CH<sub>4</sub>, CO<sub>2</sub>, H<sub>2</sub>O, etc.) are investigated to determine the production efficiency of more complex prebiotic molecules as a function of composition, pressure, and entry velocity. The possible role of comets and meteoroids in creating the inventory of prebiotic material necessary for life on Early Earth is considered.

Comets and meteoroids can also introduce new materials from the Interstellar Medium (ISM) to planetary atmospheres. The ablation of water from comets, introducing the element oxygen into Titan's atmosphere will also be considered and its implications for the formation of organic and prebiotic material.



## National Chemistry Week: Seminar Series Scientists

### Friedemann Freund, Ph.D.

Dr. Friedemann Freund has been associated with the Department of Physics at San Jose State University as an Adjunct Professor, since 1989. He has worked at the NASA Ames Research Center since 1985, first through the National Research Council (1985-1987) and then as Principal Investigator through the SETI Institute. He is currently a Visiting Scientist at the Geophysical Laboratory, Carnegie Institution, Washington, DC. Prior to coming to the USA, he was Professor of Geosciences at the University of Cologne, Germany (1970-1987), Assistant Professor of Chemistry at the University of Göttingen, Germany (1962-1969), and Research Associate Pennsylvania State University (1960-1962). He has been Visiting Professor at Stanford (1973, 1974); University of Namur, Belgium (1974-1976); University of Dijon, France (1977); Cornell University (1981);



Arizona State University (1982-1984); and University of Paris VI (1986). His research interests are centered around point defects in solids, including minerals, and in particular around defects caused by the incorporation of low-z (gas/fluid)

components.

**ABSTRACT: Strange Pre-Earthquake Phenomena**

Seismic waves are the most dramatic and most widely studied manifestations of earthquakes. However, we also know of non-seismic phenomena, which precede large earthquakes. The list is long and some have been reported for centuries, even millennia: changing well water levels, ground-hugging fog, bulging of the Earth's surface, low frequency electromagnetic emission, earthquake lights from ridges and mountain tops, magnetic field anomalies up to 1% of the Earth's dipole field, temperature anomalies by several degrees over

wide areas seen in satellite images, changes in the plasma density of the ionosphere, and – most enigmatic – strange animal behavior. Because it seems near-impossible to imagine that such diverse phenomena could have a common cause, there is great confusion and even greater controversy. This explains why non-seismic pre-earthquake phenomena are regarded with suspicion in the scientific community. This may change with the recent discovery that common rocks in the Earth's crust contain electric charge carriers, which have been overlooked in the past. Under normal conditions, these charge carriers are dormant, but when they “wake up”, the rocks begin to sparkle and to glow.



## National Chemistry Week: Seminar Series Scientists

### Lou Allamandola, Ph.D.

Lou Allamandola is the Astrochemistry Laboratory Group leader at NASA's Ames Research Center. He has 25 years of experience in pioneering laboratory studies on the chemistry, composition, and spectroscopy of interstellar matter, with emphasis on interstellar and cometary ices. He is one of the key proponents and spokesmen of the interstellar polycyclic aromatic hydrocarbon (PAH) model and has been heavily involved in the laboratory studies of PAHs under relevant interstellar conditions. He has extensive experience with low-temperature spectroscopy and astronomical observation. Lou was trained in low temperature spectroscopic techniques under the tutelage of Professors G. C. Pimentel at the University of California at Berkeley and Professor J. W. Nibler at Oregon State University. In 1976, he went to Leiden University in the Netherlands where he applied these techniques to prepare and study laboratory analogs of extraterrestrial ices. He regularly serves on NASA advisory councils and symposia scientific organizing committees.



composition is very well constrained. Lastly, the signature of carbon-rich polycyclic aromatic hydrocarbons (PAHs), shockingly large molecules by early interstellar chemistry standards, is widespread throughout the Universe. The first part of this talk

will describe how infrared studies of interstellar space, combined with laboratory simulations, have revealed the widespread presence of interstellar PAHs and the composition of interstellar ices, the building blocks of comets.

The remainder of the presentation will focus on the photochemical evolution of these materials and astrobiology. Within a molecular cloud, and especially the presolar nebula, materials frozen into the ices are photo-processed by ultraviolet light and produce more complex molecules. As these materials are the building blocks of comets and related to carbonaceous micrometeorites, they are likely to have been important sources of com-

plex materials delivered to the early Earth and their composition may be related to the origin of life.

## Website Launched! Budget and Finance (B&F)

Members of the Society Committee on Budget and Finance (B&F) are pleased to announce the Budget and Finance website. This site provides easy-to-understand information about the finances of the ACS and is updated regularly with information that is important for every member to know.

Highlights of the site include:

- The latest B&F report to Council
- The Society's 2002 Consolidated Financial Statements
- Financial overview
- Details of the Society's reserves
- The Sources and Uses of Society Funds

The B&F website can be found at: [www.chemistry.org/committees/budget](http://www.chemistry.org/committees/budget).

Please email your questions and suggestions about the kind of information you would like to see on the B&F website to [help@acs.org](mailto:help@acs.org).

### ABSTRACT: From Astrochemistry to Astrobiology

Tremendous strides have been made in our understanding of interstellar material over the past twenty five years thanks to significant developments in observational astronomy and laboratory astrophysics. Twenty years ago, the composition of interstellar dust was largely guessed at, the concept of ices in dense molecular clouds was ignored, and the notion of large, abundant, gas phase, carbon-rich molecules widespread throughout the interstellar medium (ISM) was considered impossible. Today, the composition of interstellar dust is reasonably well understood. In molecular clouds, the birthplace of stars and planets, these cold dust particles are coated with mixed molecular ices whose

## Congratulations to Our 2003 50-Year Members

In July, our annual Awards Presentation was held on the Stanford University Campus. After the wine tasting and the wonderful BBQ, the section will recognize the 50-Year Members of the American Chemical Society. The 2003 Honorees are:

<i>Dr. John F. Riley</i>	Palo Alto
<i>Dr. Robert L. Baldwin</i>	Stanford
<i>Dr. James Paddock Collman</i>	Stanford
<i>Dr. Ross Quinn</i>	Cupertino

<i>Dr. Edwin J. Kuta</i>	Gilroy
<i>Dr. James Edward Boyle</i>	San Jose
<i>Dr. Karl G. Untch</i>	San Jose
<i>Dr. James F. Coyle</i>	Carmel
<i>Dr. Bertram Irwin Rowland</i>	Hillsborough
<i>Dr. Abraham L. Landis</i>	Burlingame
<i>Dr. Edwin Fisher Ullman</i>	Atherton
<i>Ulrich Toggweiler</i>	Redwood City
<i>Dr. Noreen Tingey Eldredge</i>	Woodside
<i>Dr. Dolph Nyberg</i>	Sunnyvale
<i>T.C. Webber</i>	Palo Alto



Bert Rowland



Abraham Landis



Ted Ullman



James Collman

## New Venues for the Next Meetings

I hope you had an enjoyable summer. The September dinner meeting is a week later than normal, to let us catch our breath from being in the Big Apple at the ACS 226th Fall National Meeting. For the next two months, we are trying new locations for our meetings. For September 25th, we will meet at the Blue Pheasant Restaurant in Cupertino. It is a family-run restaurant located at the very north end of Stevens Creek Boulevard. It is just north of CA-85. If you golf, you may have played the Blackberry Farm

course, which shares this same location.

You will notice there is a choice of three menu items! I can vouch for the salmon; it is excellent! We will follow the same routine of a social hour, dinner, and a lecture. We will be meeting in the same room where we will eat, but there will be a break for the tables to be cleared. There is plenty of room for those of you who wish to join us for the lecture only.

The banquet/meeting room is downstairs from the main restaurant. If you have difficulty maneuvering the

stairs, come around the building on the right side, and enter at ground level. We face the golf course.

In October, we will be celebrating National Chemistry Week with several activities that are written up in other parts of the newsletter. Saturday, October 25th we will be at the U.S. Geological Survey for a lecture by several NASA scientists. On Friday the 24th, we have reserved the planetarium at De Anza College for the evening.

Watch the newsletter and the website, [www.scvacs.org](http://www.scvacs.org), for where we will be meeting in November!

*Sally Peters*

## Annual Wine Tasting, Family Picnic, and Award Ceremony

Stanford University July 12, 2003

*Registration Desk*



*Wine Tasting*



*Life Achievement Award— Floyd Hobbs*



# Earth's Atmosphere and Beyond National Chemistry Week Plans Get Underway

National Chemistry Week (NCW) will be held from October 19 to 25. This year is gearing up to be a great week. Mark your calendars for the following events:

**October 24:** In lieu of our monthly dinner meeting, we will be holding a family-style event at the Minolta Planetarium at De Anza College in Cupertino from 6 to 9 pm with a special screening of "Clouds of Fire: The Origin of Stars". Hors d'oeuvres and light refreshments will be provided. Cost: \$8.00 adults, \$6.00 children under 12 and seniors.

**October 25:** We are privileged to have the honor of hosting a seminar series to be presented by NASA scientists at the US Geological Survey on 345 Middlefield Road in Menlo Park from 1:00 to 4:30 pm. The scientists who will be presenting their research are:

*Dr. Lou Allamandola:* Polycyclic aromatic hydrocarbons.

*Dr. Chris Dateo:* Implications for life on early Earth and other planets.

*Dr. Friedemann Freund:* Strange pre-earthquake phenomena.

*Dr. Laura Iraci:* Atmospheric particles as tiny chemical reactors.

*Dr. Brad Sutter:* How the Atacama Desert soils of northern Chile are a possible Mars analog.

*Dr. Azadeh Tabazadeh:* The effect of the crystallization process in clouds on atmospheric chemistry and climate.

We are very excited to have them present their seminars under the unifying theme "Honoring Innovators & Pioneers in Aviation and the Atmosphere". Over the next three months will be printing their bios and abstracts in the newsletter. Please make arrangements to attend!! Admission is free and light refreshments will be provided.

Under this unifying theme, we are also having a poster contest for stu-

dents in elementary, middle, and high schools. Since ACS is celebrating its 127th anniversary this year, we are asking students to take a look at the ways that chemistry has changed or the way chemistry has caused changes in the quality of our lives, in the past 127 years.

"Chemists in the Library" is another NCW event. We are encouraging public libraries in the Santa Clara Valley to participate in this event during NCW. The libraries register with the ACS National office in Washington D.C. and registrants receive a display kit that includes a Chemists in the Library poster, bookmarks, a bibliography of National Chemistry Week theme related publications, and balloons. For a copy of the registration form, please email me and I can send one out to you.

Chemistry departments at community colleges are encouraged to hold career events for their students. All career brochures and other material will be mailed to the contact person at each college – please contact me if you are interested.

Once again, we are hoping to offer a Teachers' Workshop at Roche Pharmaceuticals in Palo Alto for elementary and middle school teachers. This is made possible by the generosity of Roche for providing the location and other materials. The theme of the workshop will keep within the theme of NCW and is taught by teachers. The workshop program usually includes two sessions of hands-on experiments, where teachers receive curriculum material and supplies to take back of their classrooms. Other highlights of the workshop include a tour of the Roche facilities, a presentation by a Roche scientist, and a raffle for prizes donated by Roche and Roche employees.

This year, we are also hoping to

## CHEMPLOYMENT ABSTRACTS AUGUST 2003

### CHEMPLOYMENT ABSTRACT 3725

*Position Title:* Dose Formulation Chemist

*Job Description:* Formulate and prepare dosing solutions, buffers, and vehicles for pharmaceutical safety and development studies in toxicology and pharmacokinetics.

#### QUALIFICATIONS DESIRED

*Education:* BS chemistry/biochemistry with 2-4 years exp; or MS (0-2 years exp).

*Experience:* Must have direct, relevant experience in pharmaceutical formulation work as described above. Experience in Good Laboratory Practice regulations, plus excellent teaming, organizational, and communication skills required.

#### LOCATION, SALARY, MAIL ADDRESS:

*Location:* Menlo Park, California

*Description of Employer:* SRI International, a nonprofit research institute, is a pioneer in the creation and application of innovative solutions for governments, businesses, and foundations. See Biosciences Division [www.sri.com/biosciences](http://www.sri.com/biosciences).

#### Application:

Apply online at [www.sri.com/jobs](http://www.sri.com/jobs) for Job #1108 and reference ACS Employment.

No phone calls or faxes please.

EOE.

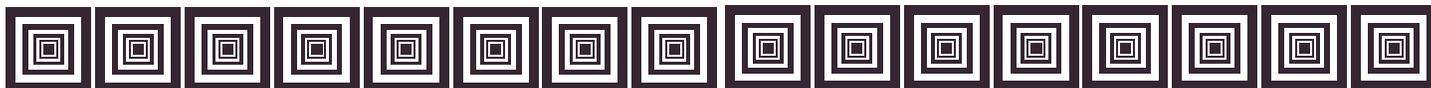
collaborate with the Hiller Aviation Museum in San Carlos (see accompanying article by Bonnie Charpentier).

Finally, the SJSU Student Affiliates usually participate in NCW by conducting chemical demonstrations at The Tech Museum of Innovation in San Jose and to showcase chemical techniques. These demonstrations allow us to reach a diverse general audience during the course of a weekend. We are hoping that they will once again organize this event for us.

For further information and to sign up for the October 24-25 events, please visit our web [www.scvacs.org](http://www.scvacs.org) or email me at [asfiaq@yahoo.com](mailto:asfiaq@yahoo.com). Here's to a great NCW!

**Asfia Qureshi**  
NCW Coordinator

**Happy Summer!**





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NCW - Seminar Series Scientists: Friedemann Freund, Ph.D.  
NCW - Seminar Series Scientists: Lou Allamandola, Ph.D.  
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New Venues for the Next Meetings  
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Earth's Atmosphere and Beyond National Chemistry Week  
Plans Get Underway

#### CHEMPLOYMENT ABSTRACTS

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2001-03: <b>Sally Peters</b>	650-812-4994	speters@parc.xerox.com
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2002-04: <b>Herb Silber</b>	408-924-4954	hbsilber@sjsuvm1.sjsu.edu
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### ChemEmployment Abstracts

Director: **Shirley B. Radding** 408-246-2564 sradding@att.net

## FUTURE MEETINGS

- Sep 7-11** ACS National Meeting  
New York City
- Sep 21-24** Combinatorial Chemistry  
ACS ProSpectives  
Leesburg, VA
- Sep 25** SCV Dinner Meeting  
Dr. Ken Carter
- Oct 15-18** Western Regional Meeting  
Long Beach, CA
- Oct 24** De Anza College Planetarium Show  
Cupertino, CA
- Oct 25** Earth's Atmosphere and Beyond  
Menlo Park, CA
- Nov (TBD)** SCV Dinner Meeting  
Dr. Karl Marhenke
- Nov 9-12** Proteomics and Genomics  
ACS ProSpectives  
Leesburg, VA

For the latest information, please visit  
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