

Silicon Valley Chemist

Santa Clara Valley Section

American Chemical Society

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Nanotechnology: Manufacturing as Extended Chemistry

Dr. Ralph C. Merkle

Abstract

Manufactured products are made from atoms. The properties of these products depend on how those atoms are arranged. If we rearrange the atoms in coal we can make diamond. If we rearrange the atoms in sand (and add a few trace elements) we can make computer chips.

Today's manufacturing methods are very crude at the molecular level. Casting, grinding, milling and even lithography move atoms in great thundering statistical herds. It's like trying to make things out of LEGO blocks with boxing gloves on your hands. Yes, you can push the LEGO blocks into great heaps and pile them up, but you can't really snap them together the way you would like.

Nanotechnology promises to let us inexpensively arrange atoms in most of the ways permitted by physical law, getting essentially every atom in the right place. An effective method

of achieving low cost is to use self-replication. Nature shows this is possible: wood is inexpensive despite the fact it is made of untold billions of complex molecular machines because a tree can make more trees. We could do likewise, making molecular manufacturing systems able to make more molecular manufacturing systems — producing inexpensive products available to all. This talk will explore the fundamental principles underlying replicating systems and examine the proposals that have been advanced so far, as well as the vast differences between proposed artificial systems and the remarkably adaptable and error tolerant biological systems that have served as “proof of principal.”

For further information on nanotechnology read Dr. Merkle's latest article in the January 2001 issue of IEEE Spectrum or visit www.zyvex.com/nano

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17,824 participants registered for the 221st annual American Chemical Society meeting in San Diego! This was the third largest meeting ever, after the recent Boston and San Francisco meetings. In addition to the record number of attendees, there were a record number of papers presented, posters to view and events to attend. This year the out-of-state visitors were less concerned about earthquakes than they were concerned about power! In one hotel where I attended sessions,

the chairman was provided a sheet of instructions for emergency power outage purposes and a flashlight; neither was needed! Two innovations begun by the Society, that probably had their roots in Silicon Valley, were unveiled at this meeting. For the first time there was a Virtual Expo on the ACS web site that preceded the typical vast exhibition in the convention center. This new feature gave the exhibitors exposure from national's web site, earned the meeting some money, and

May Dinner Meeting

Date: May 24, 2001

Time: 6:00 pm Reception

7:00 pm Dinner

8:00 pm Presentation

Location: Biltmore Hotel & Suites
2151 Laurelwood Road
Santa Clara, CA
North of 101 off the
Montague Expressway
(408) 988-8411

Speaker: Dr. Ralph C. Merkle
Principal Fellow Zyvex
Corporation

Cost: \$25 with the choice of
Chicken Piccata, or Pasta
Primavera

Reservations: Shirley Radding
(408) 246-2564
(408) 296-8625 FAX

Reservations should be made by May 21 stating your name, company affiliation, number of people in the party and the meal preference. People may also register using our web site: www.scvacs.org.

Chair's Message

will be enhanced for the Chicago and future meetings. The single most-welcome innovation in San Diego was the LCD projectors. Projectors (but not laptops) were provided for each meeting room for a rental cost to the society of \$65,000. This audio-visual tool began as an experiment, but will continue for the future meetings. The social and cultural side of the meeting was treated to a premiere performance of Carl Djerassi's play, “Oxygen.”

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Nanotechnology, continued from front page

Biography

Dr. Merkle received his Ph.D. from Stanford University in 1979 where he co-invented public key cryptography. He joined Xerox PARC in 1988, where he pursued research in computational nanotechnology until 1999. He is now a Principal Fellow at Zyvex, where he continues to pursue research in nanotechnology. He chaired the Fourth and Fifth Foresight Conferences on Nanotechnology, is on the Executive Editorial Board of the journal Nanotechnology, was co-recipient of the 1998 Feynman Prize for Nanotechnology for theory, and was co-recipient of the ACM's Kanellakis Award for Theory and Practice, the 2000 RSA Award in Mathematics, and the IEEE Kobayashi Award. Dr. Merkle has published and spoken extensively and has eight patents. His home page is at www.merkle.com.



Nominations for 2002 Petition Candidates

Petition candidates can be nominated by the membership.

Offices are: **Chair-Elect**
Secretary
Treasurer
Councilor
Alternate Councilor

The requirements are:

- Member (Grade) of SCV Section.
- Agreement to run for the office.
- Agreement to attend Executive Committee meetings.
- Signatures of 15 Members (Member Grade) of the SCV Section.
- Petitions along with a brief biography and statement must be received by August 1, 2001

Mail nominations to:

Dr. Karl Marbenke
1710 Wilshire Drive
Aptos, CA 95003-2836



Chair's Message, continued from front page

Members of the audience that I talked with gave the play "two thumbs up" as a review.

In San Diego our section in partnership with the California section won a new hospitality award. LSAC, Local Section Activities Committee, presented awards to the top three sections that hosted a tour speaker in 2000. Dr. Nagyvary, our September speaker, felt our arrangements for his talk were extraordinary, so he wrote a letter nominating us for the award.

The California section hosted a memorable luncheon to celebrate their 100th anniversary as an ACS local section. After Marinda Wu, their chair for this centennial year, gave a presentation on the statewide section's early history, each "spun off" section presented a brief history of their area. Those of us in fast paced Silicon Valley are not the only ones who do not like to drive to meetings. Early East Bay members took the ferry across the bay to meetings, which doubled as 'smokers' because only men attended. Until 1984 members from Fresno drove to Berkeley for meetings!! The first national meeting in San Francisco was in 1910. Dr. Ralph Gould from the USDA in the

East Bay organized the entire event, including the entertainment! It now takes an army of people to organize a national meeting! The San Joaquin section was formed during those long car trips! We laugh now at the number of pictures that are taken at any function, but I hope this continues for historical purposes, because the California section has some marvelous old pictures of men in starched white collars and women in long skirts! Shirley Radding, our official representative, presented a lively talk about our section.

A new date on the Future Meetings Calendar is October 28-31, 2001. The Las Padres Section is hosting the Western Regional Meeting in Santa Barbara. "WERM" will include Nobel speakers, several symposia, and special programs and events. Now is the time to submit abstracts and posters. Go to their website for more information.

<http://www.2001werm.org/>

The next Executive Committee Meeting is late in May on Wednesday, the 16th in Santa Clara. This is a perfect time to meet the committee and experience your local section's officers at work! Contact me for directions.

Chemistry Olympiad

The first section of the Santa Clara Valley Chemistry Olympiad was held on March 25th, 2001. There was an exceptional turnout and everyone had a great time! Seventy-four students took the 60 question, 100-minute exam. Thanks to Craig Seran of Los Altos High School and his scantron, the exam was graded immediately. The top 16 winners (2 from each high school) were invited to take the National Chemistry Olympiad on April 21st at Santa Clara University.

The chair of the committee, Tricia Takahara, presented prizes of cash, books, or pins to the top 27 winners. University Science Books and Perseus Books donated the books and Roche Bioscience generously provided cash, snacks, drinks, and the use of their facility.

Now, drum roll please, the overall winner was Lillian Pan of Lynbrook High School. She scored 54/60 – a great score on a very challenging test! Good luck to all the students participating in the national test.

Thanks also to Bonnie Charpentier, Mark Hasegawa, Robbie Korin, Bruce Raby, and Amy Takahara for helping.



Shirley Radding and Jack Riley Receive ACS Awards

Over 20 years ago the ACS Division of Chemistry and the Law (CHAL) was born in the Santa Clara Valley local section. For several years it was a subdivision and a probationary division before it received full status in 1985. Santa Clara Valley Local Section members have been critical to the establishment and growth of the Division.

At the San Diego ACS meeting the Division presented Lifetime Achievement Awards (as engraved mantle clocks) to charter members Shirley Radding and John (Jack) Riley to recognize their long term and continued support of the Division.



Shirley Radding receives Division on Chemistry and The Law Lifetime Achievement Award at ACS San Diego Meeting from CHAL Chair Charles Hauff

Shirley is now retired from SRI International in Menlo Park and is well known to SCV members. She served as Chair of CHAL and on its Executive Committee as its newsletter editor for years and has received the Division's Middlekauf Service Award.

Jack is now retired from Lockheed in Palo Alto and is also well known to SCV members. He served as Chair of CHAL and on the Executive Committee as its membership chair for years and has received the Division's Middlekauf Service Award.

Our congratulations to Shirley and Jack for this well deserved recognition.



Jack Riley receives Division on Chemistry and The Law Lifetime Achievement Award at ACS San Diego Meeting from CHAL Chair Charles Hauff

Section Receives Hospitality Award

In September 2000 the ACS Santa Clara Valley and California local sections had a joint program at CSU - Hayward. The ACS tour speaker was Dr. Josef Nagyvary of Texas A&M University. He spoke on his avocation of violin making using chemical techniques to duplicate the tone of a Stradivarius. Three violins, including a Stradivarius, were played by a concert violinist. The speaker was so impressed with the hospitality, preparations and the venue that he nominated the two sections for a newly created ACS hospitality award. The event won a third place prize. The photograph shows Dr. Marinda Wu Chair of the California Section, Dr. Kathleen Schultz ACS Chair of the Local Section Activities Committee and Sally Peters, Chair of the Santa Clara Valley Section. Congratulations on a job well done.



OTTENBERG SERVICE AWARD 2001 CALL FOR NOMINATIONS

It is again time to nominate candidates for the Abraham Ottenberg Service Award of the Santa Clara Valley Section.

This Award was established in 1973 by the Santa Clara Valley Section to recognize members who have rendered outstanding service to the Section. It is named after Abraham Ottenberg, a former member who devoted much of himself to service to the Section. The award consists of an engraved plaque and a check for two hundred dollars. The award recipient is selected from candidates nominated by members of the Section. Nominees

must be members or affiliates of the Santa Clara Valley Section.

Previous recipients are: Shirley B. Radding (1974), Oliver F. Senn (1975), Floyd M. Hobbs (1976), Frank R. Mayo (1977), Harry S. Mosher (1978), Lois J. Durham (1979), Richard W. Gaver (1980), Alan C. Ling (1982), Ludwig A. Mayer (1983), John F. Riley (1983), Howard M. Peters (1984), June G. Jones (1986), Robert L. Montoya (1986), Malcolm Dole (1987), Donald E. Green (1991), Hubert E. Dubb (1992), Karl Marhenke (1993), Stephen N. Senzer (1994), Carol W. Mosher (1995), Bonnie Charpentier (1998), Linda Brunauer

(1999) and Herbert B. Silber (2000).

The nominating letter should include a brief biography of the candidate and a description or evaluation of the service(s) to be recognized by the award. Seconding nominations are not required but will be accepted.

Nominations should be sent to:

Chair

**Ottenberg Award Committee
Santa Clara Valley Section, ACS
P. O. Box 395, Palo Alto, CA 94302**

Nominations must be received by May 30, 2001 to be considered for the 2001 award.



Councilors' Corner

The American Chemical Society is an organization of individuals. Throughout the Society's 125 years, its success has been ultimately attributed to the voices of members and the willingness of these members to volunteer for posts at the local and national levels. Local sections and divisions, largely autonomous units that elect their own officers, are the two major components of the Society. At the national level, a Council and Board of Directors govern ACS. The board is the legal representative and policy-setting body of the Society. The Council is the Society's "House of representatives", made up of elected councilors from all local sections and divisions.

As one of the "large" (over 3300 members) sections in the ACS, the Santa Clara Valley section has 7 councilors and 7 alternate councilors. Each of our councilors participates as part of this legislative body by volunteering to serve on a governance committee of the Council. This service, in turn, keeps our section informed on Society policy, programs and actions. At April's executive committee meeting each councilor reported in detail on their committee actions. The following is a brief summary of their reports. Each councilor is eager to discuss their committee activities further and can be reached at their attached email addresses.

Last year Bonnie Charpentier was elected to the Council Policy Committee (CPC). (The national organization loves acronyms!) CPC plans the agenda for Council meetings, nominates councilors for the Nomination and Elections Committee (N & E), and conducts long-range planning studies for the future of the ACS. In San Diego they considered changing the date of National Chemistry Week (NCW) and its implications. This year's theme is "Chemistry and Art". Reports on the Presidential Task Force on financial support to local sections and divisions were discussed. Bonnie urged us all to view these reports at <http://membership.acs.org/p/ptf> if you are interested in resources and

funding for your local section or divisions.

Bonnie Charpentier

bonnie.charpentier@roche.com



Linda Brunauer was newly appointed as an associate to the Women Chemists Committee (WCC). This committee encourages women to take an active interest in the Society by focusing on attracting women to careers in chemistry, mid-career development, and recognizing the contributions of women chemists. Linda was also busy overseeing her student affiliates at poster sessions in both Sci-Mix and at research sessions, as well as, returning to Santa Clara in mid meeting to teach her classes!

Linda Brunauer

lbrunauer@scu.edu



Ean Warren was also new to committee service as a member of the Younger Chemists Committee (YCC). The mission of YCC is to lead younger chemists (under age 35) into successful careers in the chemical profession and to active roles in ACS. At this meeting they worked on improving their web site <http://membership.acs.org/scripts/y/ycc/home/default.asp> and organizing programs for the Fall meeting. In Chicago there will be sessions on "Financial Planning", "Teaching Opportunities at Small or 2-Year Colleges", and "Alternate Careers", preceded by a fun run!

Ean Warren

ewarren@scvacs.org



Sally Peters is serving her sixth year on the Meetings & Expositions Committee (M&E). M&E is responsible for the arrangement, financing, and site selection of the national, international, and regional meetings and expositions. Because of the large number of attendees and the exposition requirements of the national meetings they are currently planning for the meetings 13 years in advance! The members of M&E are planning for 2013

and 2014 without the use of a crystal ball! One visible result of this committee was the decision (and financial support) for the LCD projectors for the 75 meeting rooms in San Diego.

Salley Peters

speters@parc.xerox.com



Jack Riley is our "senior" councilor. Over the years Jack has served on at least a dozen different committees. He is probably our most knowledgeable councilor about all of the governance of the society. The SCV section has benefited continually from his commitment to the Society. Jack is now a member of Constitution and Bylaws (C&B). C&B reviews and recommends changes in the bylaws of local sections and divisions, interpreting and initiating action to eliminate conflicts with the national constitution and by laws. Currently there are 17 local sections and 11 divisions under review. The controversial issue at this meeting involved the North Jersey election of councilors that did not follow their bylaws and election procedures.

Jack Riley

jfriley@atdial.net



SOCED (Society Committee on Education) is the committee served by Maureen Scharberg. It is one of the more crucial committees because it recommends programs, funding, and policies related to chemical education for all levels - elementary school to the university level. The popular student affiliate program falls under their auspices. Maureen felt the highlights of the meeting were the projects of the ACS Education Division (www.acs.org/education) and the issues related to the federal education policies and funding. She strongly recommends joining the ACS Legislative Action Network at www.acs.org/government/action/ for updates on federal legislation involving science education and R&D policy.

Maureen Scharberg

scharbrg@pacbell.net

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Herb Silber currently serves on the Committee on Committees (ConC), which is the “granddaddy” of all the many council committees. ConC studies the composition of all of the national committees and makes recommendations to the President and Chairman of the Board for membership on the rest of the committees. As a member of ConC, he has the added function of representing them on two other committees! Herb feels the Committee on Technician Affairs (run by and for

chemical technicians) is the best organized and run of the committees!

Herb Silber

hbsilber@sjsuvm1.sjsu.edu



All national committees (and there are more than 30 of them) do not require their members to be councilors. As a member of ACS you can be active in its governance by volunteering to serve on a committee. Committee work is interesting, rewarding, and fun! You work with fellow chemists; people dedicated to their profession,

and with exceptional staff members from the national organization. Get involved, join a committee! For more information on the various committees go to www.acs.org/committees/.



Happy Mother's Day





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AMERICAN CHEMICAL SOCIETY
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CHEMPLOYMENT ABSTRACTS



<http://www.scvacs.org>

SANTA CLARA VALLEY SECTION

2001 SECTION OFFICERS

Chair	Sally Peters	650-812-4994
Chair-Elect	Jon Touster	650-723-4340
Secretary	Karl Marhenke	831-479-6263
Treasurer	Hong Gao	650-564-5197
Past-Chair	Ean Warren	650-329-4554

Councilors

1999-01	Herb Silber	408-924-4954
2000-02	Maureen Scharberg	408-924-4966
2000-02	John F. Riley	650-328-4036
2000-02	Ean Warren	650-329-4554
2001-03	Linda Brunauer	408-554-6947
2001-03	Bonnie Charpentier	650-354-2344
2001-03	Sally Peters	650-812-4994

Alternate Councilors

1999-01	Peter Rusch	650-948-0237
1999-01	Jon Touster	650-723-4340
2000-02	Roy Okuda	408-924-2525
2000-02	Donna Drogos	408-265-2600
2000-02	Lance Wong	650-829-1148
2001-03	George Lechner	408-226-7262
2001-03	Howard Peters	650-324-1677

Newsletter Editor

Steven Colby 650-812-3424
e-mail: scolby@carr-ferrell.com

FUTURE MEETINGS

May 4 - Jun 19	Illustrating Nature Exhibit Santa Cruz
May 6-10	Intel ISEF
May 16	May Excomm Meeting
May 20	Bay to Breakers Run
May 24	Nanotechnology <i>Dr. Ralph Merke</i>
Jul 28	Annual Wine Tasting & Awards <i>Stanford University</i>
Aug 26-30	National ACS Meeting Chicago, IL

CHEMPLOYMENT ABSTRACTS

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