

Silicon Valley Chemist

Santa Clara Valley Section

American Chemical Society

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Carbon Nanotube for Nanoscale Science and Technology

– Dr. Hongjie Dai –

Abstract

We have been using the carbon nanotube as a model system to study interesting nanoscale problems concerning materials synthesis and chemistry, solid-state physics and devices, and surface science. This presentation will cover our latest results in the following areas and describe the potential of nanotubes in technological applications ranging from nanoelectronics to sensors and biosensors. (1) Controlled synthesis of nanotube structures on surfaces; patterned growth of nanotubes. I will show strategies to assemble nanotubes at their synthesis stage and using self-assembly or external forces to orient nanotubes. (2) Nanotube synthesis chemistry and development of new catalyst materials. I will present the growth of nanotubes from individual particles, especially in patterned and



scalable fashions on full silicon wafers. Isolated single walled nanotubes as long as 0.5 mm have been synthesized. (3) Nanoelectronics based on nanotube transistor arrays derived by chemical synthetic routes. (4) Surface chemistry and photochemistry, nanotube chemical and biological sensors. The chemical functionalization and utilization of nanotubes as chemical sensors, and experimental results on interactions between nanotubes and small molecules, polymer chains and proteins will be presented.

Biography

In 1989, Dr. Hongjie Dai received his Bachelors in Physics from the Tsing Hua University in Beijing, China. He received his MS in Applied Sciences in 1991 from Columbia. He received his MA and PhD in Applied Physics/Physical Chemistry in 1994 from

continued on next page

September Dinner Meeting

Date: September 26, 2002

Time: 6:00 Social Hour

7:00 Dinner

8:00 Lecture

Location: Biltmore Hotel & Suites
2151 Laurelwood Road
Santa Clara, CA 95054

Speaker: Dr. Hongjie Dai
Stanford Chemistry
Department
Carbon Nanotubes for
Nanoscale Science and
Technology

Cost: \$26.00 with the choice of
Chicken Florentine on a bed
of couscous, or Eggplant
Parmesan on garlic pasta

Reservations: www.scvacs.org
Shirley Radding
408-246-2564
408-296-8625 Fax

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

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Chair's Message

It seems that this summer is flying by. As I write this in July, just after the first big summer heat spell, I have already noticed the beginnings of back to school aisles in stores, stocked with all sorts of notebooks, paper, pens, and other supplies. With most schools and colleges starting in late August, we'll soon have to bid adieu to the joys of summer. But, we can look forward to a dinner meeting schedule full of excellent speakers. The Santa Clara Valley Section dinner meetings begin on September 26 with a talk by Professor Hongjie Dai of Stanford University on nanotechnology (see the front page for more information). November 21 will bring us another Stanford Chemistry professor, Dr. James P. Collman, who will talk on his book *Naturally Dangerous: Surprising*

continued on next page

Chair's Message, continued from front page
Facts About Food, Health and the Environment.

The fall also brings us National Chemistry week, October 20-26. If you are interested in helping out with our activities for the week, please contact Asfia Qureshi (asfiaq@yahoo.com) who is our National Chemistry Week Coordinator.

Savor the rest of your summer, and get ready for a Fall full of great local section activities!

Carbon Nanotube, continued from front page

Harvard University. His post-doctoral research was done at Rice University from 1995 to 1997. Also, Professor Dai has received a number of honors, fellowships, and awards such as the ACS Pure Chemistry Award (2002) and the Camille Dreyfus Teacher-Scholar (2002) to name a couple. Dr. Dai is currently an Associate Professor at Stanford University in the Department of Chemistry where he has been teaching since 1997. His research interests include chemistry, physics and applications of nanomaterials, and nanotechnology.

Professor C. Marvin Lang Selected for The Harry and Carol Mosher Award

The 2002 Harry and Carol Mosher Award will be awarded this year to Dr. C. Marvin Lang, on Friday January 17, 2003. This event will take place at one of the local restaurants.

Professor Lang has made numerous contributions to chemical education, the field of Chemistry and to the American Chemical Society.

He received his PhD in Physical Chemistry from the University of Wyoming. Dr. Lang began his academic career at the University of Wisconsin-Stevens Point where he is currently a Professor of Chemistry and the Eugene Katz Distinguished Letters and Science Faculty Member. His off-campus contributions include over 800 chemical demonstrations and over 450 invited lecture presentations. These engagements included the ACS Speaker Service. Over the past 10 years he has made major demonstrations and presentations in Finland,



England, Russia, Hawaii, Walt Disney World's EPCOT Center (three times), Disneyland in Anaheim, the Smithsonian Institute National Museum of American History, Newton's Apple TV Show, Congressional Visits Day at the U.S. Capitol, and the Faraday Lectures in Pittsburgh. Dr. Lang's contributions to the American Chemical Society include his service as an elected Councilor from the Central Wisconsin Section. He has served as chairman of three national committees of the ACS: Local Section Activities, Nominations and Elections and PROPPACC (Professional Programs for Planning and Coordination). He also served as an elected member to the American Chemical Society's Board of Directors and also served as a member of the Advisory Board of the ACS.

Professor Lang received several recognitions that include his election to Corresponding Member of the Finnish Chemical Society, and being a recipient of both the Helen M. Free Award in Public Outreach and the Outstanding Contributions to Chemistry Award that is given by the Central Wisconsin Section of the ACS.

Arrangements are underway for the dinner meeting on January 17, 2003 where Professor Lang will be presenting the Harry and Carol Mosher Award's Address. Please read more about this event in the upcoming December issue of the Silicon Valley Chemist. Also, you can keep track by visiting the Santa Clara Valley Section's site: www.scvacs.org.

In Memoriam: Bruce Graham

Bruce Graham died at home on Memorial Day 2002. In 1916, Dr. Graham was born in Crete, Nebraska. His family later moved to Oregon when he graduated from Monmouth Teachers' College and became principal of Knappa Grammar School at age 18. He married his lifelong love, Hermine (Judy) Zwanck in June 1937. Early in 1941, he returned to school at Oregon State College (now University) and was awarded a PhD in chemistry for his work on anti-malaria compounds. He and his family of three children then moved to Rochester, NY where he worked as a research chemist at Eastman Kodak and taught chemistry at the University of Rochester. In 1952, the family, now with 5 children, moved to California where he took a position with Stanford Research Institute. At SRI, he started the Life Sciences Division and directed its growth into a highly respected and successful part of the organization.

In 1965, he became the founding president of Gulf South Research Institute in Louisiana. Then, in 1970 he left to work in Washington, D.C. as a consultant in the contract research area, in particular for the Illinois Institute of Technology Research Institute, until he retired.

Bruce joined the ACS in 1944 and in 1955, became the chair of the Santa Clara Valley Subsection.

The family asks that anyone wishing to make a donation send it to:

Bruce Graham Memorial Scholarship Fund

c/o Kim Graham, 1844 Orangetree Lane, Mountain View, CA 94040

Division of Agricultural and Food Chemistry

Michael Tunick, Immediate Past Chair

The Division of Agricultural and Food Chemistry (AGFD) is one of the five original ACS Divisions founded in 1908. Our interests include the chemistry of food and its components such as flavors, phytochemicals, and bioactives. Other relating topics, such as what we eat and how we grow it, are in our interest as well. Membership has been increasing steadily over the past decade and currently, is over 2800. AGFD has formed a number of subdivisions in its history, two of which grew into their own ACS Divisions: the AGFD Fermentation Subdivision (now, the Division of Biochemical Technology) and the Pesticide Subdivision (now, the Division of Agrochemicals). Currently,

AGFD has a Flavor Subdivision and a Functional Foods and Natural Products Subdivision.

We usually have six to eight symposia at each National Meeting. More than 250 AGFD symposia have been cosponsored by other ACS Divisions over the years and ten International Flavor Conferences have been sponsored by AGFD. The Division encourages symposium organizers to publish proceedings books, which provide food chemists with an important source of information (and provide AGFD with royalties that help keep the Division going). We also publish a newsletter, *Cornucopia*, which comes out before each National Meeting and which includes future

programs, abstracts for the upcoming symposia, and a number of features. The *Journal of Agricultural and Food Chemistry*, which is in its 50th year as an ACS publication, counts many of our members among its editors and advisory board. Papers and presentations of ours often draw the attention of the news media - everybody has to eat and can relate to much of the research that we do.

AGFD also sponsors a number of awards for undergraduates and graduate students and has its own: Divisional, Fellow, and Distinguished Service Awards. The Divisional Award winner presents a talk at the annual AGFD banquet at the Fall Meeting.

We have a couple of mechanisms for members to become involved in the Division. We encourage people to organize symposia, which they often find to be a rewarding experience. We also try to recruit members to be subdivision officers, which allows them to get an idea of how AGFD operates. All of our recent Division Chairs have come up through one of our subdivisions. Sometimes we get people involved just by asking them.

We have not had serious problems attracting or retaining members, or in getting them involved. Our big issue is funding, as our royalties have somewhat declined in recent years. We now have a Publication Committee, which is exploring new ways to get more of our books sold. Once we shore up our book situation, AGFD should be in good shape for many years to come.

Paul Walters Receives 2002 Radding Award

Paul H. L. Walter, a native of Connecticut, received his bachelor's degree from MIT in 1956. He received his PhD in Inorganic Chemistry from the University of Kansas, where he researched the lower oxidation states of rhenium and indium under Jacob Kleinberg. After his PhD, Dr. Walter joined the Central Research Department of Dupont as a research chemist working in the solid-state group synthesizing and studying the properties of magnetic materials. He was involved in the discovery of compounds that exhibited exchange inversion; they appear to lose their magnetic properties when cooled. He spent a year at the Technische Hochschule in Stuttgart where he worked on bonding and crystal chemistry with the late professor, Heinz Krebs. His translation of the Krebs' book, *Anorganische Kristallchemie*, was published by McGraw-Hill.

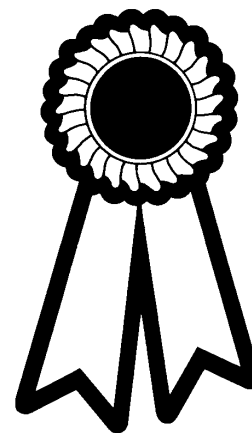
After seven years with Dupont, he joined the faculty at Skidmore College in Saratoga Springs, NY. After twenty-nine years there, including ten years



as department head, he retired to Savannah, Georgia. During his professional career, he remained active in both the American Association of University Professors and the American Chemical Society, reaching the presidency of both organizations, and chairing

the ACS Board of Directors for the statutory limit of three years. During his years as ACS Chair, the Society created the ACS Scholars Program and broadened activities internationally. This last interest began with his work on the Pacific Basin Chemical and the North American Congresses, and then ended with developing bilateral membership agreements with several other societies. He is also a Fellow of the Chemical Institute of Canada and an Honorary Member of the Sociedad Quimica de Mexico. In Georgia, he serves as a Trustee of the Advanced Academy of Georgia and is active in the Skidaway Island Presbyterian Church.

The Award will be presented during the forthcoming National ACS Meeting in Boston this month.



57th Northwest Regional Meeting

June 20-21, 2002

Host : Inland Northwest Section

Santa Clara Valley had two observers at the 57th Northwest Regional Meeting in Spokane, Washington. The meeting used the facilities of Gonsaga University and the West Coast River Inn.

Jack Riley (Secretary for Western Regional Meetings) and Howard Peters represented our Section and were impressed with the atmosphere and ambience of the meeting. Many graduate and undergraduate students made their debut before a friendly audience. A free box lunch encouraged attendees to visit the vendors. The evening dinner was the venue to present the Northwest Region outstanding high school chemistry teacher award to Nancy Treasure of Logan, Utah and the Industrial Innovation Award to Tony Pauli of Western Research Institute, Laramie, Wyoming.

The Inland Northwest Section is to be commended for a very successful regional meeting.



2002 Fifty-Year Members

On Saturday, June 29th, at the Chemistry Department, Stanford University, after Beer Tasting and a Picnic, we held our annual Awards Presentation. Santa Clara Valley Section recognized nineteen members who are FIFTY-YEAR Members of the American Chemical Society.

The Honorees were:

B. Y. Abadir	Carmel Valley
William Anderson	Palos Verdi Pensl
Victor E. Buhrke	Portola Valley
William P. Cox	Morgan Hill
Robert Joseph Dummel	Burlingame
John Fried	Atherton
Jorge Heller	Redwood City
M. Frank Levy	Los Gatos
Cassius Richard McEwen	Palo Alto
John A. Neptune	San Jose
Jiro Oyama	Cupertino
Raohael Pappo	Redwood City
Ross A. Quinn	Cupertino
George Rathmann	Sunnyvale
Elmer J. Reist	Menlo Park
E. Kirk Roberts	Palo Alto
John Ross	Stanford
Masato Tanabe	Palo Alto
Orlin D. Trapp, Jr.	Portola Valley

Certificates were presented to those able to be present. National will mail 50-year pins to each honoree.

Editor's Corner

Summer is almost over – unfortunately. I hope you were able to get in your vacation time with your family and friends. I hope you are enjoying the technical division column that was started a couple issues ago - this month the “featured” division the Agricultural and Food Chemistry Division. Many thanks to the Immediate Past Chair of the division, Michael Tunick! If you would like a particular division to be featured, please let me know and we can open the doors of communication!

Right before press time, I have been notified by Peter Rusch, Chair of the Radding Award Committee, that the 2002 Award will NOT be presented at the Boston ACS meeting, but locally:

“I have recently had a discussion with Dr. Walter about a convenient time and place to make the award presentation. It has been his expressed desire to participate in one of our local section events as it is the section's award and he feels that our membership should be present to the extent possible.

I am pleased to inform you that Dr. Walter has agreed to join us for our meeting to be held on Saturday, October 19th at SJSU. This meeting is scheduled to present the Outstanding

Western Regional High School Award. It has agreed upon that the presentation of the 2002 Radding Award will be added to the program at 1:30 PM, following lunch.

It is our honor and pleasure to have this opportunity to make the presentation at one of our local section events.”

Please make the necessary arrangements to join us for this TWO-award event—more details to come soon!

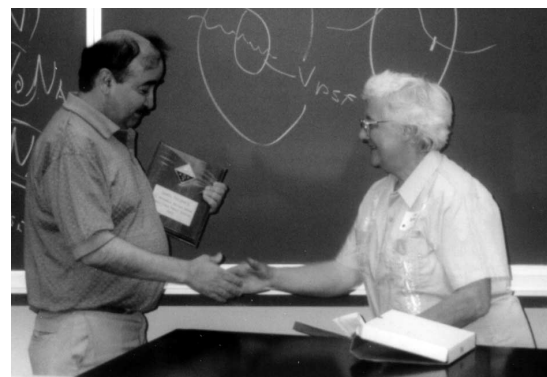
Special Recognition Awards

The Ottenberg Award for service to our local section was presented to Dr. Jamil W. Talhouk, a past-chair of the Section.

The Shirley B. Radding award will be presented at the Boston ACS Meeting to Dr. Paul H. L. Walter, a past president of the ACS.

Recipient of the Harry and Carol Mosher Award will be Dr. C. Marvin Lang of University of Wisconsin-Stevens Point and will be presented at our January 2003 meeting.

Dr. Lang served on the ACS Board of Directors for 6 years and is recognized nationally for his chemical demonstrations and strong undergraduate program.



Patent Truths

1. Abraham Lincoln is our only U.S. president to receive a U.S. patent (patent No. 6,469 on March 22, 1849). It pended for only about three months and drew on his experiences on a riverboat. The patent was for a device to lift and float flatboats on the Mississippi River that had landed on a sand bar. History indicates that he did not earn a penny or a five-dollar bill from his invention.
2. Oberlin College and a number of other Northern religious colleges in existence in the 1850's read the newly passed Fugitive Slave law and decided this was an unjust law. Students and faculty became part of the Underground Railroad to escort run-a-way slaves to Canada. Students at Oberlin once invaded the city jail to free a captured slave and sent him on his way. Wheaton College in Illinois has some fugitive slaves who died along the way still buried on the campus. Butler University in Indianapolis was founded in 1855 by an abolitionist. Geneva College (then in Northwood, Ohio, now in Beaver Falls, PA since 1880) was one of the "stations" on this Railroad.
3. Some more obscure information about aluminum is that prior to Halls' invention in 1886, aluminum metal was more precious than gold or platinum. European royalty reserved their prized aluminum ware for very special guests. The top of the Washington Monument in Washington, DC is a four-foot pyramid of cast aluminum - the largest and most expensive block ever produced about 1880.
4. Arthur Vining Davis is not a familiar name to most people. On Thanksgiving Day in 1888, he and Charles Martin Hall poured the first commercial aluminum near Pittsburgh, PA using Hall's patented process (patent No. 400,665). Davis was involved with ALCOA and other Pittsburgh companies for years. Shortly before he died

Ottenberg Award for 2002

The Abraham Ottenberg Award of the Santa Clara Valley Section recognizes members of the Section who have provided distinguished service to the Section. This year's recipient is Jamil Talhouk. The award was presented at the annual Awards Picnic and Beer Tasting meeting at Stanford University on June 29th, 2002.

The recipient was nominated for his service to the Section, which includes:

- Chair-Elect, Chair, and Past Chair (1997-2000)
- Alternate Councilor (1997-2000)
- Chair, Mosher Award Committee
- Co-Chair of the Mosher Award Luncheon at the National ACS meeting in San Francisco honoring Harry and Carol Mosher (2000)
- Served as liaison between SCVS and Bay Area Math and Science Alliance 4 years
- Chair of the Chemistry Olympiad Committee (2 years)
- He helped develop posters for Chemistry Week and arranged for their display on county transit buses
- Arranged for SCVS members to attend "California State Capitol Day"
- Acted as liaison for SCVS to the California Coordinating Committee

Jamil Talhouk has been a strong advocate for the Santa Clara Valley Section and the ACS and has provided outstanding service to the community and for the advancement of science.

- at 95 in 1962, someone asked if he was the third wealthiest individual in America. He replied "the fifth" and walked away quickly. The Davis Foundation has sponsored many educational programs over the years, particularly on PBS. The Foundation was a main sponsor of Ken Burn's Civil War series about 5 years ago.
5. An urban legend around Pittsburgh, PA is when the infant aluminum industry was looking for venture funding they approached the local Mellon Bank. Judge Mellon sent son Andrew down to talk with these wild-eyed inventors. After several days Andrew Mellon reported back to his father that he had made an assessment. He said, "They are asking for \$40,000 in funds and they should not get it. They really need \$400,000 to do it right." That is reportedly what ALCOA got, the Mellon family got

another winner and the rest is history.

6. Alfred L. Hunt was an early engineer, investor and officer at ALCOA. His home (estate) in suburban Pittsburgh was an entire city block. Recently, it was sold for \$4,000,000 (in Pittsburgh dollars - that is a lot of money) to become the official residence of the President of Carnegie-Mellon University.
7. When Charles Martin Hall, the inventor of the aluminum reduction process, died of leukemia as a bachelor at 50 in 1914, about one-third of his \$30,000,000 fortune was left to his Alma Mater Oberlin College in Ohio. There is a statute of Hall on the campus - in aluminum, of course. The chemistry program at Oberlin flourished and, since then, four ACS presidents have been Oberlin undergraduates.



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FUTURE MEETINGS

Aug 18-22	ACS 224th National Meeting Boston, MA
Sep 22-25	Combinatorial Chemistry ACS Prospectives Conference Leesburg, VA
Sep 26	SVC Dinner Meeting <i>Dr. Hongjie Dai</i> Stanford University
Oct 13-16	Future Directions of Drug Delivery Technologies ACS Prospectives Conference Boston, MA
Oct 19	Award Luncheon San Jose State University
Oct 20-26	National Chemistry Week
Nov 12-13	5th Symposium on Groundwater Contaminants Fresno, CA
Nov 21	SCV Dinner Meeting <i>Dr. Jim Collman</i>

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