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Author

Schwartz, Lila

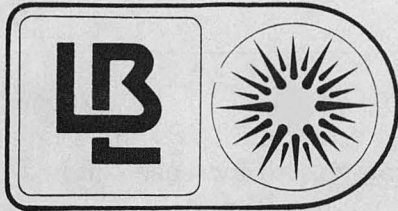
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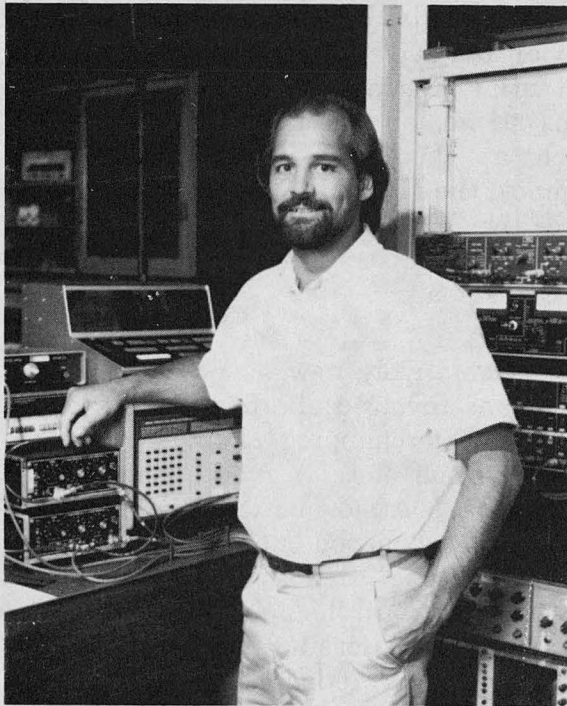


NEWSLETTER

Lawrence Berkeley Laboratory
Applied Science Division

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thermal lensing spectroscopy with optical fibers to develop environmental mixed-waste sensors. He is also studying laser ablation to make high-temperature, thin-film superconductors.

Rick earned his B.S. in chemistry from the University of Florida and his Ph.D. in analytical chemistry from Indiana University, where he then did post-doctoral work in analytical laser spectroscopy.

Rick appreciates living and working in the Bay Area and having access to the University's many facilities and resources. He is enthusiastic about his research and believes in conveying this excitement to those who work with him, particularly graduate students. Aside from working and spending time with his family, Rick enjoys playing tennis.

ASD PROFILE: RICK RUSSO

An ASD Staff Scientist since 1983, Rick Russo has been conducting research using laser photothermal spectroscopy. He is currently studying surface electrochemical processes (such as take place in batteries and fuel cells) using photothermal deflection spectroscopy, with the eventual goal of achieving more efficient storage of electrical energy. Rick has also been using photothermal deflection spectroscopy and thermal lensing techniques to detect low levels of actinides in groundwater. Aided by a grant from the Director's Exploratory Research and Development Funds, Rick will be using

DIVISION SCIENTIFIC STAFF HONORED

Faculty Senior Scientists **Charles Wilke** and **Antoni Oppenheim** were honored recently by the University, which awarded each of the ASD-affiliated scientists the prestigious Berkeley Citation. The Citation recognizes particular distinction in an awardee's field, as well as notable and distinguished service to the University.

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DOE VISITOR DISCUSSES CO₂ RESEARCH

LBL was visited on July 11 by Fred Koomanoff, Director of DOE's Carbon Dioxide Research Program, who discussed ongoing and proposed LBL research on the problem of CO₂ buildup in the atmosphere. Division Head Elton Cairns and Deputy Division Head Don Grether hosted Koominoff, Richard Kropschot (Associate Laboratory Director for Energy Sciences), Mike Chartock (of LBL's Office of Planning and Development), and others at a series of presentations given by ASD researchers.

Speakers described existing and proposed ASD work relevant to the CO₂ issue and reflected a diversity of interest areas within the Division: Alex Quintanilha discussed how the Center for Atmospheric and Biospheric Effects of Technology (CABET) might study climatologic effects of CO₂ emissions; Tica Novakov described his group's work on simulation of cloud processes for models of global climate; Art Rosenfeld of the Center for Building Science outlined research on urban heat islands and energy-efficient technologies for buildings; and Mark Levine of the Energy Analysis program discussed studies related to impacts of CO₂ emissions and strategies to control these emissions.

Paolo Ricci proposed risk analysis as applied to CO₂; Walt Westman told of the need to study effects of increased CO₂ on western conifer forests; and Lee Schipper and Jayant Sathaye spoke about international energy demand—particularly the increasing use of fossil fuels in developing countries—as a projected source of increasing CO₂ emissions.

In addition, prospects were presented for more efficient appliances (Isaac Turiel), windows (Steve Selkowitz),

and electric lighting (Sam Berman), along with novel strategies to increase combustion efficiency (Nancy Brown).

Although recent events such as the drought have attracted public attention to this buildup (part of the "greenhouse effect"), the CO₂ issue is not new: DOE's ongoing CO₂ research program has investigated CO₂ sources and sinks, possible global and regional climate changes, and potential effects on agriculture, natural ecosystems, and society. Other agencies such as the Environmental Protection Agency, the National Science Foundation, and the National Oceanic and Atmospheric Administration are also involved in CO₂ research.

A relatively new aspect of the CO₂ issue has involved efforts to help society adjust to a changing climate (and the ramifications of this) and to reduce CO₂ emissions. Atmospheric CO₂ buildup, generally believed to result from increased use of fossil fuels, can at present be controlled only by trying to reduce use of fossil fuels. Methods of achieving this reduction are currently limited to greater reliance on renewable sources of energy (e.g., solar energy), on nuclear energy, and—as ASD has emphasized—more efficient use of energy. We hope ASD will play an enhanced role in the anticipated increased national and international efforts to delineate and address the CO₂ problem.

We encourage you to submit information or suggested topics for inclusion in the ASD Newsletter. To do so, contact Lila Schwartz (ext. 4098; electronic mail address LNSchwartz@lbl) or Pat Ross (ext. 5297). You may also mail items to Lila or Pat at LBL mailstop 90-3026.

HIGH SCHOOL HONORS PROGRAM COMPLETES SECOND YEAR

July 8 marked the end of a two-week DOE program that brought 56 top-achieving high-school science students—one from each state and one each from the District of Columbia, Puerto Rico, Canada, West Germany, Italy, and Japan—to work in ten LBL laboratories throughout four Divisions (Applied Science, Chemical Biodynamics, Cell & Molecular Biology, and Research Medicine & Radiation Biophysics). For the second consecutive year, the program was coordinated at LBL by Alex Quintanilha, Jan Smith, and Cheryl Fragiadakis.

At the invitation of DOE, the students had been chosen by their respective state Governors or, in the case of the foreign students, by their Ambassadors. About 60% of the students had graduated from high school this past spring.

The students spent the first week listening to distinguished speakers from the Bay Area scientific community. The second week was spent working full-time in laboratories. The students' work in the Applied Science Division, coordinated by Alex Quintanilha and Robert Macey (with the help of David Hanzel and Ian Fry), involved the study of membrane transport from a biophysical, biochemical, and physiologic perspective.

REFEREED PUBLICATIONS

Akbari H, Warren M, de Almeida A, Connel D, Harris J. Use of energy management systems for performance monitoring of industrial load-shaping measures. *Energy* 1988; 13(3): 253-263.

Fish RH, Reynolds JG. Molecular characterization of non-porphyrin trace-metal compounds of geochemical and process significance using high-performance liquid chromatography in combination with element-selective detection. *Trends in Analytical Chemistry* 1988; 7(5): 174-179.

Whelpdale DM, Keene WC, Hansen ADA, Boatman J. Aircraft measurements of sulfur, nitrogen, and carbon species during WATOX-86. *Global Biochemical Cycles* 1987; 1(4): 357-368.

Nero AV. Controlling Indoor Air Pollution. *Scientific American* 1988; 258(5): 42-48.

PUC LAUDS CENTER

The staff of ASD's Center for Building Science was commended in a letter from John Deakin, Director of the San Francisco PUC's Bureau of Energy Conservation, "for their outstanding efforts" on behalf of San Francisco's Commercial Energy Conservation Ordinance (CECO). Deakin stated that LBL's participation was "essential" to the passage of the ordinance, the nation's first retrofit legislation for commercial buildings. Calling ASD's published research "a major resource" for developing the legislation, Mr. Deakin also praised ASD staff for reviewing the draft legislation as well as for helping ensure the ordinance's technical integrity. ASD and ASD-affiliated reviewers receiving special mention for their efforts included Alan Meier, Rudy Verderber, Robert Clear, Joe Eto, Mary Ann Piette, Steve Greenberg, and Oliver Morse.

APPLIED SCIENCE AND THE ALS

The Applied Science Division participated in the Advanced Light Source (ALS) Users' Association meeting, held June 2-3 in Berkeley, at which discussants continued to form insertion-device teams and bending-magnet teams for the ALS. The meeting was held to reach further agreement about important areas for ALS research, to gauge interest within the scientific community, and to determine limitations of the technique.

Assistant Division Head Alex Quintanilha and ASD scientist Arlon Hunt are involved in respective ALS projects. The life science application headed by Alex, Melvin Klein (of the Chemical Biodynamics Division), and Steve Rothman (of the Center for X-ray Optics) will develop facilities for microscopic spectroscopy. Specifically, this instrumentation will be designed to examine the intracellular distribution of individual chemical compounds as well as elements. This research—unusual because it will study unfixed, unstained living cells—will be particularly important for identifying intracellular sulfur such as characterizes the amino acids methionine and cysteine.

Arlon Hunt, Kwang-Je Kim (of the Accelerator and Fusion Division), Marcos Maestro (of the Molecular Biology Division), and Ignacio Tinoco (of the Chemical Biodynamics Division) are leading the development of facilities for polarization studies of scattered light. This application, too, is particularly relevant for life science research: the range of probe wavelengths provided by the ALS will match the dimensions of *in vivo* helical cell structures such as DNA, chromatin, and actin. The ALS could be the first apparatus capable of generating modulated, elliptically polarized x-rays, providing an exciting new probe of helical intracellular structures. Other applications of elliptically polarized x-rays are also being

considered.

The first decisions about insertion-device teams and bending-magnet teams will be made in September. ASD scientists wishing to become actively involved in developing particular ALS projects may direct inquiries to Chairpersons of the appropriate working groups (i.e., Surface and Materials Science; Chemical Physics; Life Sciences; Atomic and Molecular Science; X-ray Lithography and Quantum Nanostructures; and Earth Sciences). For names and phone numbers of working-group Chairpersons, contact Lila Schwartz in the Division Office (ext. 4098, 90-3027A; e-mail address LNSchwartz@lbl.ux1).

INVITED TALKS AND FOREIGN TRAVEL

June

- **Hashem Akbari, Joe Eto, Joe Huang, Alan Meier and Isaac Turiel** traveled to Ottawa, Canada, to attend and participate in the ASHRAE Annual Meeting.
- **Lee Schipper** traveled to Tokyo, Japan for energy research discussions at the Institute of Energy Economics. He then went on to the Nuclear Institute in Beijing, China for energy use discussions and to Johns Hopkins University School of Advanced International Studies in Nanjing, China to attend a symposium on energy demand.

• **Florentin Krause** was invited to testify before the West German Parliament's Special Commission on Climate Change. The session took place in Bonn on June 20. Florentin also organized and chaired a two-day seminar in Brussels (June 23-24) on Energy Policy and Climate Change. The event was sponsored by the Dutch and German Ministries of Environment and the EC Commission.

• As part of a study funded by NASA and the National Science Foundation, **Walt Westman** completed a 4-week field trip early this summer to the Atherton Tableland of North Queensland to collect field data on the effects of tropical deforestation on plant species endangerment. In July, Dr. Elizabeth Taylor joins him as a National Research Council Associate at NASA-Ames and guest scientist at LBL to work on the biodiversity project. Dr.

Taylor recently completed her dissertation in plant systematics at Harvard University.

• **Arlon Hunt** gave an invited talk at the Chemical Research, Development & Engineering Center's Aerosol Research Conference in Aberdeen, MD.

July

• **Michael Rothkopf** traveled to Paris, France to attend the European Federation of Operations Research Societies-The Institute of Management Sciences Conference.

• **Nancy Brown** has been invited to spend two months at the University of Paris to set up a cooperative research effort.

PERSONNEL NOTE

The Laboratory has eliminated the blue Internal Transfer Opportunities (ITO) list; all job postings are now listed immediately in the yellow Current Job Opportunities (CJO) list. Correspondingly, the minimum posting time for all positions is now two weeks instead of one month.

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Lawrence Berkeley Laboratory, University of California
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