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Lawrence Berkeley Laboratory
Applied Science Divisi

NEWSLETTER

JUNE 1988

STAFF RENEWAL AND DEVELOPMENT STUDIED

In response to LBL Director Shirley's request, ASD has been studying its success in attracting to itself talented new scientists and developing the quality of the Division's scientific leadership. Significant trends have been identified:

Hiring and upgrading: The ratio of term vs. indefinite appointments has been steadily decreasing since the 1984 fiscal year. In 1984, about 70% of ASD scientists had indefinite appointments; by 1987, this percentage had risen to about 88%. During the past five years, we have hired 22 new Staff Scientists, 15 UCB faculty were added as new Associated Faculty, and 24 Staff Scientists acquired leadership positions such as (Deputy) Program Leader, (Deputy) Group Leader, and Principal Investigator.

Education: In 1983, slightly more than 60% of ASD researchers had PhD's. Today, about 70% have PhD's, and this percentage, too, is rising: seven ASD scientists are recent or imminent recipients of the PhD degree.

Advancement: The Division has been experiencing an upward trend in promotions from Staff Scientist I to Staff Scientist II and to Staff Scientist III. Since the 1984 fiscal year, populations of the latter two groups have increased significantly.

The Division plans to continue its efforts to hire able scientists and to identify worthy candidates for advancement.

SAFETY COMMITTEE RECONSTITUTED

In 1985, the ASD Safety Committee was created to ensure the safety of Division activities and to advise line management on how to maintain a safe, healthful work environment. The Committee was recently reconstituted to include Robert Cheng (Chair) and Donald Hollister, both of whom will serve on the Committee through 1988; and David Littlejohn, Richard Schmidt, and Alex Quintanilha (ex officio), each of whom will serve until the end of 1989.

At present, the Committee's main focus is the Hazard Communication Program, developed by LBL's Toxic Substances Subcommittee. This program is designed to follow U.S. Department of Energy requirements that employees be notified on any health hazards they may encounter in the workplace. Such hazards are not limited to toxic or infectious substances; they also include physical hazards such as lasers, magnetic fields, ultraviolet light sources, equipment producing high levels of noise, and extremes of temperature.

This issue of the *ASD Newsletter* is the first edited by Lila Schwartz, ASD's new Scientific Liaison Administrator. We encourage you to call Lila (ext. 4098) or Pat Ross (ext. 5297) with any information or suggestions for topics you'd like included in upcoming issues.

Recent Division Events

ENERGY TRANSDUCTION IN MUSCLE: TOPIC OF ASD SEMINAR

On June 7, the Division hosted a seminar by UCSF researcher **Julian Borejdo, PhD**, who spoke on "Orientation of Myosin in Muscle." Dr. Borejdo's research focuses on the conversion of chemical to mechanical energy in muscle fibers and the mechanism of muscle contraction.

Dr. Borejdo, who received his BA/Honors in physics and his PhD in biophysics from Macquarie University in Sydney, Australia, was Associate Professor of Biophysics at the Weitzmann Institute in Rehovot, Israel, before coming to UCSF's Cardiovascular Institute. He is an Established Investigator for the American Heart Association, as well as an NIH Program Director. Dr. Borejdo is in the process of developing a joint proposal with ASD researchers **Lester Packer** and **Arlon Hunt**.

Striated muscle contains thick and thin filaments—myosin and actin, respectively—that interact with each other in the process of muscle contraction. Myosin cross bridges between these filaments are widely believed to enable the filamentous movements that are required for contraction. Myosin cross bridges have been proposed to have equivalent mechanical positions for each biochemical phase of the ATPase-driven contraction process.

In Dr. Borejdo's current experiments, dye molecules of known fluorescent characteristics are attached specifically to the myosin cross bridges. The induced fluorescence arising from an incident polarized laser beam of light focused on a relatively small number of these dyes is used for detailed measurements in an attempt to corroborate the mechanical-position theory.

Results so far indicate that in well-defined intermediate energetic states that correspond to equivalent mechanical positions, the cross bridges are indeed oriented at different angles to the axis of the filaments. These results are consistent with the proposed mechanism for muscle contraction in which the cross bridges have to rotate to allow for sliding of the filaments past each other.

The Building Energy seminar of June 9 featured William Martin of Spectral Instruments, San Ramon, CA, who discussed the basics of infrared imaging systems and demonstrated the Hughes Thermal Video System.

The following week's speaker was Vladimir Bazjanac of Energy Consultants, Berkeley, CA, whose topic was "Advanced Glazing Technologies and the Design of Museums."

Art Rosenfeld's estimate of energy savings since the 1971 oil embargo—published in the April 1988 issue of Scientific American—was noted in *DOE This Month* for May 1988.

Art, Director of ASD's **Center for Building Science**, says that U.S. energy costs have been reduced by $50 billion as a result of building efficiencies such as improved management of lighting, heating, and ventilation. In addition, despite a 35% rise in GNP during the past decade and a half, U.S. energy consumption has not increased.

The work of **Tony Nero** and colleagues in the **Indoor Radon Group** was mentioned in an April 1988 article in *Science* entitled, "Indoor Radon: The Deadliest Pollutant," by Richard Kerr. The article described the Group's radon survey as possibly "the most representative to date" on radon infiltration into houses. Approximately 4 million single-family homes (7% of the U.S. total) are believed to have indoor radon concentrations above 4 picocuries per liter, the level above which the EPA advises remedial action be taken.

The National Fire Protection Association awarded **R. Brady Williamson** the 1988 Harry C. Bigglestone Award for Excellence in Communication of Fire Protection Concepts for his paper, "Estimating room temperatures from fires along walls and in corners." The paper was published in the May 1987 issue of *Fire Technology*. Coauthor of the paper was F.W. Mowrer.

CIEE: A NEW ORGANIZATIONAL ENTITY

In 1986, Art Rosenfeld and others from ASD and the Universitywide Energy Research Group (UERG) conceptualized a research program on energy end-use and efficiency that would address the needs of California. The concept, named the California Institute for Energy Efficiency (CIEE), proposed to

1) carry out a mid-term research program based primarily on the expertise of LBL and the UC campuses, but involving other California research and education institutions;

2) receive financial support from California energy utilities (e.g., PG&E);

3) receive institutional backing from the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC);

4) establish mechanisms for transferring research results to the utilities;

5) benefit California ratepayers through lower energy costs.

Establishment of CIEE has been pursued by an Organizing Committee: Art, Jeff Harris, Mark Levine, Don Grether, and Cheryl Fragiadakis from LBL; Carl Blumstein, Mike Lederer, and Rich Gilbert from UERG; and Charles Hitch, UC President Emeritus. Initial support from the utilities became available in late 1987. However, despite many meetings, memos, position papers, and much thought, CIEE was not yet an organizational entity.

By early 1988, official establishment of CIEE had become imperative but did not occur for several more months; no arrangement had been simultaneously compatible with CIEE's intended purpose and acceptable to LBL, UERG, and the University of California Office of the President (UCOP). By the time the dust had settled, the effort had involved much of the hierarchy of LBL, the Berkeley campus, and UCOP. In addition to the Organizing Committee, those most involved were Elton; Barbara Perry, head of the LBL Office of Sponsored Research Administration; David Mears, head of the UCOP Contracts & Grants office; and Cal Moore, UCOP Associate Vice President-Academic Affairs.

Understanding this outcome requires knowing how the University may approach research activities that do not readily fit within a traditional academic department: such activities may be designated an Organized Research Unit (ORU) on a given UC campus. ORU's at Berkeley, for example, include the Institute of East Asian Studies, the Theoretical Astrophysics Center, and the Cancer Research Laboratory. Research activities involving several campuses may be

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designated a Multicampus Research Unit (MRU); the California Space Institute and the Institute for Geophysics and Planetary Physics (IGPP) are such examples. While UERG awaits approval to become an MRU, it is functioning as UC's multicampus unit for energy research.

An MRU has its headquarters on a particular campus and may have "branches" at other campuses. Any such branch is also an ORU at its own campus. IGPP, for example, has branches at UCLA and San Diego. Interestingly, IGPP also has branches at Lawrence Livermore National Lab (LLNL) and Los Alamos National Lab (LANL). IGPP and its branches at the LLNL and LANL "campuses" provided the role model for CIEE.

The institutional arrangement planned is for CIEE to be an ORU at the LBL "campus" and a "branch" of UERG. In this way CIEE will be part of the normal administrative structure of LBL but will have a university-wide character through its association with UERG. (Assuming approval as an MRU, we expect that UERG will change its name to the California Energy Institute (Cal Energy). CIEE would then be a branch of Cal Energy.) In May, a series of letters and memos established the arrangement on a provisional basis and appointed Art Rosenfeld as Acting Director of CIEE.

Why did so many people trouble so much to establish CIEE? After all, LBL and the UC campuses can already receive funding from the utilities (e.g., via the regular Work For Others (WFO) route for LBL). The primary answer is that CIEE will help retain the attention of the CPUC, the CEC, and the utilities, thereby leading to a larger, longer term, and more integrated research effort than would otherwise be the case. In time, CIEE can be expected to receive support for program areas rather than for individual projects. One can envision, for example, several utilities co-funding a particular research area. Following the advice of a Research Board, CIEE would then allocate the funding to LBL, the UC campuses, and other California research and education institutions to carry out the research. To aid such arrangements, the utilities would contract with the University acting on behalf of CIEE. (In a regular WFO project, the contract is between the funding agency and DOE acting on behalf of LBL.) The University would then transfer the funds, as appropriate, to LBL, the campuses, and/or other institutions.

Much work remains to be done to further CIEE's relations with the utilities and commissions and to start the process that will allow CIEE to become a regular unit of the University. The Organizing Committee believes that the present organizational arrangement represents a major achievement, and the Committee thanks all who helped.

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INVITED TALKS AND FOREIGN TRAVEL

April

• **Elton Cairns** attended and chaired Fuel Cell Workshop sessions at the Morgantown Energy Technology Center in Morgantown, WV.

• **Paolo Ricci** traveled to Washington, DC, where he testified in the U.S. House of Representatives on HR2800, the Hazardous Wastes Reduction Act.

• **Art Rosenfeld** was invited to testify before the U.S. House of Representatives for the House Subcommittee on Fisheries and Wildlife Conservation and the Environment.

May

• **Art Rosenfeld** testified for the Conservation Law Foundation in Boston, MA, on Massachusetts' sliding-scale hookup fees.

• **Joan Daisey** was an invited speaker at a meeting of the Consumer Federation of America in Washington, DC. The subject of her walk was "Volatile Organic Compounds in Indoor Air."

• **Art Rosenfeld** traveled to Kalispell, MT, to speak at the annual meeting of the Western Interstate Energy Board on the subject of conservation, competition, and national policies on efficiency.

• **Tica Novakov** was invited by the Technical University in Budapest, Hungary, to give a lecture entitled "Laboratory and Field Studies of Heterogeneous Atmospheric Chemistry." Tica then traveled to Vienna, Austria, where he was invited by the Technical University to participate in a workshop (on heterogeneous chemistry) for participants in a LBL-TUV-KIBK-FISBAT collaborative NSF-sponsored project. Tica was also invited by the Austrian Academy of Sciences in Vienna to speak at their Workshop on Ozone, Air Pollution Chemistry, Physics, and Effects.

June

• **Mark Levine** traveled to Indonesia and Singapore for research discussions.

• **David Littlejohn, Dick Fish, and Scott Lynn** traveled to Toronto, Canada, to attend the American Chemical Society Third Chemical Congress of North America. David presented a paper at the Congress, and Dick lectured in the Symposium on Biomimetic Catalysis.

• **Bill Carroll, Dave Grimsrud, Joe Klems, Mark Modera, Susan Reilly, Steve Selkowitz and Max Sherman** traveled to Ottawa, Canada, to attend and participate in the ASHRAE Annual Meeting.

• **Jeff Harris** gave an invited talk on "A Comparison of Multifamily Retrofits in the U.S. and Europe: Measured Results and Policy Implications" at the International Seminar on Energy Audits in Valbonne, France.

• **Joan Daisey** attended the Air Pollution Control Association meeting in Dallas, TX where she chaired a committee and presented a paper co-authored by Al Hodgson entitled "Air Cleaner Efficiencies for Removal of Nitrogen Dioxide and Volatile Organic Compounds."

• **Elton Cairns** was invited by the Electric Power Research Institute in Palo Alto, CA to speak at their Electrified Roadway R&D Planning Workshop. Elton's subject was batteries for electric vehicles.

• **Art Rosenfeld** was a speaker at the U.S. Congress, Congressional Competitiveness Caucus in Washington, DC. Art spoke on the role of energy in America's future.

• **Nancy Brown** gave an invited talk at the European Workshop on N_2O emissions (Paris, France). Her topic was "Formation and Destruction Chemistry of N_2O During Combustion."

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