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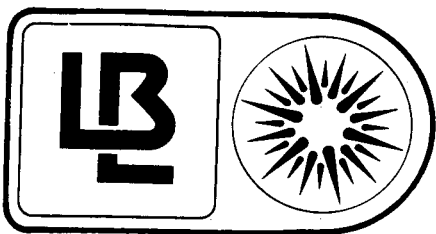
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Lawrence Berkeley Laboratory

PUB-432

Applied Science Division Newsletter

April 1989

Staff Profile

Susan Anderson: Aquatic Research and Policy Meet

With so much current concern about pollution of our waters, it's good to know that research and policymaking efforts are being directed toward ensuring the viability of San Francisco Bay and other aquatic resources.

Susan Anderson, an aquatic toxicologist with the California Water Quality Control Board, has recently begun working half-time with John Harte of ASD's Environmental Research Group on assessing pollution's effects on various species of aquatic fish and invertebrates and is currently involved in two projects at LBL.

Dr. Anderson began as a participating guest working on the San Francisco Bay Project—funded by the U.S. Environmental Protection Agency—and recently joined the LBL staff to work on the

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Dr. Susan Anderson in the bldg. 70 lab where she examines genotoxic effects on aquatic species



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Superfund Program Project, funded by the National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health (NIH).

The San Francisco Bay Project creates laboratory simulations of bay conditions and surveys the effects on specified aquatic animals exposed to these conditions. Susan points out that the art of this work lies not only in matching and incorporating the substances contained in agricultural and urban runoff, industrial discharges, and dredged sediment, but in matching the timing of Bay events: conditions in the Bay change rapidly and dramatically, as many of us know.

The Superfund Program Project is a nationwide NIEHS effort to research and

clean up environmental damage caused by waste discharges into soil and water. LBL and the University of California have an important role in the research aspect of this work, particularly as fewer than twelve university laboratories are currently involved with the Superfund project. Co-Principal Investigator (with John Harte) on the ASD effort, Susan is working to determine genotoxic and reproductive effects on various animals and on a model that can predict effects on aquatic populations. The work also attempts to assess the role of long- and short-term genetic toxicology assays in predicting cancer and reproductive success, as well as how such predictions should be linked to management decision- (cont. p. 6, col. 3)

PUB-432

SEAC and ASD Reviews

A Month for Review

Two major reviews of the Applied Science Division held prominent places in April's schedule of ASD events: the Scientific and Educational Advisory Committee (SEAC) Review, held at LBL April 21-22; and the ASD Annual Review, held April 24-25.

After attending a series of research presentations and overviews, open discussions, and executive sessions, the SEAC panel is charged with advising the President of the University on the quality and merit of selected research programs. The SEAC Review is held semiannually and tends to focus on a different research area each meeting; this Spring's review focused generally on Energy Sciences at LBL, with particular emphasis placed on selected research of the Applied Science Division.

Presentations and conferences also form the structure of the ASD Annual Review. Instead of reporting its findings

to the UC President, however, the panel for the Division Review presents its opinions and suggestions to the LBL Director.

SEAC Review

Introductory addresses at the SEAC Review included a labwide report, given by LBL Director **David Shirley**; an overview of LBL Energy Sciences divisions, given by Associate Laboratory Director **Richard Kropschot**; and an overview of the Applied Science Division, given by ASD Director **Elton Cairns**.

The SEAC panel comprised ten scientific experts from academia and industry: **Prof. Edwin Goldwasser** (committee chairman) of the University of Illinois; **Prof. Stanley Brodsky** of Stanford University's Linear Accelerator Center; **Prof. Douglas Fuerstenau** of UC Berkeley's Department of Materials Science and Mineral Engineering; **Prof. Ernest Henley** of the Department of Physics, University of Washington; **Prof. C. Judson King**, Provost of Professional Schools and Colleges, UC Berkeley; **Prof. Robert Langridge** of UCSF's Department of Pharmaceutical Chemistry; **Dr. Eugene Meieran** of Intel Corporation; **Dr. Mortimer Mendelsohn**, Associate Director of LLNL's Biomedical & Environmental Research Program; **Dr. Warren Miller**, Deputy Director of Energy Research & Technology, Los Alamos National Laboratory; and **Dr. Martin Walt**, Director of the Physical Science Department, Lockheed Missiles & Space Company.

The 45-minute research presentations discussed ASD work on high-efficiency lighting (**Sam Berman**, Leader, Lighting Research Group); (cont. p. 7, col. 3)



Sam Berman (left), Leader of LBL Lighting Research Group, in animated conversation with SEAC reviewer Stanley Brodsky of the Stanford Linear Accelerator Center (SLAC)

New Hollowell Committee

The topic and speaker for the 1989 Craig Hollowell Memorial Lecture will be selected by the newly formed 1989 Hollowell Lecture Series Committee: **Don Grether**, Deputy Division Director (Chair); **Tica Novakov**, Leader, Environmental Research Program; **Art Rosenfeld**, Director, Center for Building Science; **Mike Wahlig**, Leader, Building Energy Systems Program; **Steve Selkowitz**, Leader, Windows & Lighting Program; **Joan Daisey**, Leader, Indoor Environment Program; and **Mark Levine**, Leader, Energy Analysis Program. **Lila Schwartz** will again serve as staff to the Committee.

The 1988 lecture attracted a huge crowd: the auditorium of Building 50 was filled to capacity, with loudspeakers brought into the hallways for the overflow. We look forward to another successful lecture for 1989—the lecture customarily is given in October or November—and invite all suggestions for speaker and topic.

During visit to ASD's Lighting Lab, SEAC Reviewers gather around Don Levy of the Lighting Systems Research Group as he explains a technical point



Congratulations

• Five members of ASD's Simulation Research Group—**Fred Winkelmann, Bruce Birdsall, Fred Buhl, Kathy Ellington, and Ender Erdem**—were named as winners of the 1989 Federal Laboratory Consortium's Special Award for Excellence in Technology Transfer. One of only two 1989 FLC awards at LBL, the ASD group's award is being conferred "for developing, documenting, disseminating, and supporting the DOE-2 program for simulation of energy use in buildings, thereby transferring new conservation technology to private industry and government agencies."

• **Joe Eto** has been named the 1989 winner of both the Crosby Field Award and the Willis H. Carrier Award—two prestigious awards given by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) for his paper, "The HVAC Costs of Increased Fresh Air Ventilation Rates in Office Buildings." In a letter from Frank Coda, ASHRAE Executive Director-Secretary, Joe's paper was described as one of the best papers presented before an ASHRAE Technical Session or Symposium in 1988.

The Crosby Field Award, which consists of a special citation and an honorarium of \$750, is given for the best paper published by ASHRAE in a given year. The Willis H. Carrier Award, consisting of a special citation and an honorarium of \$500, is given to the author of a best paper who at the time of presentation was 32 years of age or less.

Joe works with the Energy Conservation Policy Group, part of ASD's Energy Analysis Program. He has been with ASD since 1984.

• In a national election held by the American Association of Geographers, **Walt Westman** of the Energy Analysis Program was elected to the Board of Directors of the Association's Energy and Environment Specialty Group.

ASD Director **Elton Cairns** has been elected to the office of President of the Electrochemical Society. Elton's one-year term of office will begin on May 13.

By unanimous vote of the Editorial Committee, ASD Assistant Director **Alex Quintanilha** has been reappointed to the Editorial Board of *Archives of Biochemistry and Biophysics* for a second three-year term effective July 1.

Tony Hansen of ASD's Environmental Research Program has been granted a U.S. Statutory Invention Registration (SIR) for his invention, the "optical analyzer." This device provides information about physical and chemical processes as well as a variety of quantitative and qualitative data on a sample of particulate matter inserted into the analyzer.

An SIR differs from a patent by having the defensive attributes of a patent without the latter's enforceable attributes.

Center for Building Science Director **Art Rosenfeld** and International Energy Studies Group Co-Leader **Jayant Sathaye** were extensively quoted in the "Ideas and Trends" section of *The New York Times*. In a recent article titled "Why Americans Consume More Energy to Produce Less," the ASD scientists told *Times* writer **Matthew L. Wald** about the need for energy conservation as a major part of U.S. energy strategy, how the United States compares with other countries in producing energy-efficient equipment, and what can be done to improve energy efficiency and reduce energy costs.

A SNAP to Reconstitute

The ninth cycle of ASD's Search for New Areas and Projects (SNAP) program is now beginning. The members of the SNAP Group and their Program affiliations are: **Tony Hansen**, Environmental Research (Chair); **Rick Russo**, Energy Conversion (cont. p. 7, col. 1)

Send news of awards, publications, visitors—and any other items you'd like announced in the ASD Newsletter—to the Editor, Lila Schwartz, at mailstop 90-3026, x4098 (orelectronic mail address LNSchwartz@lbl) or stop by her office, 90-3027A. Suggestions for articles or for staff/visitor profiles are also most welcome.

ASD People in Print Refereed Publications

Benner WH, Hansen ADA, Novakov T. A concurrent-flow cloud chamber study of incorporation of black carbon into droplets. *Aerosol Science and Technology* 1989;10:84.

Dod RL, Brown NJ, Mowrer FW, Novakov T, Williamson RB. Smoke emission factors from medium-scale fires: Part 1. *Aerosol Science and Technology* 1989; 2:20.

Dod RL, Brown NJ, Mowrer FW, Novakov T, Williamson RB. Smoke emission factors from medium-scale fires: Part 2. *Aerosol Science and Technology* 1989; 10:20.

Fowler WR Jr., Demarest A, Michel HW, Asaro F, Stross F. Sources of obsidian from El Mirador, Guatemala: New evidence on preclassic Maya interaction. *American Anthropologist* 1989; 91:158.

Hansen ADA, Novakov T. Real-time measurements of the size fractionation of ambient black carbon aerosols at elevated humidities. (cont. p. 8, col. 1)

Indoor Environment Program Research

COMIS: Designing Buildings That Breathe Right

Understanding the airflow in a building is critical for identifying and solving problems of indoor air quality (especially given a known pollutant source), for predicting smoke distribution during a building fire, and for calculating the energy and equipment requirements for heating, cooling, or ventilating a given area. To understand the significance of airflow patterns within buildings, engineers and architects need a readily available, easily usable model of multizone infiltration.

In the context of indoor environments, the term *infiltration* refers to the exchange of gases (including air) between parts of a building or between the exterior and interior of the building. In this context, the rooms of a building constitute its *zones*; in addition, any building area capable of having its own atmospheric environment may also be called a zone.

Purpose of COMIS

ASD's Energy Performance of Buildings (EPB) Group is the coordinator and host of an international cooperative research effort to develop a computer model of the airflows and energy flows between the zones of a building. The COMIS project (Conjunction of Multizone Infiltration Specialists) is working to develop a detailed accounting of airflow through cracks, the influence of heating/ventilation/air conditioning (HVAC) systems, "single-sided" ventilation (i.e., where the opening is parallel to the mean airflow), cross ventilation, and air transport through large openings (e.g., open doorways).

COMIS will develop the user-friendly model (aimed at professionals in the building field), validate it using multigas tracer measurements and wind-tunnel data, and produce a user handbook complemented by various levels of user support. The project was initiated by EPB's **Helmut Feustel** and has been planned, organized, and led by him since its beginnings in 1987. **Carol Stoker** of ASD assists with arrangements.

In addition to Helmut, current LBL participants in COMIS include **Max Sherman**, **Rick Diamond**, **Ed Arens**, **Darryl Dickerhoff**, and **Fred Winkelmann**.

International Aspects

Infiltration specialists from France, Italy, Japan, The Netherlands, People's Republic of China, Sweden, and Switzerland have been sponsored by their home institutions to spend the 1989 fiscal year at LBL, working with EPB scientists on the COMIS project.

Non-LBL U.S. scientists participating in the COMIS project include **George Walton** of the National Institute of Standards and Technology, **David Harrje** of Princeton University, and **Fred Bauman** of UC Berkeley. Canadian participants include **Gren Yuill** and **Craig Wray**, both of Yuill & Associates. **Martin Liddament** (of the Air Infiltration & Ventilation Centre) and **Steve Irving** (of Oscar Faber Consulting Engineers) are British members of the project.

Swedish participants include **Ake Blomsterberg** of the Swedish National

Testing Institute, **Johnny Kronvall** of Lund University, **Arne Logdberg** of the Swedish Council for Building Research, and **Magnus Herrlin** of the Royal Institute of Technology.

From Switzerland, COMIS is hosting **Claude-Alain Roulet** (of the École Polytechnique Fédérale de Lausanne) and **Peter Hartmann** of EMPA. **Francis Alard** of France is affiliated with CNRS/INSA de Lyon.

Hans Phaff and **Willem de Gids** of TNO in the Netherlands), **Mario Grosso** (of Politecnico di Torino), **Santiago de Vinuesa** of Madrid's Institute del Frio, and **Jorn Brunzell** of the Norwegian Building Institute have also joined the COMIS project, as have **Liu Mingsheng** of the Harbin Architectural & Civil Engineer Institute, People's Republic of China; **Hiroshi Yoshino** of Tohoku University in Japan; **Lutz Trepte** of Dornier Systems GmbH, Federal Republic of Germany; and **Reijo Kohonen** of Finland's Technical Research Centre.

The participating scientists' research contributions will be integrated into a single model containing a large library of modules. A COMIS handbook will be published by the Air Infiltration and Ventilation Centre (AIVC)—a section of the International Energy Agency (IEA)—and will therefore receive widespread international distribution.

Unique Features

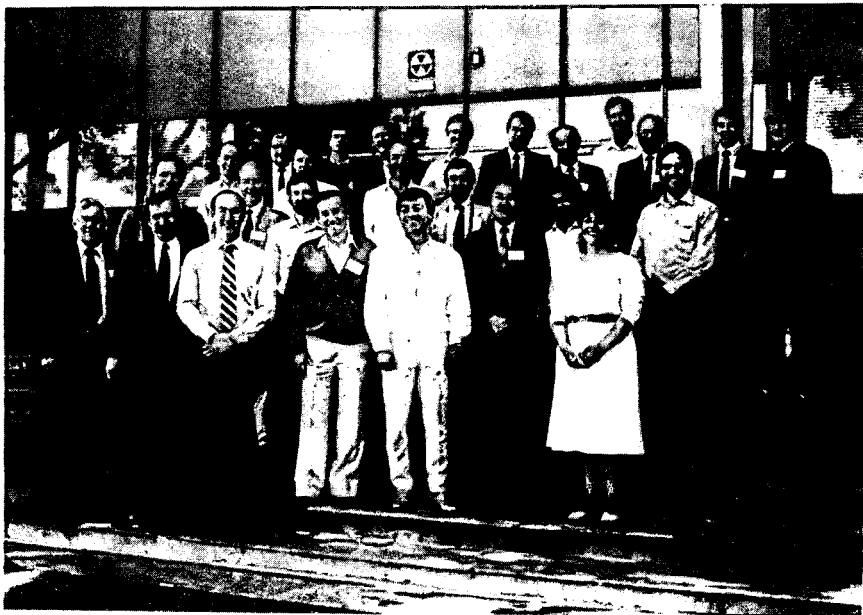
Although models of multizone infiltration exist, most are written as research tools only and/or are not readily available (or useful) to building engineers and architects. The COMIS model will therefore be unique in its accessibility and ease of use, as well as in its direct application to building design. The COMIS program will also be usable on a variety of computer hardware. To avoid potential problems with software copyrights and to make the program easily transportable, the program will be available as source code only. The program will nevertheless be easily usable with other software such as computer-aided design (CAD) systems or as infiltration modules of building-simulation programs.

(cont. p. 5, col. 1)

COMIS (from p. 4)**COMIS-AIVC Workshop**

During April 10-14, corresponding with the semi-annual meeting of the AIVC, EPB sponsored an international workshop on ventilation research. The workshop took place at LBL and gathered an AIVC panel to observe and critique the COMIS project. According to COMIS leader Feustel, the review panel offered a number of helpful comments on COMIS priorities as well as suggestions for future projects.

Led by **Max Sherman**, ASD's Energy Performance of Buildings Group is a multidisciplinary group whose researchers study the flow of energy through all elements of a building. Laboratory research is conducted at LBL; current field work is being conducted in single-family buildings in Texas. Since its establishment in 1977, the group has hosted more than 20 researchers and students (other than COMIS participants) from twelve countries.



Attendees and organizers of the joint AIVC/COMIS workshop held at LBL

Visitors & Participating Guests

• **Eliyahu Ne'eman** of the Technion (Israel Institute of Technology) is working with the Windows and Lighting Program on lighting, daylighting, and energy in buildings and will be visiting LBL until September. Dr. Ne'eman recently gave a fascinating, well-attended talk at LBL on museum lighting. He has consulted with museums and galleries worldwide on designing lighting systems and display pro-

cedures that do the least physical harm to the objects displayed. Works—many of them priceless and irreplaceable—whose physical preservation depends on such planning include paintings, sculpture, and major historical artifacts such as the Dead Sea Scrolls.

• The Windows and Lighting Program is hosting **Anat Grynberg**, a student at France's Université Pierre et Marie

Curie, to work on validating the Radiance computer program.

• Beginning in April, **Eric Martin** of the French Ministry of Housing, Urban Development, and Transport (MELATT) will spend one year working with ASD's Buildings Energy Data Group to evaluate past conservation programs applicable to France and to contribute to international comparisons of efficient buildings in the BECA data base. He has been involved for some years, both at MELATT and the French Energy Agency (AFME), with the program for improved energy efficiency in new and existing homes.

• **Yves Claude Bonnefous** is a Visiting Researcher working with Mark Modera on radon research. Yves, who is a student at France's École Nationale des Travaux Publics de l'État (National School of State Public Works), will be with ASD's Indoor Environment Program from April until September.

Throughout the year, the six Programs within the Applied Science Division host visiting scientists representing varied disciplines and institutions. Some scientists visit LBL briefly to observe ongoing work or to consult with ASD staff; others come for longer periods and participate actively in LBL projects.

Although space in this column allows mention of only a few of our many visitors, we wish to extend a warm welcome to them all.

Invited Talks & Foreign Travel

• **Ron Ritschard** traveled to Washington, DC, to discuss a report being prepared for the U.S. Congress by the Energy Analysis Program. The report, mandated by Congress, will describe 1) federal sources of data on anthropogenic and biogenic greenhouse gas emissions, 2) trends in these emissions, and 3) climate measurements and change. The analysis will also recommend policies to improve the collection, coordination, archiving, and dissemination of federal data on emissions and climate change. Completion of the study is planned for later this year.

• **Hashem Akbari** of the Energy Analysis Program and **Art Rosenfeld** of the Center for Building Science testified at a California Energy Commission (CEC) hearing on the 1989 *Fuels Report*, a document connected with California's principal energy policy and planning document, *California's Energy Agenda*. The latter report is produced biennially and forms the basis for determining how the Legislature, government agencies, utilities, businesses, and the public will meet California's future energy needs.

At the hearing, which focused on environmental issues related to use of various fuels, Art and Hashem described "least-cost" planning programs for reducing urban pollution.

• At a two-day workshop in Los Angeles, "Innovations in Utility Lighting Programs," **Ed Vine** spoke on "Designing a Utility Lighting Program and Achieving Success." Ed's talk was based on work being done by the ASD's Utility Planning & Policy Group.

Featuring presentations by scientists from LBL, the Electric Power Research Institute (EPRI), the Rocky Mountain Institute, and ASW Engineering, the workshop was directed at utility marketing managers and designers of energy conservation programs. The event was cosponsored by the Western Area Power Administration and the Los Angeles Department of Water and Power and was coordinated by the Energy Services Exchange of the American Public Power Association.

The workshop addressed the important statistic that lighting represents up to 50% of a commercial building's total energy load and uses approximately one quarter of our nation's electricity.

• The Indoor Environment Program was well represented at the Symposium on Air Change Rate and Air Tightness in Buildings, held by the American Society of Testing Materials (ASTM) in Atlanta, Georgia. Chaired by **Max Sherman**, the meeting included a poster session chaired by **Helmut Feustel** and two presentations by **Mark Modera**: "Effects of Wind on Residential Building Leakage Measurements" (at the session on residential air tightness) and "Experimental Investigation of Three Techniques for Measuring Interzonal Air Leakage" (at the session on multizone leakage).

• Speaking on "Novel Approaches to the Study of Sickled Red Blood Cells," Assistant Division Director **Alex Quintanilha** addressed the 14th Annual National Sick Cell Centers Conference, held in Durham, North Carolina. More than 800 people attended the conference, which was cosponsored by the National Institutes of Health (NIH) and Duke University.

• Representing his Program and the Center for Building Science, Windows & Lighting Program Leader **Steve Selkowitz** spoke about "Daylighting and Electric Lighting Integration: Progress and Potentials" at the Bi-Regional Conference of the Illuminating Engineering Society (IES). Also speaking at the conference were **Rudy Verderber**, Deputy Leader of the Lighting Systems Group; and **Michael Siminovitch**, researcher in the Windows & Lighting Program.

Rudy gave the conference's keynote talk, "Describing Results and Impacts of LBL Lighting Systems Programs," as well as another address, "Fundamental Considerations in Lighting Retrofit Applications"; Michael (who is trained as an architect) spoke on "Evaluating Luminous Environments."

Anderson (from page 1)

making.

Susan has unusually valuable expertise for this type of work, as her background spans both the research and the policymaking aspects of ecotoxicology. Currently serving as an Environmental Specialist with the California Water Quality Control Board, she is responsible for an extensive program to evaluate sources of toxicity feeding into Bay waters. She is also one of only a few ecotoxicologists in the world who specialize in genotoxic effects (i.e., effects on DNA) in marine species. Genetic change may be cumulative or short-term and may in some cases be capable of being repaired.

After receiving her Ph.D. in Ecology from UC Davis, Dr. Anderson did postdoctoral work in the Environmental Sciences Division of Lawrence Livermore National Laboratory on the biologic effects of disposing low-level radioactive wastes into the ocean. More specifically, this work examined the reproductive and cytogenetic effects of ionizing radiation on marine organisms. In her present capacity as consultant for LLNL and among other accomplishments, Susan has developed hazard assessment and risk management schemes to evaluate and control risks to aquatic life from disposal of low-level radioactive wastes.

From her unique vantage point as researcher/policymaker, Dr. Anderson says she is glad to be doing the kind of research that gives policymakers the scientific information they need for environmental management decisions. She considers her present affiliation with LBL/UC a good opportunity to learn about global climate change and energy policy. Beyond her current laboratory work, she is also interested in further developing risk assessment techniques, which merge the efforts of scientists and policymakers to enhance life on our planet.

SNAP *(from p. 3)*

& Storage; Hashem Akbari, Energy Analysis; Fred Winkelmann, Building Energy Systems; Carl Lampert, Windows & Lighting; Lara Gundel, Indoor Environment; and Alex Quintanilha, Assistant Division Director (ex officio).

As stated in the 1982 memo announcing the establishment of SNAP, the mandate of the SNAP group is "to examine a wide range of new ideas for research, to recommend a few of these for the Division to pursue, and to present a plan for this pursuit."

The Group for the recently completed eighth SNAP cycle—Ron Kammerud (chair), Carl Lampert, Dick Fish, Joan Daisey, Tony Hansen, Alan Meier, and Don Grether (ex officio)—received and evaluated twelve proposals, examined each in detail, and selected the top four proposals for presentation by the authors to the Group. As the committee recommended, Division Director Elton Cairns decided to pursue two of the ideas.

Energy Pricing Reforms in China

The year 2030 is expected to see massively increased energy demand in the People's Republic of China: some analysts have claimed that if China retains its present consumption methods and policies, that country will need an additional amount of coal *comparable to the world's present annual coal output*. In addition to its irreplaceable drain on natural resources, such an increase in coal use would dramatically raise the level of CO₂ emissions, seriously affecting global climate.

Energy efficiency would simultaneously help ensure China's energy supply and control CO₂ emissions; the results of efficiency measures would thus be environmentally visible. However, efficiency measures must also be quantified in monetary terms (i.e., payback periods must be determined), and China currently imposes no meaningful relation between cost and price of energy. The current energy pricing system therefore precludes determination of the economic value of investments in energy efficiency.

Mark Levine, Leader of the Energy

Analysis Program, has proposed that the ASD's International Energy Studies Group work with the Energy Research Institute of the China's State Planning Commission to address reform of the Chinese energy pricing system. This effort offers the opportunity 1) to work with China on a topic of considerable economic and environmental interest, 2) to extend our knowledge in an important area of applied economics, and 3) to develop state-of-the-art models of the economies of developing countries. Co-Leaders of the International Energy Studies Group are Lee Schipper and Jayant Sathaye.

Visible-Light Diode Lasers

Diode lasers are "pumped" directly by electric current, are small (i.e., their dimensions are on the order of 100 μ m), and are very reliable. For these and other reasons, diode lasers have been the first to be produced in large amounts for consumer products (e.g., compact-disk players). Most development to date has focused on diode lasers operating in the near-infrared spectrum, and a few commercially available diode lasers operate in the red end of the visible spectrum; however, shorter-wavelength diode lasers (e.g., that operate in the green-blue area of the spectrum) are still in their infancy.

Because they are produced using similar materials (semiconductors) and techniques (thin-film deposition) as used to produce integrated circuits, diode lasers can be incorporated directly into computer chips. As an entry into this emerging field of photonics—the combination of photons (light) and electronics—ASD's Mike Rubin has proposed to develop a prototype visible-light laser.

In this effort, Mike will use his own expertise in thin-film deposition techniques (i.e., as used to produce window coatings), a state-of-the-art deposition system recently acquired by LBL, and interactions with researchers in the UC Berkeley Department of Electronics Engineering & Computer Science and at Hewlett-Packard Laboratories in San Jose.

ASD staff are encouraged to relay questions and suggestions regarding SNAP to any member of the Group. The first meeting of the Group will be scheduled soon.

Reviews *(from p. 2)*

energy conservation in buildings (Art Rosenfeld, Director, Center for Building Science); accomplishments, current projects, and goals of the Windows & Daylighting Group (Steve Selkowitz, Leader, Windows & Lighting Program); achievements and status of ASD radon work (Tony Nero, Deputy Leader, Indoor Environment Program); NO₂ chemistry on indoor surfaces (Joan Daisey, Leader, Indoor Environment Program); and predicting effects of climate change (Walt Westman, Energy Analysis Program). The SEAC reviewers also toured the Lighting Research Group's lighting laboratory and engineering shops.

ASD Annual Review

Following closely on the heels of the SEAC Review, the ASD Annual Review surveyed work being done in all six Programs of the Division. Elton Cairns and ASD Deputy Director Don Grether gave introductory overviews of the Division's organization, accomplishments, recognition, and future directions.

Two days of research presentations and meetings followed.

From the Energy Analysis Program, Mark Levine gave an overview of the Program, Walt Westman discussed considerations in predicting effects of climate change on ecosystems, and Jeff Harris spoke about analyzing measured energy data from buildings. From the Windows & Lighting Program, Joe Klems described fenestration performance measurements.

Brandt Andersson of the Building Energy Systems Program illustrated the international collaboration aspects of passive solar systems for commercial buildings. The Indoor Environment Program's Joan Daisey repeated her SEAC presentation on NO₂ chemistry. Rick Russo of the Energy Conversion & Storage Program described laser-material interactions.

(cont. p. 8, col 2)

Publications *(from p. 5)*

Aerosol Science and Technology 1989; 10:106.

Klems JH. U-values, solar heat gain, and thermal performance: Recent studies using the MoWiTT. *ASHRAE Transactions* 1989; 95 (Pt 1).

Nazaroff WW. Predicting the rate of ^{222}Rn entry from soil into the basement of a dwelling due to pressure-driven air flow. *Radiation Protection Dosimetry* 1988;24:199.

Sherman MH. Analysis of errors associated with passive ventilation measurement techniques. *Building and Environment* 1989;24:131.

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Reviews *(from p. 7)*

Two researchers from ASD's Environmental Research Program described their work: **Henry Benner** spoke about microparticle acceleration, and **Brady Williamson** outlined the Combustion Research Group's work on characterizing smoke particles issued from medium-scale fires.

A presentation was also given on the status of the California Institute for Energy Efficiency (CIEE): **Art Rosenfeld** discussed the motivation and research agenda for CIEE, and **Don Grether** presented the institutional arrangements formed during the past year.

The review committee consisted of **Dr. Henry Kelly** (committee chairman) of the U.S. Office of Technology Assessment; **Dr. James Pitts** of UC Riverside; **Dr. Clark Bullard** of the University of Illinois at Urbana-Champaign; **Mr. Arnold Fickett** of the Electric Power Research Institute (EPRI); **Dr. William Fulkerson** of Oak Ridge National Laboratory; and **Dr. Howard Palmer** of Pennsylvania State University.

ASD overview materials presented at the review are available in the ASD reception area on the third floor of bldg. 90.

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