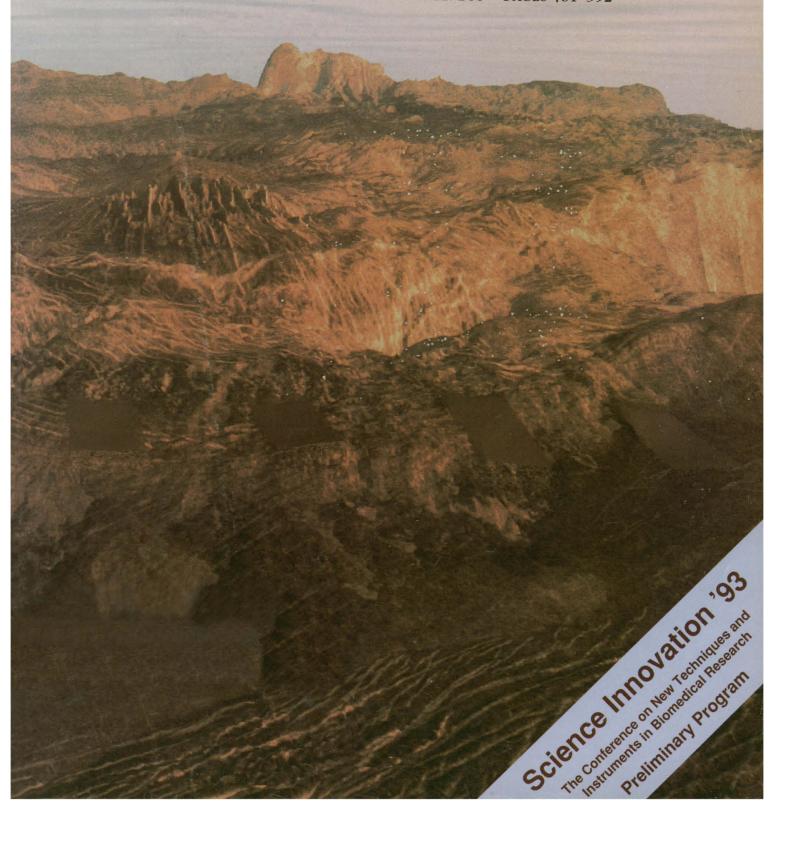
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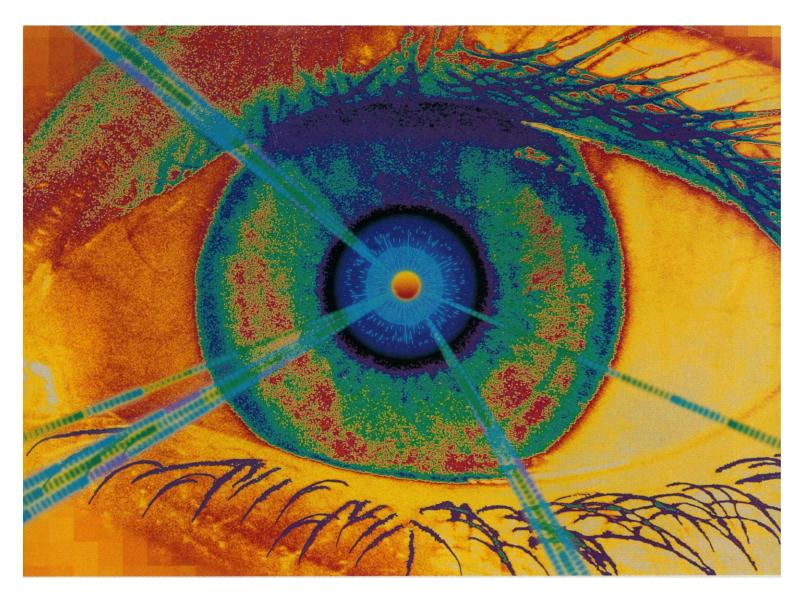
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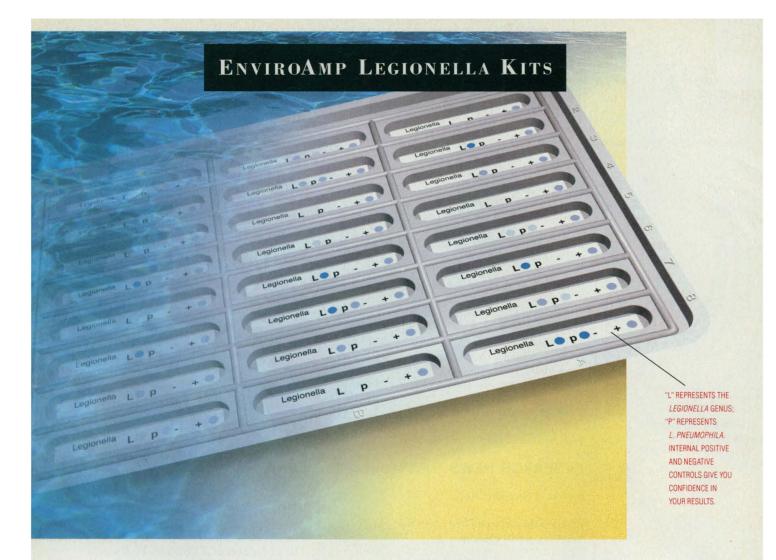
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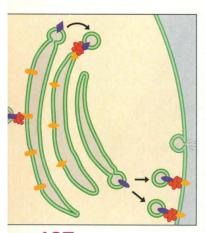
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Eastern Aphrodite Terra, Venus, looking south across Miralaidji corona (image, ~300 kilometers across). Foreground lineaments represent crustal fractures; rectangles indicate missing data. The blistering of eastern Aphrodite Terra by magma diapirs indicates

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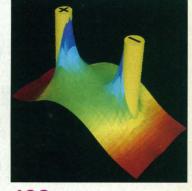
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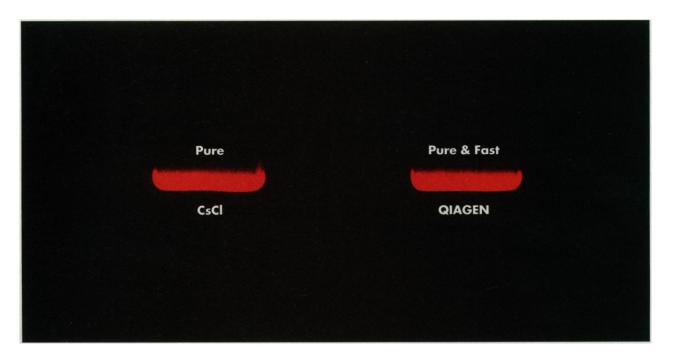


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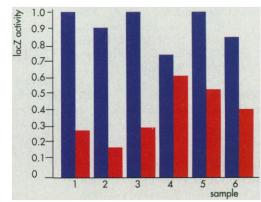
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THIS WEEK IN SCIENCE

F

edited by PHIL SZUROMI

Fields that clean

Removing chemical contaminants from soils can be a daunting task, especially in that toxic substances are often distributed over a wide area at low concentrations. Probstein and Hicks (p. 498) review the use of electric fields generated by buried electrodes to transport contaminants so that they can be removed more efficiently. Organic compounds respond to electroosmotic effects, whereas metal ions are transported by electromigration effects.

Following the guide

A ribozyme derived from the self-splicing group I intron of Tetrahymena makes use of an internal guide sequence (IGS) to direct its endonuclease activity. Cross-linking studies by Wang et al. (p. 504) show that base-pairing of the RNA or DNA substrate to the IGS to form the P1 helix is accompanied by a large-scale conformational rearrangement. These studies locate the P1 helix near helices P4 and P5, in agreement with the structural model of Michel and Westhof. The reorganization helps move the substrate from its solution-binding site into the catalytic core of the ribozyme.

Brighter than the average moon

When the moon becomes full (what astronomers call opposition), its brightness abruptly increases. The century-old explanation for this opposition effect, which is seen for other solar system bodies, has been that only when sunlight is reflected from a rough, particulate surface at 180° does the entire surface reflect; at other angles,

Loss in the ozone

The Total Ozone Mapping Spectrometer on board the Nimbus-7 satellite has been measuring the global distribution of ozone, essentially stratospheric ozone, since 1979. Gleason *et al.* (p. 523; see news story by Kerr, p. 490) report that daily global average ozone amounts for 1992 and into early 1993 were continuously lower than for any of the earlier 13 years of observations and 1.5 percent lower than expected based on the inferred linear decrease in the last several years. The long-term effects from the eruption of Mount Pinatubo may be the culprit.

some fraction is obscured by shadows cast by large particles. Hapke et al. (p. 509) propose that the opposition effect has a different origin—coherent backscattering. From a surface made of subwavelength-sized particles, light reflects by multiple scattering, and for 180° reflection, the tortuous path of a reflected photon adds coherently to that of a photon traveling in the opposite direction, leading to a peak in reflection efficiency. Measurements on Apollo lunar soil confirms that coherent backscatter occurs. This finding means that properties of the surfaces of solar system bodies deduced from reflection characteristics will have to be rethought.

Manganese oxide molecular sieves

Todorokite, a naturally occurring manganese oxide that has an open, molecular sieve structure, is usually found in a poorly crystalline form that is contaminated with other minerals. Shen et al. (p. 511) report the synthesis of stable todorokite by reacting $Mg(MnO_4)_2$ with $MnCl_2$ under strongly alkaline conditions. The tunnels in this material are formed by three MnO₆ octahedral units in each direction to produce a 6.9 angstrom cavity. Acidic sites within the tunnels may be useful for catalyzing reactions such as isomerizations, and the mixed valency and temperature-dependent conductivity of this material may find application in electrochemical devices.

Quasi-free growth of buckytubes

Carbon nanotubes that exhibit extremely small diameters can be grown from carbon vapor under ultrahigh vacuum conditions. Ge and Sattler (p. 515) generated vapor-phase carbon by resistively heating a carbon foil in vacuum and condensed it on a cold graphite substrate. Scanning tunneling microscope images revealed the presence of buckytubes in a variety of orientations that ranged in diameter from 10 to 70 angstroms.

Mantle conductivity

The conductivity of the mantle, particularly near the coremantle boundary, affects the nature of the geomagnetic field seen at the Earth's surface. Gautason and Muehlenbachs (p. 518) suggest that conductivity in the lower mantle might be dominated by the diffusion of oxygen. They studied oxygen self-diffusion in CaTiO₃ perovskite, an analog of MgSiO₃ perovskite, which is thought to be the dominant mineral in the lower mantle. The data imply

that oxygen diffusion in perovskites is related to anion porosity; for the mantle, anion porosity and oxygen diffusion are predicted to increase markedly and be sufficient to account for inferred values of conductivity near the core-mantle boundary.

Uncomplexed kinase

Normal progression of a cell through the cell cycle requires the activation of cyclin-dependent protein kinases (CDKs). Cdk2 is activated by association with cyclin E and appears to participate in controlling the progression through the G1 phase of the cell cycle. Koff et al. (p. 536) report that transforming growth factor-β, which caused cells to arrest in G1, inhibited the formation of active complexes of cyclin E and Cdk2 even though normal amounts of both proteins were present. Their results suggest that, like mating pheromones in yeast, agents that inhibit proliferation of mammalian cells may do so by inhibiting activation of CDKs during G1.

CD45, inside and out

A transmembrane tyrosine phosphatase, CD45, is necessary for efficient signaling by the T cell receptor (TCR) in normal T cells. Two reports, by Volarević et al. (p. 541) and by Hovis et al. (p. 544), show that functional TCR signaling can be restored in CD45-deficient T cells by the expression of chimeric molecules that contained only the cytoplasmic domain of the CD45 protein and that were localized to the cell membrane. The extracellular domain may act as a receptor protein that helps regulate phosphatase activity through ligand binding.

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 Pulmonary Physiology The Microbiological Basis for Anti-microbial Therapy Technological Advances in CF Home Care
 A Comprehensive Educational Program for CF Patients/Caregivers

Conference proceedings will be published as a supplement to *Pediatric Pulmonology*. **ABSTRACT DEADLINE:** May 20, 1993.

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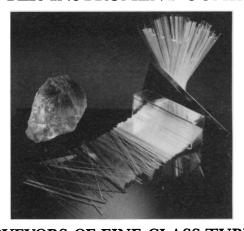
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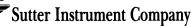


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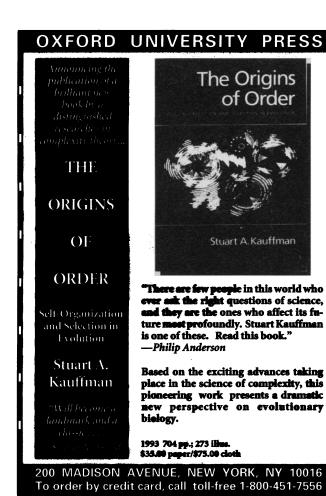
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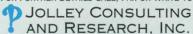
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For further information contact:

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KUWAIT FOUNDATION FOR THE ADVANCEMENT OF SCIENCES (KFAS) INVITATION OF NOMINATIONS FOR THE KUWAIT PRIZE 1993

The Kuwait Prize was institutionalized to recognize distinguished accomplishments in the arts, humanities and sciences.

The prizes are awarded annually in the following categories:

- A. Basic Sciences
- B. Applied Sciences
- C. Economics and Social Sciences
- D. Arts and Letters
- E. Arabic and Islamic Scientific Heritage

The prizes for 1993 will be awarded in the following fields:

- A. Computer Science
- B. Irrigation in Desert Land
- C. Population Policies and Human Resources in the Arab World
- D. Arabic Grammar
- E. Book Production

Background:

- Two prizes are awarded in each field: A prize to recognize the scientific research of a distinguished Kuwaiti and a prize to recognize the scientific research of a distinguished citizen of an Arab country.
- 2. The candidate should not have been awarded a prize for the submitted work by any other institution.
- Nominations for these prizes are accepted from academic and scientific centres, learned societies, past recipients of the prizes, and peers of the nominees. No nominations are accepted from political entities.
- 4. The scientific research submitted must have been published during the last ten years.
- Each prize consists of a cash sum of K.D. 30,000 (appr. U.S. \$100,000), Gold Medal, KFAS Shield and a Certificate of Recognition.
- 6. Nominators must clearly state the distinguished work that qualifies their candidate for consideration.
- 7. The results of KFAS findings regarding the selection of the winners are final.
- 8. The papers submitted for nominations will not be returned regardless of the outcome of the selection.
- Each winner is expected to deliver a lecture concerning the contribution for which he was awarded the prize.

Inquiries concerning the Kuwait prize and nominations, including complete curriculum vitae and updated lists of publications by the candidates and four copies of each of their published papers, should be addressed before October 31, 1993 to:

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KUWAIT FOUNDATION FOR THE
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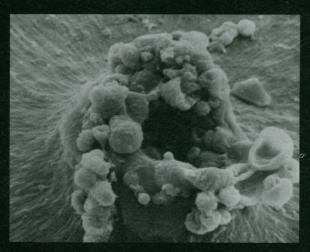
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DEAR COLLEAGUE:

Here is the preliminary program for SCIENCE INNOVATION '93, a refreshingly different presentation of new technologies and instruments in biomedical research and developments.

As we all know, novel technology developments have played a pivotal role to propel research and generate new knowledge. A most vivid example is the recent discovery of PCR, which has revolutionized the concept and practice of molecular biology and genetics.

Thus, this meeting uniquely focuses on the process of research rather than on its findings. It showcases new technologies and instruments that scientists can use to conduct their own research more effectively. It also enables investigators to learn not only about new technologies but also about new applications of existing technologies.

The meeting program is constantly being expanded and refined to ensure that the presentation will represent the very cutting edge of biotechnology. It has been carefully structured to provide both a broad understanding of available new technologies and the detailed information you need to adapt specific techniques and applications to solve problems in your own area of research.

The organization of the conference is such that overviews of new technologies will be presented as plenary lectures in the mornings and evenings. In the afternoons, there will be multiple workshops running concurrently and you can participate in specific ones of your choice. Furthermore, you can exchange ideas with your colleagues at the poster sessions and experience the new technologies up close in daily exhibits, as well as in the industry workshops.

Finally, you will also have the opportunity to preview the emerging technologies at a unique, last-day session highlighting the next frontiers of science.

Register now by completing and returning the registration form on the inside back cover. I look forward to seeing you in Boston.

SamLana

Savio L.C. Woo, Ph.D.

Science Innovation '93 Program Chair

Science Innovation '93 Preliminary Program 6-10 August 1993

Boston

Assignment of plenary speakers and concurrent sessions to specific days will be based on the availability of the speakers.

* Confirmed speaker

Friday, 8/6

12:00-7:00pm

Registration

12:00pm-6:00pm

Employment Exchange

5:00-7:00pm

Exhibition Opening and Reception

7:00pm

INTRODUCTION Savio L.C. Woo* Baylor Coll of Med

7:15pm

THOMAS ALVA EDISON LECTURE **DNA AMPLIFICATION** Kary Mullis* Atomic Tags

8:15pm

KEYNOTE ADDRESS—SCIENCE AND **TECHNOLOGY IN AMERICA** A View from the New Administration Speaker TBA

Saturday-Monday, 8/7-9

7:30am-6:00pm

Employment Exchange

8:00am-12:30pm

Plenary

8:30am-12:45pm/5:00pm-6:00pm

Career Development Seminars

10:00-10:30am

Coffee Break

10:00am-3:00pm

Exhibits

12:30-2:30pm

Lunch

1:00-2:15pm

Exhibitor Workshops

2:30-5:00pm

Concurrent Discussions

5:00-7:00pm

Poster Session/Exhibits

8:00-10:30pm

Evening Concurrent Plenaries

Tuesday, 8/10

8:00am-12:30pm

Plenary

9:00am-1:00pm

Employment Exchange

10:00-10:30am

Coffee Break

12:30-2:00pm

Lunch

12:30-2:00pm

Program Committee Meeting

2:00-5:00pm

Emerging Technologies

Plenary Lectures (Saturday-Tuesday)

RNA CATALYSIS

Sidney Altman

Yale Univ

HUMAN GENOME

Francis Collins*

National Ctr for Human Genome Rsch

GENE MAPPING

Eric Lander*

Whitehead Inst

GENE THERAPY AND TRANSFER

Kenneth Culver*

ONCOGENES AND CANCER

David Housman*

MIT

PLANT MOLECULAR BIOLOGY

Robert Goldberg*

Univ of California-Los Angeles

PROTEIN CRYSTALLOGRAPHIC

STRUCTURE

Doug Rees

California Inst of Technology

PROTEIN-DNA INTERACTIONS

Tom Steitz

Yale Univ

PREDICTING FUNCTION BASED ON

SEQUENCE

Russell F. Doolittle*

Univ of California-San Diego

CATALYTIC ANTIBODIES

Peter Schultz

Univ of California-Berkeley

ANTIBIOTIC RESISTANCE

Barry Bloom

Albert Einstein Coll of Med

DRUG DELIVERY AND TISSUE

ENGINEERING

Robert Langer*

NEUROIMAGING

Jack Belliveau*

Harvard Univ

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Stephen Fodor

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George Whitesides

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Exhibitor Workshops (Saturday-Monday)

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INTRODUCTION TO MATHEMATICA Wolfram Research, Inc

Concurrent Discussions (Saturday-Monday)

DNA AMPLIFICATION Julian Gordon*, Abbott Labs Francois Ferre, Immune Response

GENE SEQUENCING TOOLS Lloyd Smith, Univ of Wisconsin R. Graham Cooks*, Purdue Univ

FLUORESCENT IN SITU HYBRIDIZATION AND NONISOTOPIC DETECTION Irena Bronstein, Tropix Barbara Trask, Lawrence Livermore Natl Lab

SCREENING

Michael Wigler, Cold Spring Harbor Lab Joseph Gray*, Univ of California-San Francisco

PEPTIDES AND COMBINATORIAL **LIBRARIES** William DeGrado*, Du Pont Merck **Pharmaceutical** George Smith, Univ of Missouri

NMR DETERMINATION OF PROTEIN **STRUCTURE** Ad Bax, NIH

ANTIBODY CATALYSIS Steve Benkovic, Pennsylvania State Univ **Donald Landry, Columbia Univ**

NON-INVASIVE DIAGNOSTICS Christopher Green*, General Motors

IMAGING Paul Bottomley*, General Electric Thomas Brady, Massachusetts Genl Hosp **DNA DIAGNOSTICS** Thomas Caskey*, Baylor Coll of Med Janet Rowley*, Univ of Chicago

OLIGONUCLEOTIDE SYNTHESIS AND ANTISENSE PHARMACEUTICALS Paul Zamecnik*, Worcester Fndn Exptl Biology

DRUG DESIGN Ray Salemme*, 3-D Pharmaceuticals Joan Brugge*, Ariad Pharmaceuticals

DRUG TARGETING AND LIPOSOMES Phillip L. Felgner*, Vical Inc W. Mark Saltzman*, Johns Hopkins Univ

CLINICAL IMMUNOLOGY/ **IMMUNOSUPPRESSION/VACCINES** Gene Shearer, NIH Margaret A. Liu*, Merck Rsch Labs

GROWTH FACTORS, CYTOKINES AND THEIR RECEPTORS: STRUCTURE AND **FUNCTION** Joost J. Oppenheim*, NCI/Frederick Cancer Rsch Facility Michael Klagsbrun*, Children's Hosp-Boston

TUMOR IMMUNOGENICITY AND **MARKERS** Bert Vogelstein, Johns Hopkins Univ Jim Allison, Univ of California-Berkeley

BLOOD SUBSTITUTES David Anderson, Somatogen Thomas H. Schmitz*, Baxter Healthcare Corp

AIDS RESEARCH AND ANIMAL **MODELS** Ronald C. Desrosiers*, Harvard Med Sch Flossie Wong-Staal, Univ of California-San Diego

CHEMICAL COMMUNICATION lan Baldwin, SUNY Buffalo May Berenbaum, Univ of Illinois-Urbana

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Evening Concurrent Plenaries

GENOMIC LIBRARIES David Page, Whitehead Inst YAC Nat Sternberg, Du Pont Merck Pharmaceutical

Jean-Michel H. Vos*, Univ of North Carolina-Chapel Hill **EBV**

Melvin Simon and Hiroaki Shizuya*, California Inst of Technology Mapping Chromosomes with BACs and Fosmids

F. William Studier, Brookhaven Natl Lab Primer Walking

RNA AND IN VITRO GENETIC **SELECTION** Harry Noller, Univ of California-Santa Cruz Jack Szostak, Massachusetts General Hosp Julius Rebek, MIT

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General Meeting Information

LOCATION

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HOUSING

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Reservations must be made through the housing bureau and must be postmarked by 9 July 1993.

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Friday 6 August, noon-8:00pm Saturday-Monday 7-9 August, 7:00am-9:00pm Tuesday 10 August, 7:00am-3:00pm

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(Check one box only) Category □ Regular AAAS mer	nber	Advance l 16 July '9 \$295		_	n Site 3395			□ Ori	ginal i	nstiti	ıtiona	ıl pur						сриси	,	
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Lunch, Monday 9 ALunch, Tuesday 10 A		\$21 \$21						Mail to 21263												MD

IMPORTANT FOOTNOTES

- [1] Deadline for advance registration is 16 July! Registrations received after this date will not be processed, however, you may register on site at the Hynes Convention Center beginning at noon on 6 August. One-day registration is available on site only at the following rates: Regular member-\$195, regular nonmember-\$245, student member-\$95, student nonmember-\$125.
- [2] To qualify for student rate, you must be a graduate or undergraduate student and must attach a copy of your student ID card. Registrations received without appropriate verification will be charged at the Regular rates.
- [3] Membership: \$47 of dues plus international postage fees are allocated to Science. Canadian dues include GST. Please allow 6-8 weeks for receipt of first issue of
- [4] Cancellations must be received in writing by 23 July 1993. No refunds will be made for cancellations received after this date. Refunds are subject to a \$50 cancellation charge and will be processed after the meeting.
- [5] Checks must be in United States currency and must be payable on a U.S. bank. Please make checks payable to Science Innovation '93.

Hotel Reservation Form

SEND CONFIRMATION TO (please type or print legibly)

First/Given Name		Last/Fami	ily Name				
nstitution/Company (if part of address	;)						
Address							
Sity		State	Zip		Country		_
Phone		FAX					
Names of All Room Occupant(s)	(name)				(name)		
	(name)				(name)		_
Hotel Choice Hotel N	ame						
1st							
2nd							
3rd							
4th							
□ proximity to the meeting Type of room desired (check o □ Single (1 person, 1 bed) □ Triple (3 people, 2 beds)	ne):		oom rate ople, 1 bed) I people, 2 beds)		ouble/Double (2 -bedroom suite	people, 2 beds) □ 2-bedroom st	vite
ARRIVAL DATE	TIME		DEPARTU	IRE DATE	וו	IME	
Special housing needs:	om	□ Non:	smoking room				
All reservations must be guar		a deposit	or credit card gu	Jarantee	e 14 days prior	to arrival.	
Credit Card #							
Exp. Date	Card User I	Name (pleas	se print)				

If you do not wish to use a credit card guarantee, a deposit check for the first and last night's stay will be required by the assigned hotel at least 14 days prior to arrival. Deposit checks should not be sent to the housing bureau; if received they will be returned. The check should be sent directly to the hotel where you have been assigned after you receive the hotel confirmation. If credit card information is not provided or if a deposit check is not received 14 days prior to arrival, the hotels reserve the right to release your reservation. AAAS has negotiated discounted room rates at the hotels listed. We strongly encourage you to stay at one of these official hotels. You will get a chance to meet and network informally with fellow Science Innovation participants. In addition, for each participant's stay in one of these hotels, AAAS gets credit for our part in filling the hotel. This helps to defray speaker costs, which in turn helps to keep registration fees lower. Thank you for your support.

MAILING INSTRUCTIONS (9JULY DEADLINE)

Signature

Send your completed form via mail or fax (not both) to:

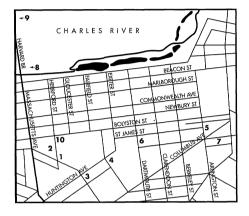
Science Innovation '93, AAAS Housing Bureau, Prudential Tower, Suite 400, P.O. Box 490, Boston, MA 02199 FAX 617-536-0813

Reservation forms must be received by 9 July 1993. Housing requests received after 9 July 1993 are conditional on room availability. Do not mail this form to AAAS; see the mailing address above. It is recommended that you keep a photocopy of this form for your records. The meeting will be located at the Hynes Convention Center #10 on map.

Science Innovation '93 Boston 6-10 August 1993

HOTEL ROOM RATES

	Hotel Name	Single	Double	Extra Person
1	Sheraton Boston*	\$121	\$133	\$20
2	Back Bay Hilton	113	113	20
3	Colonnade Hotel	103	103	_
4	Marriott Copley Place	145	165	20
5	Boston Park Plaza	125	135	20
6	Copley Plaza	125	145	20
7	57 Park Plaza	100	110	15
8	Guest Quarters Suites	110	120	20
9	Hyatt Regency Cambridge	110	120	25
	*Headquarters Hotel			



RESERVATIONS

The AAAS Housing Bureau will make hotel reservations on a first-come, first served basis upon receipt of a properly completed Science Innovation '93 housing form. Reservations will be processed in order of receipt, based on choice and availability. Acknowledgments will be sent directly to the occupant by the Housing Bureau and will be followed by a confirmation from the assigned hotel. Telephone reservations cannot be accepted. To complete this form:

- Use a separate reservation form for each room requested, not for each individual. Send only one form if sharing with a colleague; duplicate forms cause delays in processing and may result in double charges.
- [2] List at least four hotels, in order of preference, where you'd like to stay. Check whether rate or proximity is most important to you.
- [3] Check the type of room you would like.
- [4] Complete the remainder of the form, being sure to include your arrival and departure dates, credit card number and expiration date (if using credit card for your deposit), and any special requests you might have (nonsmoking room, wheelchair accessibility, etc.).
- [5] Please be thorough; failure to include all pertinent information may delay processing of your reservation.
- [6] Children: there is usually no charge for children under a particular age; check with the hotel to which you are assigned.

CANCELLATIONS/CHANGES

To cancel or make changes to reservations, contact the Housing Bureau at 617-536-9028 until 9 July. After that, please contact the hotel directly. No refunds will be given for cancellations made less than 72 hours prior to the opening of the conference.



What is Science Innovation?

Science Innovation is the annual conference on the latest techniques and instruments in biomedical research.

This is a conference by scientists for scientists that focuses on the process and methods for doing science rather than the findings.

The Innovation Meeting is sponsored by the American Association for the Advancement of Science and its renowned journal SCIENCE. Join us in Boston...don't miss Science Innovation '93.

Employment Exchange

The Employment Exchange is a career opportunities/career development service for job candidates and employers. Interview scheduling, position posting, a message center, job and resume referrals, career development seminars, and private interview booths are provided during the week of Science Innovation '93. If you have positions to be filled or are currently seeking employment, you should take advantage of this program.

EMPLOYER BENEFITS

An employer who enrolls with the Employment Exchange will receive several benefits including:

- Access to hundreds of top-notch candidate's resumes cross-referenced by discipline.
- On-site interview facilities and scheduling services at no extra charge.
- Unlimited position available postings.
- Copy of the "Pre-Meeting Bulletin", including a brief synopsis of each available candidate enrolled with the Exchange.
- Special rates for Science Innovation exhibitors, nonprofit organizations, and AAAS Corporate Members.

CANDIDATE BENEFITS

Candidates who enroll with the Employment Exchange receive the following benefits:

- FREE enrollment for AAAS member candidates. Nonmembers pay a modest \$10 enrollment fee.
- Hundreds of current position openings in a variety of disciplines and experience levels.
- On-site interview facilities, including on-the-spot interviews.
- Access to full descriptions of all available positions.
- On-site career development seminars.
- Employment Exchange Only fee for non-conference attendees.

For more information and an enrollment form, contact: Jacquelyn Roberts, AAAS Employment Exchange, Suite 1163, 1333 H Street, NW, Washington, DC 20005 (Phone: 202-326-6737; FAX 202-842-1065)