American Association for the Advancement of Science

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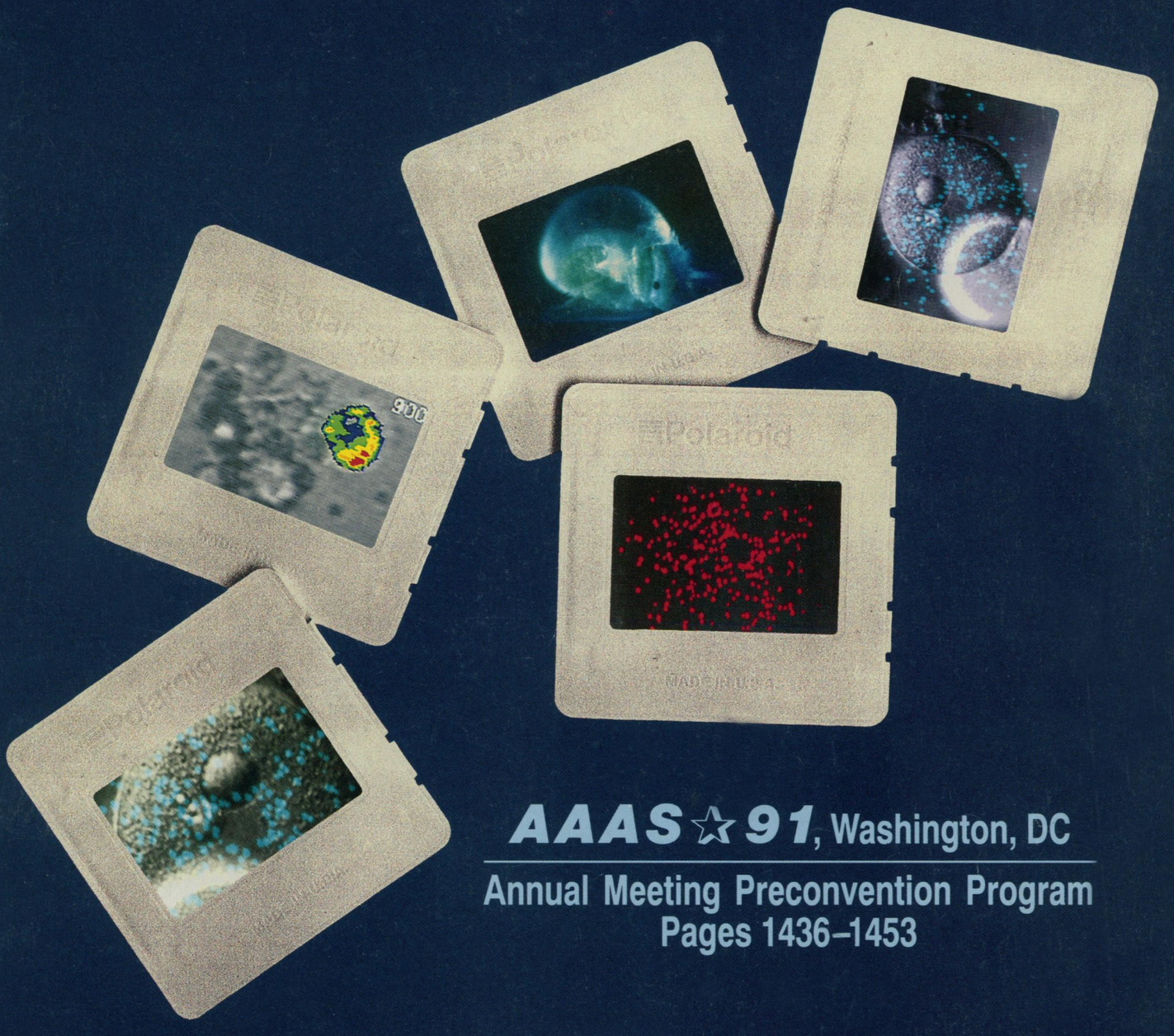

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COVER Topics spanning the spectrum of physical, life, social sciences, and technology will be presented at the AAAS Annual Meeting, 14 to 19 February, in Washington, DC. A small sampling of slides from one of the more than 200 symposia, technical sessions, and workshops is depicted on the cover (courtesy of K. Dunlap and P. Brehm, D. E. Morse, and R. B. Silver, whose work will be presented at the symposium on "New Perspectives in Cellular Signaling"). The meeting will also include plenary lectures, a special seminar on the neurosciences, poster sessions, exhibits, short courses, and an employment exchange. For details, see page 1437.

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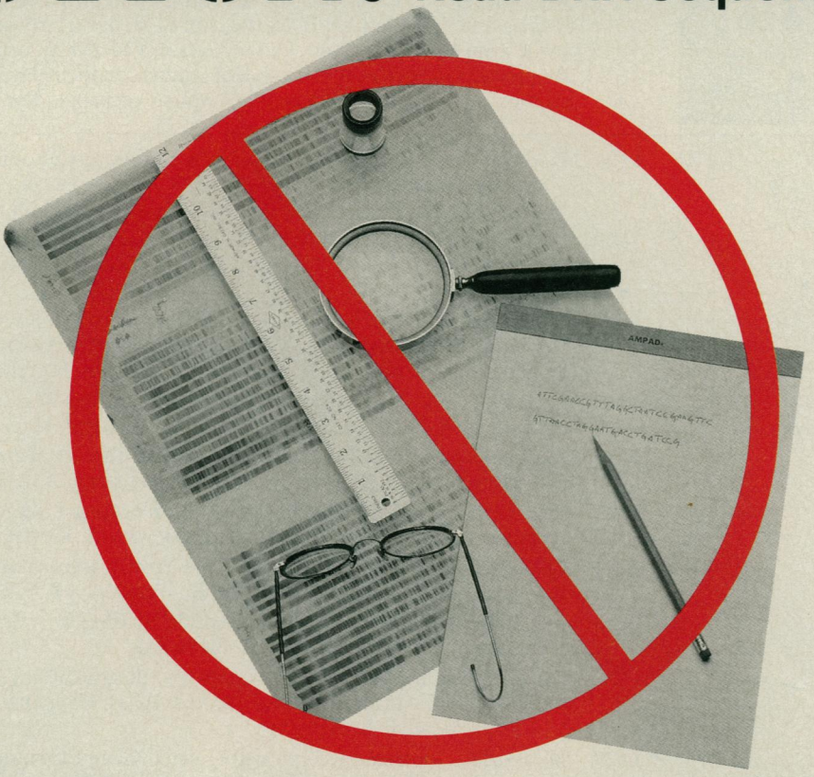

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This Week in
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Global chill?

THE Younger Dryas interval, a short period of colder climate during the last glacial age, has been well documented in the North Atlantic, in Europe, and in Greenland. It was originally thought that the climate perturbations that caused the cold spell were fairly circumscribed to the North Atlantic, but accumulating data suggest that the event may have been quite widespread and perhaps global. Engstrom *et al.* add to this growing evidence with a detailed climate record from Pleasant Island in southeastern Alaska's Glacier Bay region (page 1383). The chemical composition of the sediments and fossil pollen in the core show that forest-parkland was replaced between 10,800 and 9,800 years ago (the Younger Dryas years) with tundra vegetation; thereafter, spruce and hemlock forests colonized the area. If the Younger Dryas event did indeed have global consequences, the perturbation in the North Atlantic must have been propagated globally through ocean-atmosphere effects.

Blackbird hanky-panky

IN an analysis of parentage in natural populations of marsh-dwelling red-winged blackbirds, nearly half of nests examined included at least one chick whose profile of genetic markers did not match those of the putative father; for most of the illegitimate chicks, the true father turned out to be a male whose territory was nearby on the marsh (page 1394). The extra-pair fertilizations proved to be quite common among the blackbirds, and males could achieve as much as 20% of their reproductive success by mating with females other than their nest mate. The males that were most successful in fertilizing their nest mate's eggs were also the most successful at fertilizing eggs in other nests. These data challenge the validity of older measures of male reproductive success that were based on observations rather than genetic evidence. Gibbs *et al.* point out that evolutionary ecologists must now consider anew how best to account for the evolution of polygynous mating behavior.

Novel HIV-1 inhibitor

THE reverse transcriptase of the AIDS virus catalyzes the synthesis of proviral DNA from viral RNA early in the infection process; it should therefore be possible to block the replication of the virus and stymie HIV-1 infections by halting the action of this enzyme. The compound BI-RG-587, a dipyridodiazepinone, has been found to be a potent inhibitor of the human reverse transcriptase while being nontoxic to human cells (page 1411). BI-RG-587 was synthesized by Merluzzi *et al.* and shown to be highly specific for the human reverse transcriptase: it did not inhibit the activities of simian or feline reverse transcriptases or a variety of other related enzymes. It inhibited replication of several HIV-1 strains and isolates in vitro but had no effect on a HIV-2 isolate. The drug is chemically different from nucleoside analogs such as AZT and ddI that are currently in use clinically for treating AIDS. It is not competitive with a nucleoside-analog triphosphate; thus, in vivo, it may not produce the types of toxic side effects associated with AZT and ddI use. BI-RG-587 might have clinical efficacy where AZT and ddI do not or where these drugs once were but are no longer effective.

Follow the leader

TWO bacteriophages have coat proteins that are similar in size and structure but differ in an important respect: in phage M13, the coat protein is synthesized with a leader sequence attached to it, whereas the protein of phage Pf3 has no leader. Nonetheless, both proteins end up being inserted into host cell membranes. Leader sequences are known to facilitate the translocation of newly synthesized proteins from the cell's synthetic machinery to the membrane; often the leader is clipped off after the protein is inserted in the membrane. Rohrer and Kuhn made hybrid coat proteins in which the various domains of the M13 and Pf3 proteins were intermingled (page 1418). The presence of negatively charged residues in the periplasmic domain was found to be key to whether a leader sequence was needed: for M13, which has three negatively charged residues in this region, the leader sequence could be dispensed with if the charged amino acids were neutralized. Unless a leader sequence is there to lead, water shells that surround the charged amino acids may effectively block the entry of coat proteins into the lipid bilayer of the host cell's membrane.

Enzyme threat to genome stability

IN lymphocytes, enzyme activity of V-(D)-J recombinases helps in the assembly of genes for immunoglobulins and genes for T cell receptors from pieces of DNA dispersed around the chromosome. It now appears that other genes inside these cells, perhaps innocent bystanders, might be subject to disruption and rearrangement by V-(D)-J recombinases (page 1426). Aplan *et al.* found that, in three independent T cell lines, a common rearrangement between two previously distinct genes, *SCL* and *SIL*, had occurred; a common mechanism for the rearrangement was likely. Analysis of the fusion genes showed telltale signs of V-(D)-J recombinase activity: DNA had been nibbled away at the junction point, a region of random (nontemplated) nucleotides had been added, and there were a number of V-(D)-J recombinase-specific target sequences in the DNA. Other genes in lymphocytes, like *SCL*, may also be targets of the recombinase system if they too fit the structural requirements. Because *SCL* belongs to a gene family whose members are important in cell growth and regulation, disruptions to structure in these genes can lead to disruptions in cell functioning. ■ RUTH LEVY GUYER

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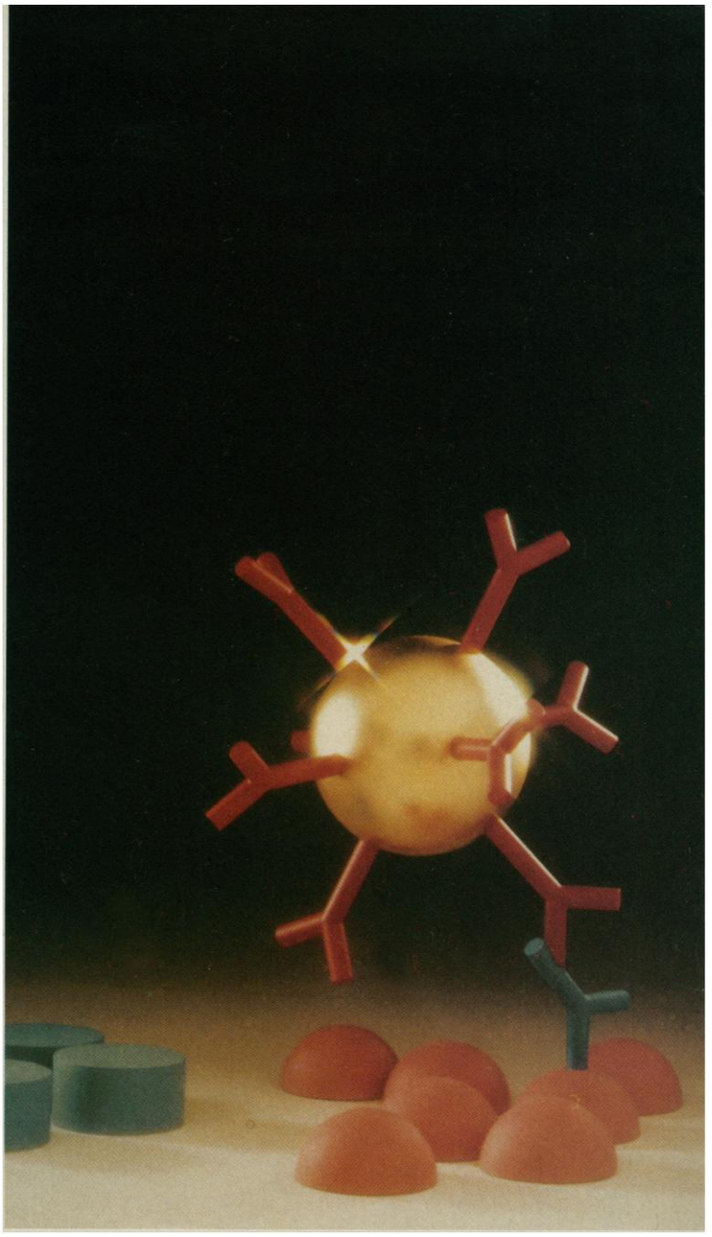

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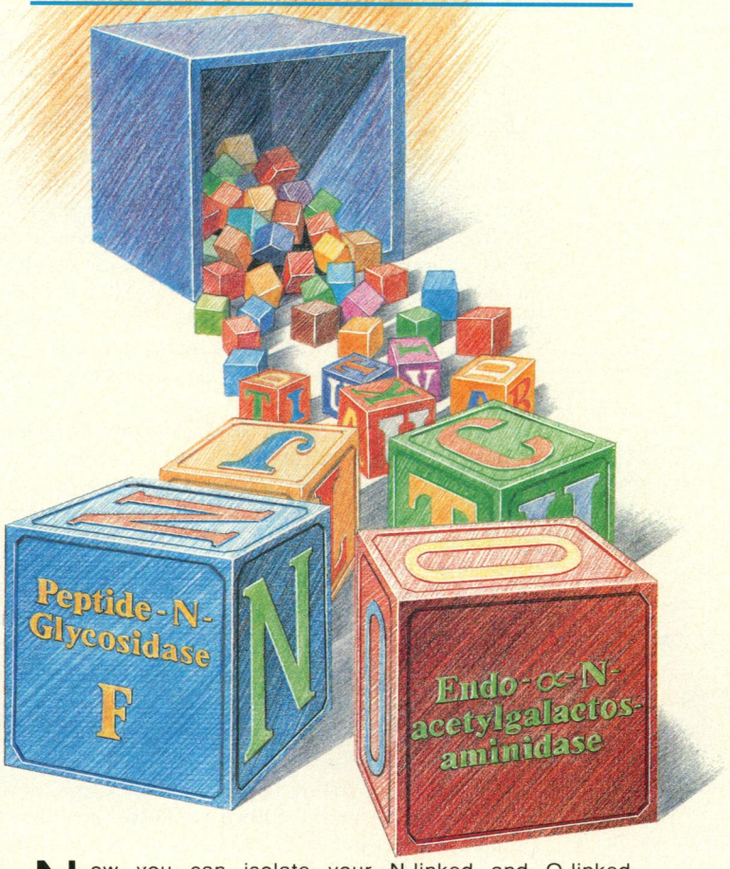

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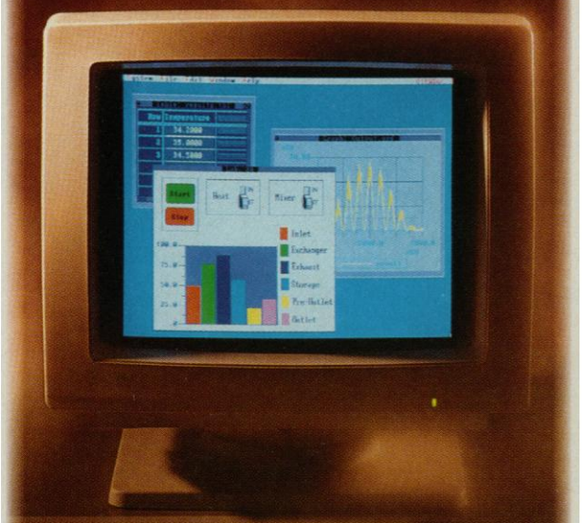

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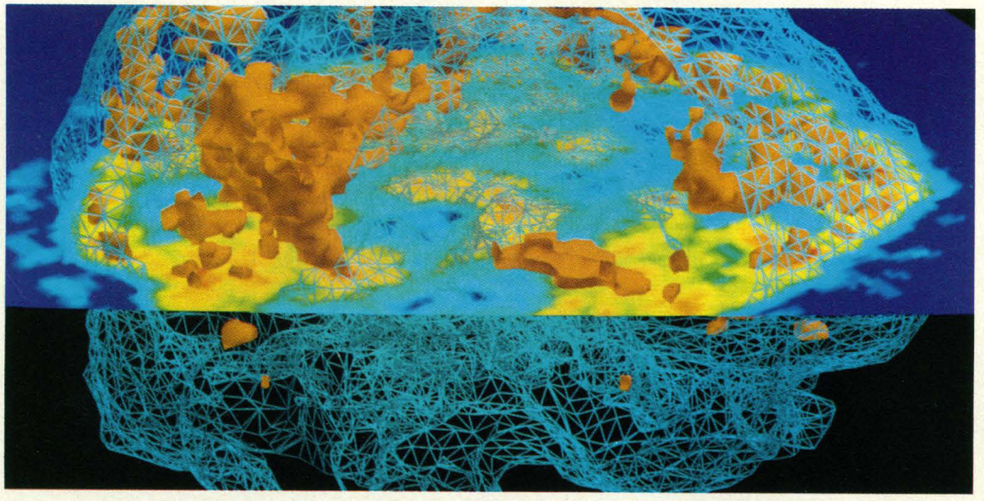

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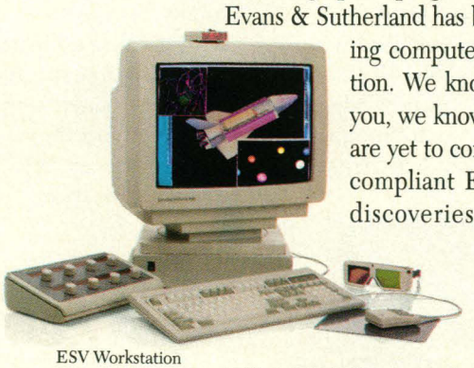

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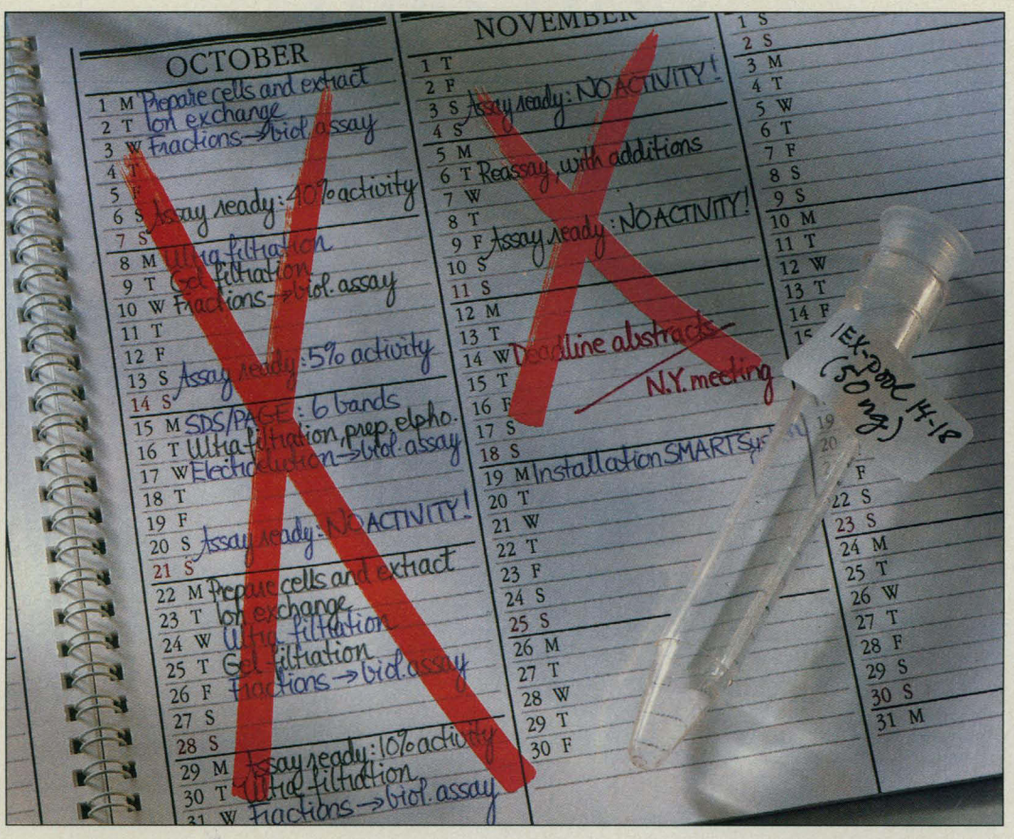

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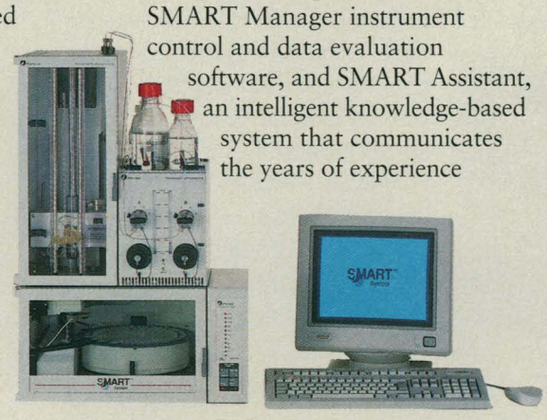

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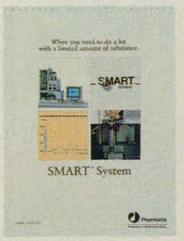

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**patent pending.* *mRNA model courtesy of* BIOSYM

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Direct hard copy cloning of PCR* products into the multifunctional pCR2000™ vector is now possible with the new TA Cloning kit from Invitrogen. This system eliminates inefficient, time consuming reactions normally involved in cloning PCR products and allows direct cloning of amplified nucleic acids from genomic DNA, cDNA or recombinant lambda, cosmids and YACs.

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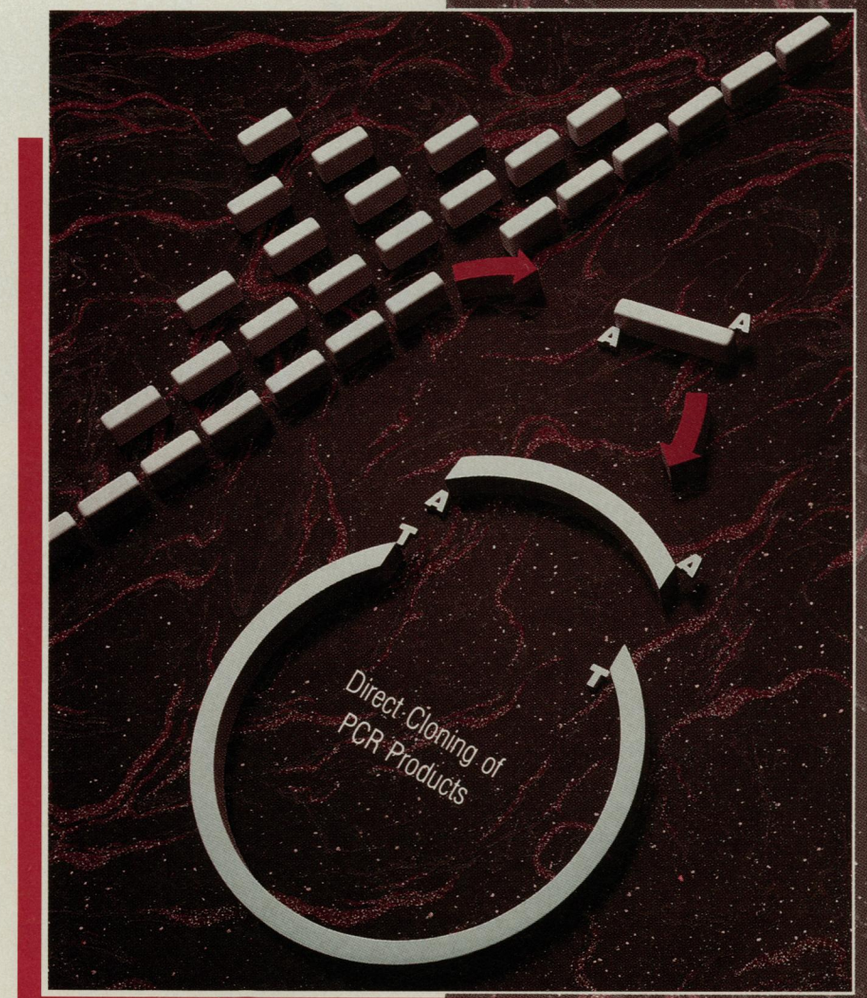

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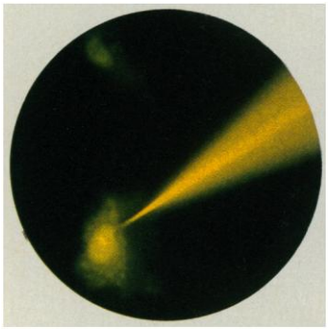

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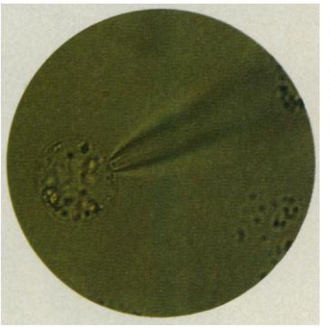

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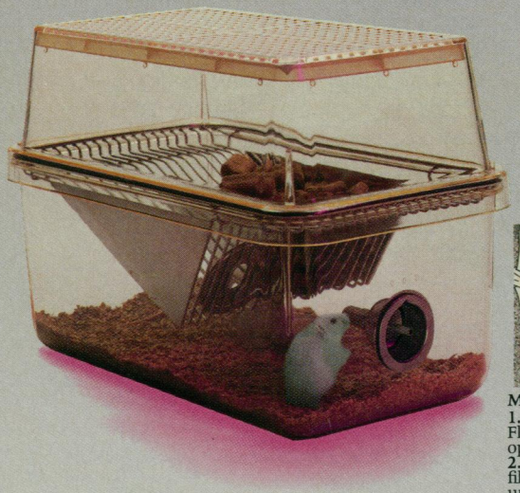
How a task-oriented, problem- to a new generation in animal

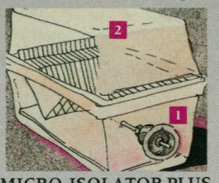
Before we at Lab Products Inc. were asked to assist our customers with their animal housing/handling problems, we were intensely curious about lab operations.

What were the tasks? How were they accomplished? Could they be done more effectively? Or more efficiently?

This desire to understand lab animal practices led our R&D to the development of the animal-sized Petri dish, the original and unmatched Micro-Isolator™, and the system that was to be the first viable alternative to complex, costly barrier rooms. Now, in another leap forward, we proudly present…

The new Micro-Isolator Plus™ System with Improved Environmental Control.





MICRO-ISOLATOR PLUS
1. Unique docking port: Floor-level air with optional dripless watering.
2. Original Micro-Isolator filter top design provides unmatched filter protection.

This innovation on the still-available and popular static Micro-Isolator deploys positive ventilation with optional automatic watering through a unique connecting mechanism which docks the cage to an air/water manifold built into our racks.

This system dramatically lowers the levels of ammonia*, carbon dioxide and humidity at the cage level and eliminates the cross-contamination associated with other automatic watering valves that are outside the cage barrier.

Air passed through a HEPA filter (99.99% efficient to 0.3 micron particles) is uniformly introduced directly into each cage ensuring the protective barrier with positive internal pressure. Air then flows out the top of the cage through a protected filter as well as from under the Petri-type lid.

The unique, dripless L-2000 Bedding-Proof Watering Valve and quick-disconnect system is part of the cage's port and so remains with the cage for cleaning and sterilization.

The result of these combined systems is an extended healthier environment with substantial savings in labor and material costs, plus greater assurance against disastrous research compromise via contamination or flooding.

It is a cost-efficient way to sustain microbial integrity from and between animals and personnel while extending animal populations to the maximum-allowable housing densities.

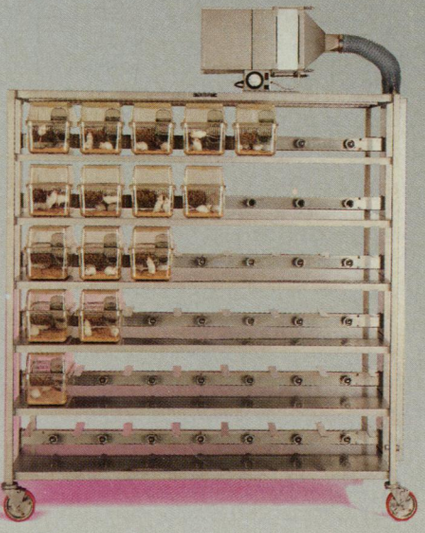
* Testing shows ammonia levels are maintained well below 10 ppm with only one cage change for up to a two-week period.

solving mentality led us housing technology.

Our Micro-Environmental Control Rack Systems complete the housing picture.

In one simple motion the individual Micro-Isolator Plus™ cage is slipped onto a shelf of one of a variety of Lab Products rack systems that support the HEPA air supply and integrated water manifold docking systems. Each shelf's air manifold is designed to supply balanced, low-velocity air to each cage regardless of the number of cages being docked. And it does so at very low levels of noise and vibration.

The Open-Shelf Rack System is used with the



Micro-Isolator Plus System when isolation at the rack level is not required, thus the cage is positive to the room.

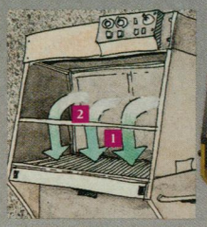
The Ventilated Rack Systems provide additional isolation by exhausting air from each shelf to the building exhaust ventilation or through a HEPA filter module that exhausts into the room. This puts each shelf space under negative pressure relative to the room and to each cage.

Our mobile, Laminar Flow Stay-Clean™ Workbench II just got even better.

Because handling equipment must maintain the aseptic integrity of housing and be practical and efficient, Lab Products Inc. continuously performs R&D in this area. Example: our newly improved workbench with easier access, cleaning and maintenance, greater user comfort, and improved mobility and safety features.

Through extensive testing we found that Class 100 horizontal air flow patterns from back to front more effectively protect animals and control particulate from spreading across cages and work area than vertical air flow systems. We combined this with a full-length front edge air intake which then pulls the air down, creating a vertical air flow curtain at the face opening of the workbench to minimize the escape of allergens and other cage effluent into the room. One new Stay-Clean Workbench II can easily be moved around to accommodate several projects daily.**

When combined with a Lab Products Waste Management



STAY-CLEAN WORKBENCH II
1. Airflow allows maximum product protection.
2. New design features adjustable sash for improved access.

Unit, these components complete a comprehensive system that ensures the integrity of complex animal research at cage barrier levels. Now you can house and process hundreds of small animals of varying species involving a variety of research in one small facility with greater effectiveness and greater efficiency. And it can all be done in a pleasant, virtually-odorless environment.

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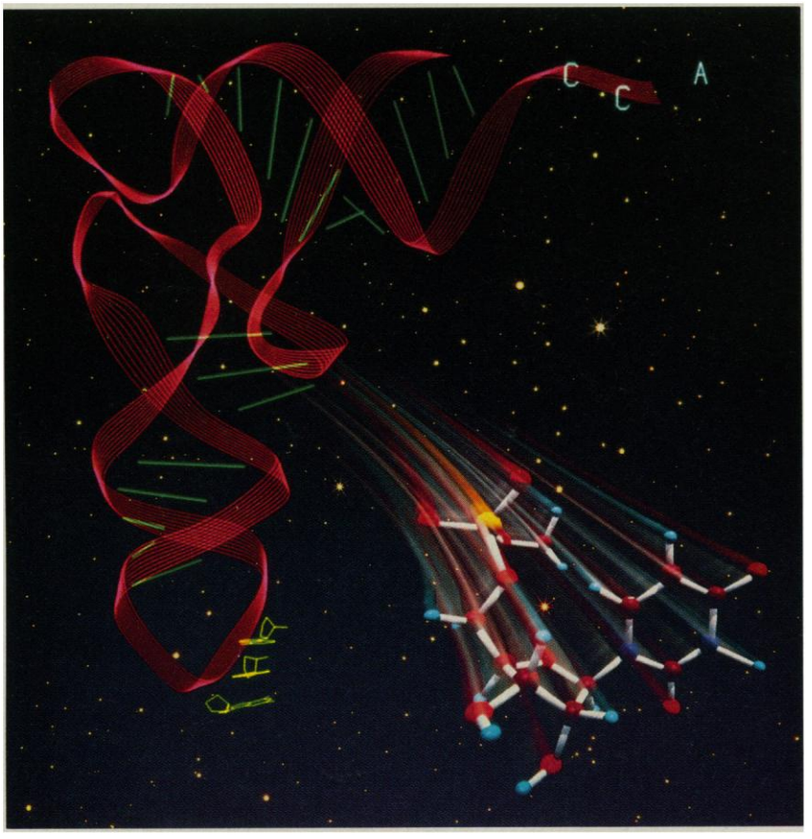

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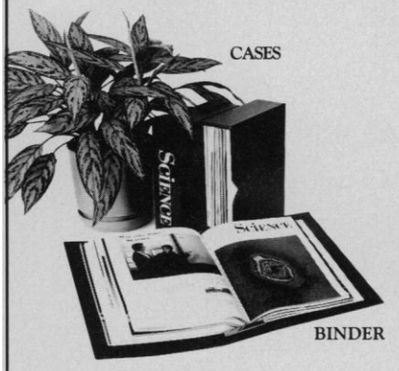

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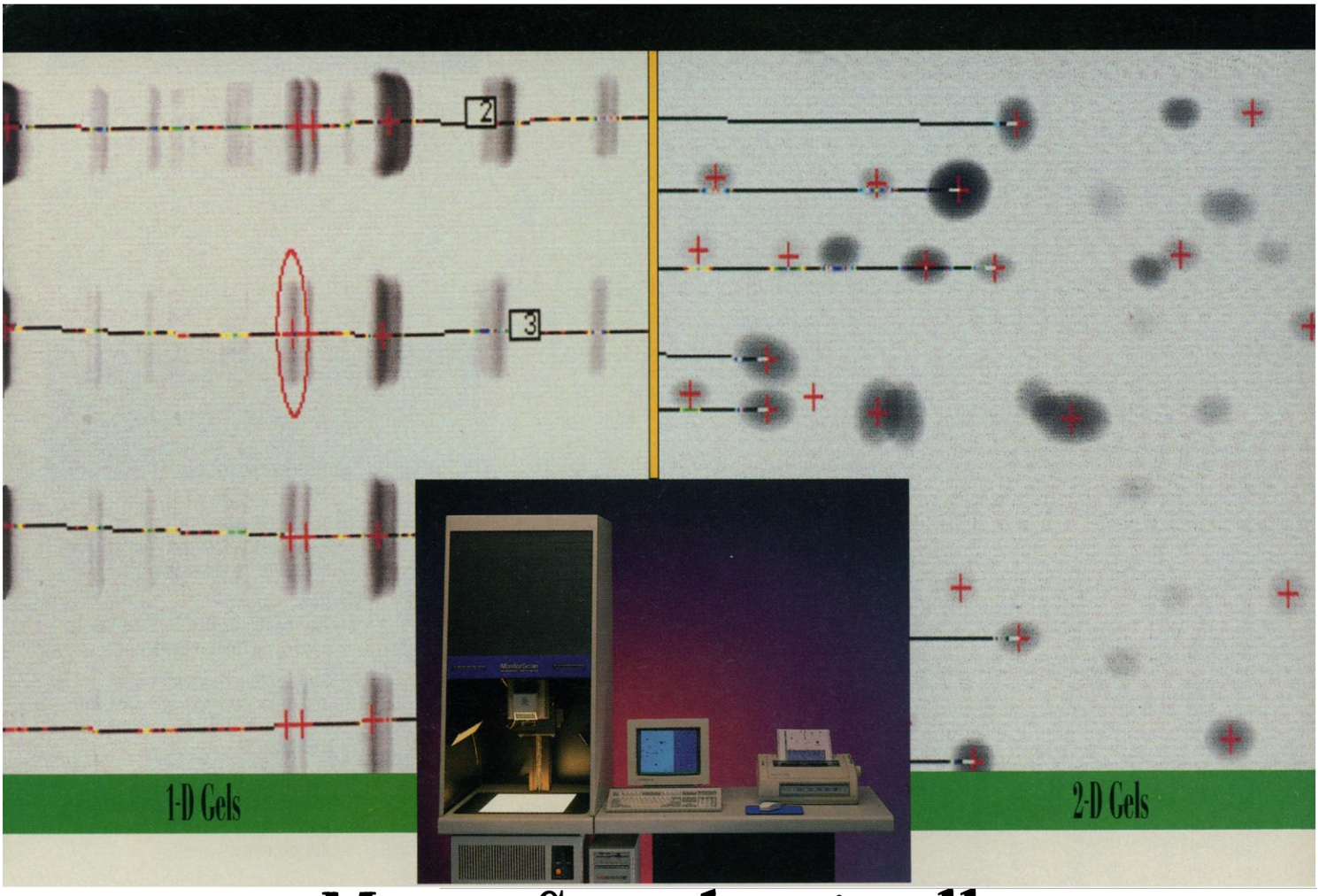

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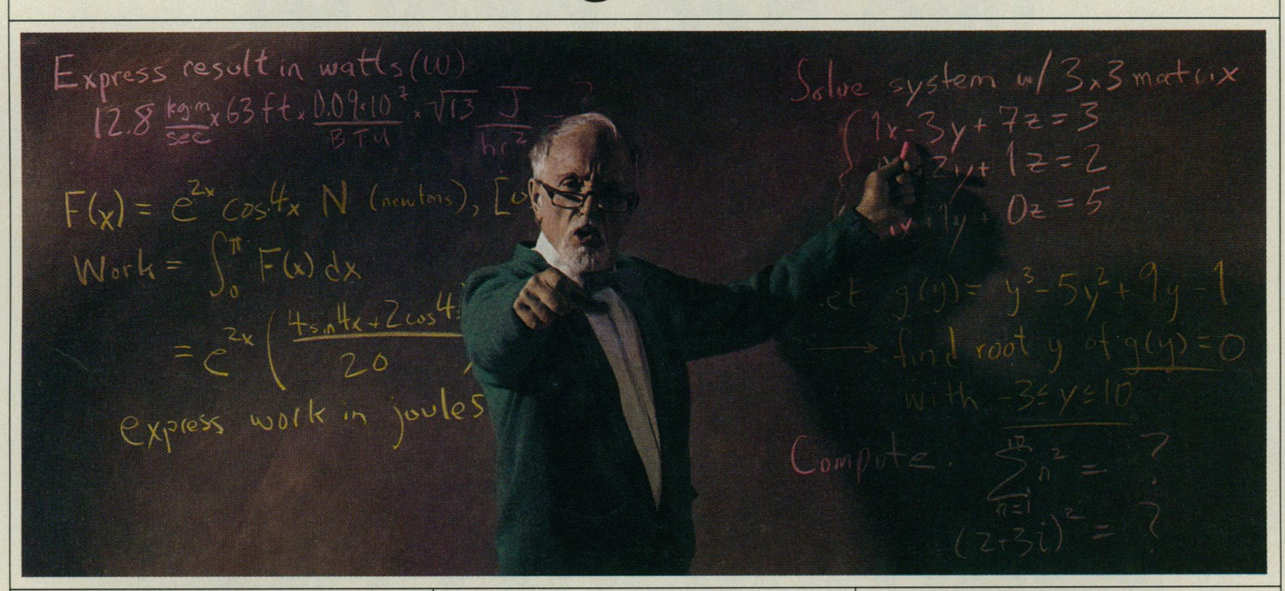

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PC MAGAZINE EDITOR'S CHOICE
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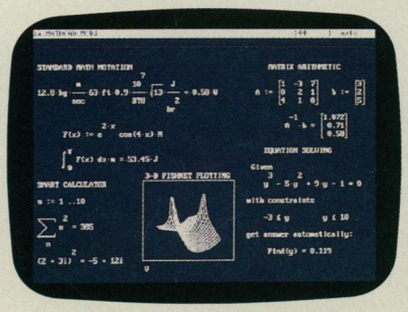

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We are proud to accept entries for the second annual Biomedical Science Journalism Prizes.

The General Motors Cancer Research Foundation will present its second annual Biomedical Science Journalism Prizes in March, 1991.

For more than a decade, the Foundation has honored distinguished scientists working to understand and conquer cancer. These Journalism Prizes are presented to encourage and to recognize outstanding journalistic coverage of biomedical research relating to the nature, cause, prevention, or treatment of cancer.

The Prizes honor those who play a critical role in public awareness, which is essential to winning the fight against cancer. Each Prize consists of a limited-edition work of art and a cash award of $10,000.

A panel of prominent print and electronic journalists and journalism educators will select a winner in each of three categories:

- **Newspapers and Wire Services**
- **Periodicals**
- **Broadcast Media**

Among the criteria used in the judging will be: significance and value in promoting public knowledge and understanding of cancer, scientific accuracy, originality, clarity of presentation, and initiative.

ENTRY INFORMATION

Articles and programs appearing during 1990 are eligible. Entries must be about cancer, cancer research, or cancer therapy; they must have appeared in a national or local mass-communication medium oriented to a lay, non-technical audience; and they must be submitted in English or accompanied by an English translation. Entries must be postmarked by January 31, 1991.

Write for complete entry requirements and copies of official submission forms. Or call (212) 418-6384.

General Motors
Cancer Research Foundation
767 Fifth Avenue
26th Floor
New York, NY 10153

General Motors Cancer Research Foundation

Advance Registration Form – AAAS☆91

AAAS Annual Meeting; Washington, DC
14–19 February 1991

Please print

Name of registrant _____
(last name) (first name)

Institution/company _____
(institution/company name will appear on badge)

Mailing address _____
(number / street)

_____
(city / state / zip / country)

Daytime telephone number _____

Name of spouse registrant _____
(if registering for meeting, see spouse registration fees at right)

Convention address _____
(hotel or phone number)

Circle days you will attend meeting: Thu Fri Sat Sun Mon Tue

[ ] Check here if you need special services due to a handicap.

[1] **11 January deadline:** Advance registrations received after this date cannot be processed; however, you may register on site, beginning 14 February, at the Sheraton Washington Hotel. On-site rates: regular member, $140; regular nonmember, $190; all others, same as advance rates.

[2] **Refund requests** must be made in writing to the address below by **5 February** and will be honored after the meeting. **No refunds will be made for cancellations received after this date.**

[3] **Special rates:** To qualify for student rates, you must attach a copy of your student ID card. (Student rates apply to full-time undergraduate and graduate students only.) To qualify for postdoctoral rates or high school teacher rates, you must attach a letter from your chairman confirming your status. **Registrations received without appropriate proof of status will be charged at the regular rates.**

[4] Regular nonmember 6-day (not 1-day) registration fee includes an introductory membership with 25 issues of *Science* (16 issues if mailed outside the USA).

Advance registration deadline: 11 JANUARY 1991

Mail this registration form to:

AAAS Annual Meeting Registration
P.O. Box 23320
Alexandria, VA 22304-9330

OFFICE USE ONLY
AMT PD _____
CHECK # _____
DEP. DATE _____
SOURCE: K L

I. Meeting Registration Fees[1]

Registrant	Six-day	One-day	Amount
Regular member	[ ] $110	[ ] $50	$ _____
Regular nonmember	[ ] $160[4]	[ ] $65	$ _____
Student member[3]	[ ] $ 10	[ ] $ 5	$ _____
Student nonmember[3]	[ ] $ 15	[ ] $ 5	$ _____
Postdoctoral member[3]	[ ] $ 30	[ ] $15	$ _____
Postdoctoral nonmember[3]	[ ] $ 40	[ ] $20	$ _____
HS teacher[3] or emeritus	[ ] $ 50	[ ] $25	$ _____
Spouse of registrant	[ ] $ 40	[ ] $20	$ _____

Important: *Students, postdocs, and high school teachers must attach proof of status.[3]*

One-day registrants circle one: Thu Fri Sat Sun Mon Tue

II. Additional Fees

(Seminar and short course fees are in addition to, not in lieu of, the meeting registration fee.)

Neuroscience Seminar (16-18 February)
Regular [ ] $110
Grad student or postdoc [ ] $ 30 $ _____

Short Courses (14 February)
Regular [ ] $ 50
Grad student or postdoc [ ] $ 15 $ _____
Select one short course only:
[ ] Sophisticated Uses of Computers
[ ] Computers in Medical Imaging

TOTAL AMOUNT: $_____

III. Payment[2]

[ ] check enclosed [ ] VISA [ ] MasterCard
(no other cards accepted)
[ ] original institutional purchase order attached

Card no. _____

Expires _____ Signature _____

Hotel Reservation Instructions

To make hotel reservations: Call the AAAS Housing Bureau, toll free, weekdays between 9:00 a.m. and 5:00 p.m., Eastern time, at the following numbers:

United States: 1-800-535-3336

Canada: 1-800-535-3356

Metropolitan Washington: 202-842-2930

Have the following information ready when you call: [1] Name of convention: "AAAS Annual Meeting"; [2] 1st, 2nd, and 3rd choice of hotel; [3] arrival/departure dates [4] number of rooms needed; [5] type of room (single, double, etc.); [6] number of persons in party; [7] arrival time; [8] credit card name, number, and expiration date; [9] names of all occupants of room; [10] your mailing address; [11] your telephone number; [12] any special needs due to a handicap.

Hearing-impaired and international attendees: Hearing-impaired attendees and those from outside the USA and Canada may send written requests containing the indicated information to: AAAS Housing Bureau, 1212 New York Ave., Washington, DC 20005, USA (FAX: 202-789-7037).

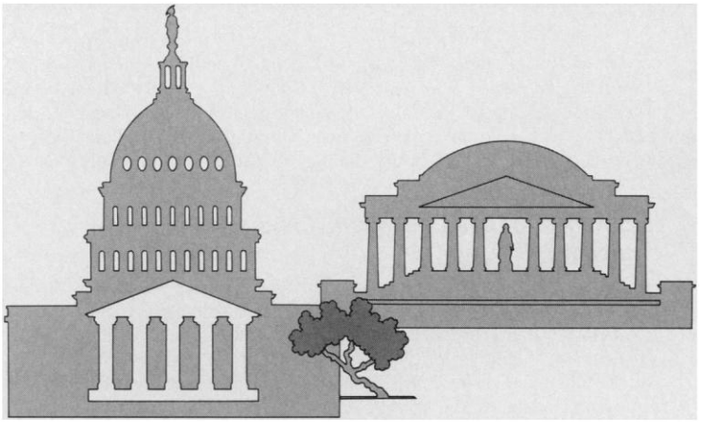
Hotel confirmations: Confirmations will be sent by the Housing Bureau. If you do not use a credit card, you must remit the deposit indicated on the confirmation within 15 days of its receipt. (No deposit is required if you use a credit card.) Your choice of hotel and/or room is subject to availability.

Changes/cancellations: Prior to 15 January, changes and cancellations must be made with the Housing Bureau. After this date, contact the appropriate hotel directly.

Hotels and rates:
Please add 11% DC sales tax and $1.50 room tax per night.

	Single	*Double*
Sheraton Washington	$110	$130
2660 Woodley Road, NW	$125	$145
(AAAS headquarters hotel)	$140	$160
Omni Shoreham	$105	$120
2500 Calvert Street, NW	$121	$136
(Across from Sheraton)	$134	$149
Dupont Plaza	$ 80	$ 90
1500 New Hampshire Ave., NW		
(One Metro stop from Sheraton)		

Hotel reservation deadline:
15 JANUARY 1991



AAAS☆91

The AAAS Annual Meeting

Washington, DC; 14 – 19 February 1991

Plenary Lectures

Thursday, 14 February

George Bush, *President of the United States* (invited), Keynote Address *(8:30 pm)*

Friday, 15 February

Walter Bodmer, *Director of Research, Imperial Cancer Research Fund, United Kingdom,* "The Human Genome Project" *(1:00 pm)*

Riccardo Giacconi, *Director, Space Technology Institute,* Topic to be announced *(8:30 pm)*

Saturday, 16 February

Shosaku Numa, *Professor, Departments of Medical Chemistry and Molecular Genetics, Kyoto University Faculty of Medicine, Japan,* "Molecular Insights into the Function of Neurotransmitter Receptors and Ionic Channels" *(1:00 pm)*

E. J. Corey, *Professor of Chemistry, Harvard University,* "Molecular Robots" *(1:00 pm)*

José Goldemberg, *Secretary of State for Science and Technology, Brazil,* "Science and Technology in Developing Countries" *(8:30 pm)*

Sunday, 17 February

Kenneth Manning, *Professor of the History of Science, Massachusetts Institute of Technology,* "The Complexion of Scientific Communities" *(1:00 pm)*

Larry L. Smarr, *Director, National Center for Supercomputing Applications, University of Illinois,* "The Grand Challenges of Computational Science" *(1:00 pm)*

Donald N. Langenberg, *Chancellor, University of Maryland,* and *President, AAAS,* "Science, Slogans, and Civic Duty" *(8:30 pm)*

Monday, 18 February

John Brademas, *President, New York University,* "American Science in the 21st Century: Prospects and Problems" *(1:00 pm)*

Fang Li Zhi, *Royal Society Guest Research Fellow, Institute of Astronomy, Cambridge University, United Kingdom,* "Cosmology: Some New Developments and Problems" *(1:00 pm)*

Louis W. Sullivan, *Secretary, U.S. Department of Health and Human Services,* "Biomedical Research" *(8:30 pm)*

Tuesday, 19 February

Lecturers to be announced (1:00 pm)

Contents

Neuroscience Seminar

Three days; Saturday–Monday, 16–18 February

(Separate fee required; see registration form on page 1436)

The Neurosciences: Challenges for the '90s

Organized by: Katrina L. Kelner *(Science magazine)*

Stimulus-Transcription Coupling in Neuronal Cells *(Saturday, 8:30 am)*

Inducible Proto-oncogenes in the Nervous System —James I. Morgan *(Roche Inst. of Molecular Biology);* Regulation of Neuronal Gene Expression by Depolarization —Michael Greenberg *(Harvard Med. School);* Pleasure, Pain, and Proto-oncogenes —Michael J. Iadarola *(NIDR, NIH);* NGF Induces Transcription of Genes Encoding Zinc-Finger Proteins —Jeffrey Milbrandt *(Washington Univ., St. Louis)*

Plenary Lecture *(Saturday, 1:00 pm)*

Molecular Insights into the Function of Neurotransmitter Receptors and Ionic Channels —Shosaku Numa *(Kyoto Univ. Faculty of Med., Japan)*

Structure and Function of Potassium Channels *(Saturday, 2:30 pm)*

A Minimalist Potassium Channel —Arthur M. Brown *(Baylor College of Med.);* Molecular Studies of Voltage-gated Potassium Channels —Lily Y. Jan *(UC-San Francisco);* Structure-Function Correlations in a Family of Rat Brain Potassium Channels —Walter Stuhmer *(Max Planck Inst., Germany);* Biophysical and Molecular Mechanisms of Potassium Channel Gating —Richard W. Aldrich *(Stanford Univ. School of Med.)*

Olfaction and Taste *(Sunday, 8:30 am)*

From Ions and Molecules to Perception and Cognition —Gordon M. Shepherd *(Yale Univ. School of Med.);* Molecular Mechanisms of Transduction in Olfaction: A Model for Receptor-Ligand Signaling Systems —Stuart Firestein *(Yale Univ. School of Med.);* Long-term Potentiation and Serial Memory Processing in the Olfactory Hippocampal Circuit —Gary S. Lynch *(UC-Irvine);* The Initial Events in Taste Transduction —Stephen D. Roper *(Colorado State Univ.);* Sensory Coding of Gustatory Information —David V. Smith *(Univ. of Cincinnati)*

Activity-dependent Plasticity in Development and Learning *(Sunday, 2:30 pm)*

Long-term Potentiation: A Cellular Model for Learning —Roger A. Nicoll *(UC School of Med., San Francisco);* Mechanisms for Use-dependent Synaptic Plasticity in the Developing and Mature Visual Cortex —Wolf Singer *(Max Planck Inst., Germany);* Regulation of Synapse Stabilization by Regulation of a Receptor System —Martha Constantine-Paton *(Yale Univ.);* Spontaneous Activity and the Patterning of Connections in Fetal Development —Carla J. Shatz *(Stanford Univ. School of Med.)*

Cognitive Processes *(Monday, 8:30 am)*

Memory: Brain Systems and Cognition —Larry Squire *(Veterans Admin. Med. Ctr., San Diego);* Attentional Control of Visual Perception: Cortical and Subcortical Mechanisms —Robert Desimone *(NIMH, NIH);* Components of High-level Vision: A Cognitive Neuroscience Analysis —Stephen Kosslyn *(Harvard Univ.);* Neural Circuits That Mediate Perceptual Judgments of Motion Direction —William T. Newsome III *(Stanford Univ. School of Med.)*

Molecular Basis of Neurological Disease *(Monday, 2:30 pm)*

Molecular Genetic Approaches to Identification of Mutant Genes in Neurological Disorders —Joseph B. Martin *(UC School of Med., San Francisco);* Molecular Genetics of Hereditary Retinal Disease: Retinoblastoma —Thaddeus P. Dryja *(Massachusetts Eye and Ear Infirmary);* Neuronal Polarity and Microtubule System: A Target of Alzheimer's Pathology —Kenneth Kosik *(Brigham and Women's Hosp., Boston);* Molecular Biology and Genetics of Prions Causing Neurodegeneration —Stanley B. Prusiner *(UC School of Med., San Francisco)*

Poster Session *(Date and time to be announced)*

Short Courses

One day; Thursday, 14 February

(Separate fee required; see registration form on page 1436)

Sophisticated Uses of Simple Computers

This course will focus on how microcomputers can be used to solve sophisticated problems in physics and chemistry research. Organized by: Jack M. Wilson *(Rensselaer Polytechnic Inst.)*, Rolf Sinclair *(NSF)*

Session I *(Thursday, 8:30 am)*

New Minds for Old —Jerry Pournelle *(Jerry Pournelle Associates);* The Comprehensive Unified Physics Learning Environment —Edward F. Redish *(Univ. of Maryland);* Catalyst: Computers in Chemistry Education —Joe Lagowski (Journal of Chemical Education and *Univ. of Texas, Austin);* The Power of the Visual Image —Donna Cox *(Natl. Ctr. for Supercomputing Applications);* Using Mathematics in Scientific Research —Kevin McIssac *(Wolfram Research)*

Session II *(Thursday, 2:30 pm)*

Individualized hands-on instruction for all participants, moderated by Jack M. Wilson, Rolf Sinclair, and others.

Computers in Medical Imaging and Graphics

This course will focus on new imaging modalities, including imaging components of interventional procedures as used by cardiologists and pulmonary and other specialists. Organized by: Robert S. Ledley *(Georgetown Univ. Med. Ctr.)*

Session I *(Thursday, 8:30 am)*

Digital Fluoroscopy Update —Klemens H. Barth *(Georgetown Univ. Med. Ctr.);* Stereo 3-D Imaging —Robert S. Ledley; Use of Cross-sectional Imaging in the Performance of Interventional Procedures in the Abdomen —Peter R. Mueller *(Massachusetts General Hospital);* Advances in Computerized Imaging Techniques in the Practice of Invasive and Interventional Cardiology —Gary S. Ledley *(Albert Einstein Med. Ctr);* Multimodality Imaging: Challenges for Resource Allocation and Health Care Delivery —David J. Goodenough *(George Washington Univ.)*

Session II *(Thursday, 2:30 pm)*

Bioimaging at the Microscopic Level —Edmund M. Glaser *(Univ. of Maryland School of Med.);* Real-time Imaging and ECG Gating with MR —Robert J. Herfkens *(Stanford Univ. School of Med.);* International Image Compression Standards and Medical Applications —Gregory K. Wallace *(Digital Equipment Corp.);* Recent Advances in Diagnostic Medical Image Storage —Robert Hindel *(Philips Medical Systems);* Endoluminal Ultrasound —Barry B. Goldberg *(Thomas Jefferson Univ.)*

Physical Sciences & Technology

General Physical Science & Technology

Frontiers of the Physical Sciences: 1991 (Fri/am-pm)

Session I: Large Telescopes of the Future, *J. Roger P. Angel;* Enzyme Mimics, *Ronald Breslow;* The Laser Interferometer Gravity Wave Observatory: Opening a New Frontier in Astrophysics, *Rochus Vogt*
Session II: Arranging Points on a Sphere, *Neil J.A. Sloane;* Volcanoes Under the Sea: The Last Frontier of Global Vulcanology, *Katharine V. Cashman;* Toward a Science of Storm-scale Weather Prediction, *Kelvin Droegemeier.* Organized by: *Rolf M. Sinclair*

Computing; Communications

Global Initiatives in High-performance Computing and Networking (Fri/pm; Sat/am-pm)

Session I: The Grand Challenges in Supercomputing, *John W.D. Connolly;* Building upon the 1985 NSF Advanced Scientific Computing Initiative, *Elizabeth C. Schermerhorn;* The NSF Supercomputer Centers as a Catalyst for Change, *Lawrence A. Smarr;* Supercomputing for Science-based Economic Development, *Lawrence A. Lee;* IBM European Initiatives in Supercomputing, *Franco Pavoncelli*
Session II: NREN (National Research and Education Network) Initiatives at the NSF, *Stephen Wolff;* EASInet: European Networks and Connections to the United States, *Herbert F. Budd;* Network Infrastructure: The Electronic Library and the Knowbot, *Robert E. Kahn;* Social/Behavioral Issues in Network Development, *Charles W. McClure, Ann Bishop, Phil Doty;* Legal, Regulatory, and Pricing Issues in Network Development, *Brian Kahin*
Session III: The Electronic Superhighway System: A National Vision, *Albert Gore, Jr.;* High-performance Computing: The Real Customers, *Alvin Trivelpiece;* Biomedical Applications of a National Electronic Superhighway, *Donald A.B. Lindberg;* Project 2061: Status of Efforts to Connect Higher Education and K–12 to the National Networking Matrix, *Kenneth M. King;* A Resource for Industrial Development, *Allan H. Weis;* A Resource for Small Business, *Joshua I. Smith.* Organized by: *Gligor A. Tashkovich, Bonnie C. Carroll, Lawrence A. Lee*

Computer Virus Legislation: Problems and Pitfalls (Fri/am)

What's Up on the Hill: Looking Ahead, *Katie Miller;* Drafting State Legislation: Coping with Computer Viruses, *Phyllis L. Kahn;* Good and Bad Viruses and How to Tell the Difference, *John F. Shoch;* Bugs and Bugaboos: Concerns of the Software Industry, *Ronald J. Palenski;* Hardening the Hardware: The Limits of Technological Fixes, *Oliver R. Smoot;* Perspectives of a Prosecutor, *Mark D. Rasch.* Organized by: *Anne Wells Branscomb, Mark S. Frankel*

Information Technology in Support of Research: What Your National Libraries Are Doing (Mon/am)

Outreach Through Technology, *Elliot R. Siegel;* Visiting the Virtual Library, *Daniel R. Masys;* Access to Biotechnology Information, *Dennis A. Benson;* The Role of Laserdisc Technology in Agriculture, *Alan Fusonie, Ron Young, Richard Myers;* Bringing the Library of Congress to Its Off-site Users, *Suzanne Thorin.* Organized by: *Linda C. Smith, Elliot R. Siegel*

Can Electronic Publishing Solve the Science Library Crisis? (Mon/am)

Electronic Publishing from a Publisher's Point of View, *Stuart Rothenstein;* Research and Development in Electronic Publishing, *Martin J. Dillon;* Electronic Publishing: An Economic View, *Malcolm Getz;* When Will Electronic Information Systems Replace Printed Journals? *Stewart C. Loken.* Organized by: *H.H. Barshall*

Scientific Communications in a Changing World (Sun/am-pm)

Session I: Scientific and Technical Information and National Competitiveness: A Government Policy Perspective, *Nancy Mason;* The Scientific and Technical Information Infrastructure: Perspective of the NSF, *F. Karl Willenbrock;* Information Technology and the Conduct of Research: The User's View, *Donald N. Langenberg;* STI as an Integral Part of the R&D Process: An STI Manager's Perspective, *Joseph G. Coyne;* Information Resource Management: A Competitive Edge, *Barbara Muhalas*
Session II: Collaborative Research and Proprietary Interests, *Keith W. McHenry;* Impact of National Security Control on Scientific Communications, *Deborah Runkle;* Intellectual Property Law and Scientific Communications, *Gerry J. Elman;* The Pitfalls of Intellectual Property, *Art Kleiner;* Electronic Watermarks: Toward a Technological Solution to the Problem of Intellectual Property, *Paul Levinson.* Organized by: *Bonnie C. Carroll*

Mathematics in the Public Policy Arena (Mon/pm)

Public Policy Aspects of Statistics: An Application to the Study of Complex Salary Structure, *Mary W. Gray;* The Wavelet Revolution in Mathematics and Signal Processing, *Ingrid C. Daubechies;* Human-Computer Collaboration, *Barbara J. Grosz;* Calculating Fractal Dimensions and Invariant Measures, *Fern Y. Hunt;* Covergence Analysis for Simulating Flow in Root-Soil Systems, *Mary F. Wheeler.* Organized by: *Mary Beth Ruskai, Mary W. Gray, Jill P. Mesirov*

Technical Sessions:

Robotics and Mathematics *(Tue/pm).* Motion planning, dexterous manipulation, nonholonomy. *Jacob T. Schwartz, Daniel Koditscheck, Bhubaneswar Mishra, P. S. Krishnaprasad*

Stereo Computer Imaging and Analysis in Science *(Tue/am).* Echocardiograms, 3-D and 4-D. *Robert S. Ledley, James F. Greenleaf, Michael W. Vannier, Boyd MacNaughton, Jr., James V. Jester, Lee D. Peachey*

Energy; Technology

Energy R&D Policy in the United States (Fri/am)

U.S. National Energy Strategy, *Linda G. Stuntz;* U.S. Science and Technology Policy; What Priority for Energy R&D? *Rodney W. Nichols;* Congressional Perspective on Energy R&D, *Ben S. Cooper;* Industry Perspective on Energy R&D Policy, *Daniel A. Dreyfus;* Economics, Environment, and Energy R&D Priorities, *Robert W. Fri.* Organized by: *H.M. Hubbard, Robert W. Fri, Barbara Farhar*

Energy Technologies for Developing Countries (Sat/pm)

The Brazilian Perspective: Technologies for Sustainable Development, *José Goldemberg;* The Chinese Perspective: Long-term Demand and Technology Choices, *Yingzhong Lu;* The Indian Perspective: Appropriate Energy Technologies, *Amulya Kumar N. Reddy;* The World Bank Perspective: Energy Technology Investments, *Mohan Munasinghe;* The Global Energy Efficiency Initiative, *Alvaro Umana.* Organized by: *William Fulkerson, Mark D. Levine*

Date and Time Key

"Thurs" = 14 February	"Mon" = 18 February
"Fri" = 15 February	"Tue" = 19 February
"Sat" = 16 February	"am" = 8:30 am to 11:30 am
"Sun" = 17 February	"pm" = 2:30 pm to 5:30 pm

Scientific Advances in Emerging Solar Energy Technologies (Fri/pm)

Photon Conversion Processes, *Arthur J. Nozik;* Advances in Photovoltaic Solar Technology, *Don L. Morel;* Characterization of Photovoltaic Materials, *Lawrence L. Kazmerski;* Development of Biomass Energy Crops, *Lynn L. Wright;* Conversion of Lignocellulose to Fuels and Chemicals, *Barbara J. Goodman.* Organized by: *H.M. Hubbard, Robert L. San Martin, Barbara Farhar*

Engineering in Japan (Sun/pm)

Introduction, *H. Guyford Stever;* Engineering in Japan, *Takashi Mukaibo;* Education in High Technology for Engineers in Japan, *Yoshiharu Namba;* Research and Engineering at Fuji Xerox and Xerox Corporation, *William J. Spencer, Y. Ogawa;* Reforms in Engineering Graduate Schools in Japan, *Hiroyuki Yoshikawa;* The Future of Engineering in Japan, *Michiyuki Uenohara.* Discussants: *Jordan Baruch, Hisashi Kobayashi, Rustum Roy.* Organized by: *Robert S. Cutler, Ryo Hirasawa, Kazuhiko Kawamura*

Technical Sessions:

The Interaction of Science and Engineering in the Modern Age *(Sat/am).* Technological improvement, invention. *Edwin T. Layton, Jr., John H. Lienhard, David F. Channell, Matthew Mehalik, W. Barnard Carlson, Michael E. Gorman*

Geophysical Imaging Systems: From Medical Microcosm to Outer Space *(Tue/am).* Airborne surveys, remote sensing, computerization. *George Ricaurte, James Tetrud, William A. Sauck, Farouk El-Baz, Anna C. Roosevelt, Lawrence G. Desmond, Larry E. Murphy, T. H. Lee Williams, Robert G. Strom*

Changing Lives: New Technology for People with Disabilities *(Sun/am).* Reading systems, E-mail, speech processors, electroejaculation, orthotics, aging. *James R. Fruchterman, J. Tilak Ratnanather, Bosco Keown, S.W.J. Seager, Moreno J. White, Dennis R. La Buda, Virginia W. Stern, Jan Galvin*

Physics; Chemistry

Seventy-five Years of General Relativity (Fri/am)

Einstein's Theory of Gravitation: Historical Reflections, *Peter G. Bergmann;* Nonlocal Variables for General Relativity, *Ezra T. Newman;* Experimental Gravitation, *Ranier Weiss;* The Problem of Quantum Gravity: How to Finish the Revolutions of 20th-Century Physics, *Lee Smolin.* Organized by: *Arthur B. Komar*

Elementary Particle Physics: Present Status and Future Prospects (Fri/pm)

Overview of Theory, *Paul H. Frampton;* Future of High-energy Electron Physics, *Burton Richter;* Status of Superconducting Super Collider, *Roy Schwitters;* Results from LEP and Future Plans, *Samuel C.C. Ting.* Organized by: *Paul H. Frampton*

Quantum Mechanics of Single Atoms (Tue/am)

Single Ion Cyclotron Resonance for Precision Mass Measurement, *David E. Pritchard;* Experiments at NIST with Stored Ions, *Daniel J. Heinzen;* Nonclassical Light: The Extraordinary Radiation Properties of a Micromaser, *Gerhard Rempe;* Optical Spectroscopy of Single Ions: An Approach to the Ideal, *Warren Nagourney;* Quantum Mechanics of Single Atoms, *Thomas Erber.* Organized by: *Thomas Erber, D.J. Wineland*

Chemistry Rediscovers Materials Science (Mon/am-pm)

Session I: Architecture with Photopolymers, *Douglas C. Neckers;* New Inorganic-Organic Hybrid Materials by the Sol-Gel Approach, *Garth L. Wilkes;* Are Liquid Crystals Ordered Reaction Media? *Richard G. Weiss;* Electrical Properties of Organic Solids, *Dwaine O. Cowan*
Session II: Theory of Extended Structures, *Jeremy K. Burdett;* Interstitial Synthesis: When Materials Are Born and the Unexpected Turn Up, *John D. Corbett;* From Chemistry to New Materials, *Kenneth R. Poeppelmeier;* Chemistry and Physics of Thin Films for Electronics, *Eugene A. Irene.* Organized by: *George S. Hammond*

Mathematics in the Materials Sciences (Sun/pm)

Frustrated Solids, *Richard James;* Mathematics in the Materials Sciences, *Morton Gurtin;* Extremal Microstructures: What Do We Know About Composites? *Robert Kohn;* The Computation and Visualization of Defects and Microstructure, *Mitchell Luskin.* Organized by: *David Kinderlehrer*

Status of High-temperature Superconductivity (Sat/pm)

The Report of the National Commission on Superconductivity, *David W. McCall;* Federally Funded Superconductivity Programs, *Ted G. Berlincourt;* High T_c and High J_c in Oxide Superconductors, *Paul C. W. Chu;* Experimental Results on the Nature of High-temperature Superconductivity and Unusual Normal State Properties, *Miles V. Klein;* Prospects for the Development of Conductors of High-temperature Superconductors, *David C. Larbalestier.* Organized by: *William T. Oosterhuis*

Current Directions in Musical Acoustics (Sun/am)

Perceptual Segregation and Integration of Musical Tones, *William Morris Hartmann;* Sound Production in the Piano, *Anders Askenfelt;* Aperiodicity in Oscillations of Musical Instruments, *Robert T. Schumacher;* Brass Instruments, *Klaus Wogram;* Wind Instruments and Chaotic Dynamics, *Douglas H. Keefe;* Current Directions in Computer Music, *Max V. Mathews;* Modes of Vibration and Sound Production in Percussion Instruments, *Thomas D. Rossing.* Organized by: *Thomas D. Rossing, Logan Hargrove, Mark F. Hamilton*

Technical Session:

Revisionist Kinetics: New Views of Nature's Throttle *(Tue/pm).* Chemical reactions, rates, and mechanisms. *Peter G. Wolynes, Michael John Weaver, James T. Hynes, Graham R. Fleming, R. Stephen Berry*

Astronomy; Planetary Science

Cosmology: Our Knowledge of the Universe (Sat/am)

Observing the Universe Long Ago: The Cosmic Background Explorer, *Michael G. Hauser;* Motions of Galaxies and the Large-scale Structure of the Universe, *Vera C. Rubin;* The Early Universe, *Alan H. Guth;* How Much Can We Learn About the Universe? *Martin Harwit.* Organized by: *Martin Harwit*

Adverse Environmental Threats to Astronomy (Mon/pm)

Introduction to the Issues, *A.K. Dupree;* Light Pollution: The Theft of the Night, *David L. Crawford;* Keeping the Radio Sky Quiet: Limited Future Options, *P. A. Vanden Bout;* The Growing Threat of Orbital Debris, *David L. Talent.* Organized by: *David L. Crawford*

The Human Exploration of Space (Sun/am-pm)

Session I: NASA's Space Exploration Initiative (SEI) Plans, *Richard H. Truly;* SEI as a Goal of Space Research, *Mark Albrecht;* SEI Within the Context of a National Research Program, *Robert E. Grady;* Congressional Views of SEI Plans, *Albert Gore, Jr.;* Roles and Responsibilities of the U.S. Space Research Community, *Louis J. Lanzerotti*
Session II: Space Studies Board Study on Human Exploration, *Noel W. Hinners;* Issues in Life Science Research, *Dennis L. Smith;* Planetary Exploration, *Larry Esposito;* Role of Solar and Space Physics in Space Exploration Initiative, *Marcia Neugebauer;* Astronomy from a Lunar Base, *Andrea K. Dupree.* Organized by: *Richard C. Hart*

The Rationale for Human Exploration of Mars (Mon/am)

Discussants: *Richard Garwin, Michael Carr, Robert Brown.* Organized by: *Louis Friedman*

Science with the Hubble Space Telescope (Tue/am)

Early Results with Wide Field Camera, *James Westphal;* Early Results with Faint Object Camera, *F. Duccio Macchetto;* Early Results with Goddard High-resolution Spectrograph, *John Brandt;* Early Results with Faint Object Spectrograph, *Richard Harms;* Early Results with High-speed Photometer, *Robert Bless;* Early Results with Fine Guidance Sensors, *William Jeffreys.* Discussants: *Albert Boggess, Riccardo Giacconi, Colin Norman, Robert O'Dell, Edward Weiler.* Organized by: *Eric Chaisson, Colin Norman*

Geoscience; Climate

Human Response to Sea-Level Rise (Sun/pm; Mon/am-pm)

Session I: Global Eustatic Sea-Level Changes: Causes, Trends, Perspectives, *Nils-Axel Morner;* Human Response to Sea-Level Rise in Prehistoric and Historic Times, *Michael J. Tooley;* Sea-Level Rise and Small-Island States, *David R. Stoddart;* Sea-Level Rise and the Maldive Islands, Indian Ocean, *Alasdair Edwards;* Consequences of Sea-Level Rise in Bermuda, *Joanna C. Ellison*
Session II: Social, Economic, and Political Projections in Small-Island States, *Tim P. Bayliss-Smith;* Consequences to Northwest Europe, *Ian Shennan;* Coastal Zone Management in The Netherlands, *Robbert Misdorp;* Human Responses to Sea-Level Rise in the British Isles, *Robert J. N. Devoy;* Defense Against Sea-Level Rise, Venice, Italy, *Paolo A. Pirazzoli*
Session III: Stabilization Versus Retreat: New York and Eastern Mediterranean Examples, *Victor Goldsmith;* Future Sea-Level Rise in Chesapeake Bay: Implications for Shore Erosion and Marsh Loss in a Rapidly Urbanizing, Subsiding Coast, *Michael S. Kearney;* Human Response to Sea-Level Rise: The Louisiana Experience, *Denise J. Reed;* Human Response to Sea-Level Rise in Southeast Asia, *Eric Bird;* Sea-Level Rise in the Yellow River Delta: Implications and Response Strategies, *Mei-e Ren.* Organized by: *David R. Stoddart, Joanna C. Ellison*

Coastal Erosion Zone Management (Fri/pm)

New Jersey's Rocks, Concrete, and Sand: Consequences of the Structured Shoreline Approach, *Stewart Farrell;* Maintaining the Soft Interface: Florida's Commitment to Beach Nourishment, *Robert Dean;* Louisiana's Disappearing Shores: America's Coastal Erosion Hot Spot, *Mark Byrnes;* California Sun, Surf, and Sand: The Myth and Reality of Shoreline Maintenance, *Reinhard Flick;* Living on the Edge: A Great Lakes Dilemma, *William Wood.* Organized by: *Stephen P. Leatherman*

Impacts of the Climate During the 1980s in the United States (Fri/am)

Major Climate Events of the 1980s in the United States, *Thomas R. Karl;* How We Dealt with Climate Surprises of the 1980s, *William E. Riebsame;* Climate and Agricultural Comparative Advantage in the Western Corn Belt: Patterns and Prospects, *William E. Easterling;* Agribusiness Use of Climate Information in the 1980s, *Steven T. Sonka;* Can We Do Climate Impact Analysis? *Peter J. Lamb.* Organized by: *Stanley A. Changnon*

Technical Sessions:

Impacts of Climate in Regions of the United States *(Mon/pm).* Variability, effects on activities. *Peter J. Robinson, Warren W. Knapp, Kenneth E. Kunkel, Kenneth G. Hubbard, Kelly T. Redmond, Arnold Court, Stanley A. Changnon*

Earthquake Prediction and Validation *(Mon/am).* Seismicity patterns, Soviet work, empirical evidence, statistical validation. *George M. Molchan, David Vere-Jones, Stu T. Nishenko, Allan G. Lindh, Mark V. Matthews, Volodya I. Keilis-Borok, Bernard J. Minster, Paul Switzer*

Global Change and the Carbon Cycle in Terrestrial Ecosystems *(Sun/pm).* Modeling, climatic change, vegetation response. *George M. Woodwell, Michael E. Schlesinger, William R. Emanuel, Allen M. Solomon, Ronald P. Neilson, Bert G. Drake, Roger J. Sedjo, Robert K. Dixon, David P. Turner*

Global Change

Making Informed Decisions for Planet Earth: The Role of Satellite Observations (Fri/pm; Sat/am-pm)

Session I: International Responses to Environmental Concerns, *Robert A. Reinstein;* International Environmental Programs, *S. Ichtiaque Rasool;* U.S. Global Change Research Program, *Dallas Peck;* Satellite Observations for Global Change Research, *D. James Baker*
Session II: What Are the Key Questions? *John A. Eddy;* Physics, *J. Michael Hall;* Biology, *Harold A. Mooney;* The Data Management Challenge, *Lisa R. Shaffer;* Modeling and Prediction, *Robert Dickenson*
Session III: Integrating Diverse Data Sets for Policymakers, *Jack R. Lousma;* Applications of Satellite Data and Information in the U.S.: Policy Formation and Land-Use Planning, *James W. Merchant;* The Use of Satellite Observations for Improving Environmental Decisionmaking in Less-developed Countries, *Jonathan T. Olsson;* The Role of Earth Observation Satellites in the Development and Enforcement of International Environmental Agreements, *Paul F. Uhlir.* Organized by: *Philip H. Abelson, Gerald Soffen, Paul F. Uhlir*

Humankind in Global Change: Indicators and Prospects (Sun/am-pm; Mon/am-pm; Tue/am-pm)

Session I: Population Trends and Models, *Paul Demeny;* National and Transnational Migration Patterns (Including Environmental Refugees), *Michael Teitelbaum;* Changing Scales of Urbanization and Migration in the Third World, *Sally E. Findley;* The Labor Force of the Future and the Role of Women in It: Current Trends and Future Prospects, *Paul T. Schultz;* Population, Production, and Consumption, *William C. Clark*
Session II: Production of Goods and Services: Towards a Sustainable Future, *Robert Ayers;* The Environmental Impact of Production on Regions of the World: Distribution Issues in Human Settlement, *Michaela Smith;* Biological Diversity and the Changing Resource Base, *Thomas Lovejoy;* Technological Change and Global Change, *Alan Porter;* Fields, Fisheries, Grasslands, and Forests: Towards More Regenerative Systems, *Kenneth Dahlberg*
Session III: Population Tectonics of Energy Consumption, *Barbara Boyle Torrey;* How Much Is Enough: Consumption and Overconsumption, *Alan Durning;* The Political Economics of Environmental Problems and Policies, *Allan Schnaiberg;* The Effects of Global Change on Meeting Future Food Needs, *Robert Chen*
Session IV: Economic Values for a Sustainable Future, *Peter Soderbaum;* Cultural Factors and Attitudes Towards Global Change, *Lourdes Arzipe;* Postmaterialism and Environmentalism: Persistence and Change, *Ronald Inglehart;* Value and Attitude Change: Evidence from Eastern Europe and the Soviet Union, *Ronald Hinckley;* Unnatural Selection: Industrial Values and the Future of Modernization, *Dennis Pirages*
Session V: Intergovernmental Institutions, *Peter Haas;* International Nongovernmental Institutions, *Helen Ingram;* National, State, and Local Institutions, *Chad Alger;* International Collaboration in Science and Symbol, Myth, and Substance, *Harold Jacobson, Roberta Balstad Miller;* International Scientific Organizations, *Mary Martha Treichel*
Session VI: Implications for Science and Technology Policy, *Robert W. Corell;* Implications for the Educational System, *Allan Mazur;* Implications for Interdisciplinary Research Agendas, *Nazli Choucri;* Implications for Linking Science to Policy, *Richard H. Moss;* Developing Long-term Local, National, and International Policy Goals and Strategies for a Sustainable Planet, *Dan Tunstall, Janet Welsh Brown.* Organized by: *Elizabeth J. Kirk, Thomas Malone*

Science in Africa: Achievements and Prospects (Fri/am-pm)

Session I: Three Decades of Science: Quantum Achievements and the Context for Future Advances, *Thomas R. Odhiambo;* The Potential of Endod, the Ethiopian Soapberry Plant, for Control of Schistosomiasis, *Aklilu Lemma;* Understanding Hemoglobins and Sickle Cell Disease in the Progress Towards Therapy, *Gabriel B. Ogunmola;* The *Anopheles gambiae* Complex in West Africa, *Yeya Ttiemoko Toure*
Session II: Agricultural Research for Sustainable Development in Africa: Building Institutional and Technological Capacity, *Bede N. Okigbo;* Con-

servation and Utilization of Crop Genetic Resources: An Ethiopian Perspective, *Melaku Worede;* Nuclear Techniques and Solar Energy for the Development of Sub-Saharan Countries, *Malu wa Kalenga;* Panel Discussion on Science and Technology in Africa: Policy Strategies for Continued Success, *Yeya Ttiemoko Toure, Thomas R. Odhiambo, Lydia P. Makhubu, C.J. Chetsanga, Bede N. Okigbo.* Organized by: *Amy Auerbacher Wilson*

Science, Technology, and Third World Economic Security (Sat/am-pm)

Session I: Science and Technology for Development, *Frank Press;* The Role of the World Bank, *David Hopper;* The Role of U.S. AID, *Nyle Brady;* The Role of Private Foundations, *Ken Pruitt*
Session II: What the North Can Do for the South, *Abdus Salam;* The Third World Perspective, *Cyril Ponnamperuma;* The African Perspective, *Thomas Odhiambo;* The Asian Perspective, *M. G. K. Menon;* The Latin American Perspective, *Francisco Sagusti;* The Far Eastern Perspective, *Kim Yong Ki.* Organized by: *Cyril Ponnamperuma*

What Are the Effects of Human Activity on the Global Ecosystem? (Fri/pm)

Global Climate Change: Ecosystem Effects, *Stephen H. Schneider;* Nonlinear Dynamics and Chaos: Implications for a Brave New World, *William M. Schaffer;* Catastrophe or Maturity in Century 21? *Kenneth E. Boulding;* Description and Diagnosis of a Planetary Ecopathological Process, *Warren M. Hern.* Discussants: *Tim Wirth, Priscilla Reining.* Organized by: *Warren M. Hern, Priscilla Reining*

The Resourceful Species: The State and Trends of the Human Enterprise (Mon/pm)

Speakers and topics to be announced. Organized by: *Julian L. Simon*

Environment

The Role and Responsibilities of Scientists and Engineers in Environmental Debates (Mon/pm)

Balancing Professional Integrity and Public Advocacy in Environmental Debates, *Phil Regal;* Ethics, Responsibility, and Environmental Scientists and Engineers, *Mark Sagoff;* Speaking Truth to Power: Communicating Environmental Risks to the Public, *Ellen K. Silbergeld;* Government Scientists and Engineers in Environmental Disputes, *Howard G. Wilshire;* From an Engineer's Perspective, *Jerome B. Gilbert.* Organized by: *Amy Crumpton, Sheldon Krimsky*

Science: A Basis for Environmental Policy? (Mon/am)

Science Base for Global Warming, *Patrick Michaels;* Science Base for Acid Precipitation, *James R. Mahoney;* Stratospheric Ozone: Time Trends and Mechanisms, *S. Fred Singer;* New Controls for Urban Ozone: The Role of Science in the Congressional Debates, *Robert M. Friedman;* Health Benefits of Air Toxics Legislation, *John D. Graham;* Economics and the Regulation of Environmental Risks, *Paul Portnoy.* Organized by: *S. Fred Singer*

Is Superfund Working? (Tue/am)

Superfund: Environmental Progress? *Henry L. Longest II;* Using Improved Technologies for Superfund Cleanups Remains a Critical Need, *Joel S. Hirschhorn;* Improving Superfund Through the Remedy Selection Process, *Thomas P. Grumbly;* Environmental Protection, Resource Allocation, and CERCLA: A Practitioner's Perspective, *Richard B. Weiss, Marvin Feldman, William F. Isherwood.* Organized by: *William F. Isherwood*

Assessing the Impacts of Nuclear Waste Facilities: The State of the Art Updated (Sat/pm)

Overview: The Social Amplification Process, *Roger E. Kasperson;* The Importance of Imagery as a Causal Factor, *Paul Slovic;* Political Trust and the Siting of Nuclear Waste Facilities, *K. David Pijawka;* Economic Impacts of a Nuclear Waste Facility, *Howard Kunreuther;* Social and Cultural Impacts of a Nuclear Waste Facility, *Joanne Nigg.* Discussants: *Kai Erickson, Richard Stoffle.* Organized by: *Roger E. Kasperson*

Cleaning Up the Mess at the DOE Nuclear Weapons Complex (Sat/am)

Cleaning Up the Weapons Mess: OTA Findings, *Emilia L. Govan;* The DOE Weapons Complex Cleanup: Evaluation of Health Impacts, *Tara O'Toole;* Citizen Participation in DOE Weapons Cleanup, *Daniel W. Reicher;* Public Health Assessments: Progress and Prospects, *Mark M. Bashor.* Organized by: *Peter A. Johnson, Robert P. Morgan*

Technical Sessions:

Meta-analysis and Risk Assessment: A Tool for the '90s? *(Fri/pm).* Concepts, case studies, applications, policy decisions. *Ingram Olkin, Michael E. Ginevan, Resha M. Putzrath, A. Judson Wells, Kay T. Kimball, Edward P. Washburn, William J. Nicholson*

Proof of Environmental and Natural Resource Damages in Litigation *(Sun/pm).* Legal perspective, cleanup and community disruption, economic assessment. *Bert Black, Linda S. Wennerberg, V. Kerry Smith, Alan Randall, Ron Simon, Steve C. Gold, Sherry Bragg, Daniel A. Bronstein*

Popular Science

Chemistry Is Fun! (Mon/am)

Chemistry Is Fun! *Bassam Z. Shakhashiri; Ethel Schultz; Lois Nicholson.* Organized by: *Jean'ne M. Shreeve*

Science for the Naked Eye; or, The Physics of Everyday Experience, XVIII (Sun/am-pm)

Session I: A Collection of Simple Physics Demonstrations, *Robert Ehrlich;* The Bird's Eye View, *Jerry A. Waldvogel;* Movement and New Forms in Photography: Documentation and Measurement, *Phillip Leonian*
Session II: Mozart's Starling, *Meredith J. West;* Art and the Computer, *Donna Cox;* Lightning and How to Avoid It, *Charles B. Moore.* Organized by: *Rolf M. Sinclair*

Science, Technology, Intelligence, and Espionage (Mon/am)

Spying from Space, *William E. Burrows;* Intelligence and the Private Sector, *Kerry Grawe;* Computer Espionage, *Clifford Stoll;* Periscopes to Perestroika: An Eastern Bloc View of Intelligence *(speaker's name withheld).* Discussants: *Jill H. Pace.* Organized by: *Albert H. Teich, Donald N. Langenberg, Jill H. Pace*

Life Sciences & Technology

General Life Sciences & Technology

Consciousness in Life (Mon/pm)

Are Whale Songs Evidence of Consciousness? *Roger Payne;* Bacterial Consciousness, *Lynn Margulis;* Neuropeptides and Their Receptors in the Central Nervous, Endocrine, and Immune Systems: A Psychosomatic Network, *Candace Pert;* Inherited Memories and Learned Beliefs, *Peter F. Allport;* Sensory Processing in Simple Nervous Systems, *R.K. Murphey.* Organized by: *Roger Payne, Lynn Margulis*

Molecular & Cellular Biology

The Revolution in Developmental Biology (Fri/pm; Sat/am)

Session I: *Xenopus, Igor Dawid; Caenorhabditis, Andrew Fire;* Transgenic Mouse, *Oliver Smithies;* Transgenic Mouse, *Heiner Westphal*
Session II: *Dictyostelium, Alan Kimmel; Arabidopsis, Gerald Fink; Drosophila, Michael Levine; Drosophila, James Kennison.* Organized by: *Arthur S. Levine, Igor Dawid, Heiner Westphal*

New Perspectives on Cellular Signaling (Sat/pm)

Signaling Systems for Inducible Plant Defense Genes, *Clarence A. Ryan;* Chemical Signaling Through Cell-to-Cell Junctions: Lessons from a Primitive Organism, *Kathleen Dunlap;* Chemosensory Receptors and Signal Transducers Controlling Settlement and Metamorphosis in Planktonic Abalone Larvae, *Daniel E. Morse;* Calcium Signals and Cellular Clocks Control Cell Division, *Robert B. Silver.* Organized by: *Maryanna Henkart*

Technical Sessions:

New Interactions Between Topology and Science *(Mon/pm).* DNA topology, knots, catenanes, quantum fields, structure proofs. *Sylvia J. Spengler, De Witt L. Sumners, Jonathan L. Simon, Stuart G. Whittington, Louis H. Kauffman*

National and International Efforts in Plant Genome Mapping *(Tue/am).* Gene sequencing, networks. *David R. MacKenzie, Jerome Miksche, Bruno Quebedeaux, Machi F. Dilworth, Scott Tingey, B.S. Gill, Ed Coe, Jr., R. A. Nilan, Tim Helentjaris*

Medical Sciences

New Molecular Insights into "Old" Genetic Disorders (Sun/pm)

Neurofibromatosis, *Francis S. Collins;* Cystic Fibrosis, *Garry R. Cutting;* Hemophilia, *Haig H. Kazazian, Jr.;* Marfan Syndrome, *Reed E. Pyeritzakis.* Organized by: *Victor A. McKusick*

Gene Therapy: Scientific Prospects and Societal Implications (Mon/pm)

The ADA Human Gene Therapy Clinical Protocol, *R. Michael Blaese;* Gene Therapy for Cancer, *Steven A. Rosenberg;* Potential Applications of Human Gene Therapy, *W. French Anderson;* Ethical and Societal Implications of Human Gene Therapy, *LeRoy Walters;* Implications of Human Genetic Manipulation, *Andrew Kimbrell.* Organized by: *W. French Anderson*

Molecular Determinants of Human Cancers (Fri/pm)

The Cancer Cell Phenotype, *Donald S. Coffey;* DNA Methylation and Malignant Transformation, *Stephen B. Baylin;* Altered Growth Factor Signaling Pathways in Human Cancer Cells, *Stuart A. Aaronson;* The Molecular Genetics of Bowel Cancers, Bert Vogelstein. Organized by: *Albert H. Owens, Jr.*

The Aging and Cancer Interface: Multidimensional Research Perspectives (Sun/am)

Cancer in the Aged: An Epidemiologic Overview, *Rosemary Yancik*; Senescence and Neoplasia: Two Sides of the Same Cellular Coin, *Vincent Cristofalo*; Geriatric Oncology: Early Detection and Diagnosis, *Harvey Cohen*; Cancer in the Elderly: To Treat or Not to Treat? *Paul Carbone.* Discussants: *T. Franklin Williams,* Jerome Yates. Organized by: *Rosemary Yancik*

The Progesterone Antagonist RU-486: Science and Science Policy (Sat/am-pm)

Session I: The Progesterone Receptor and Its Molecular Actions, *Bert W. O'Malley;* RU-486: The French Experience, *Andre Ullmann;* Abortion in the United States, *Jacqueline Darroch Forrest;* Antiprogesterone Drugs: Ethical and Legal Issues, *Rebecca J. Cook*
Session II: Antiprogestins: Probability of Multiple Indications in Reproductive Medicine, *Gary D. Hodgen;* RU-486: Antiglucocorticoid Research, *M. Gaillard-Moguilewsky;* RU-486: Anticancer Activity, *H. H. Sedlacek;* RU-486 and U.S. Science Policy, *Cory Richards.* Organized by: *Sheldon J. Segal*

Prospects for Immunocontraception (Fri/pm)

Molecular Genetics of the Mouse and Human Zona Pellucida Genes: Strategies for Immunocontraception, *Jurrien Dean;* Epitope Mapping of the Zona Pellucida Protein Antigens for Human Contraceptive Vaccine Development, *Bonnie S. Dunbar;* Sperm Surface Proteins as Antigens for a Birth Control Vaccine That Blocks Sperm Function, *Paul Primakoff;* Contraceptive Vaccine Candidate SP-10 Associated with Human Sperm Acrosomal Membranes, *John C. Herr.* Organized by: *John C. Herr*

Development of Medications for the Treatment of Brain/Behavior Disorders (Tue/am)

History of Medication Development and Brain/Behavior Disorders, *Frederick K. Goodwin;* FDA's Interactive Role in the Review of Drugs for Treating Addictive Disorders, *Michael Klein*; Medication Development for Drug Addiction, *Charles O'Brien*; Current Approaches to Medication Development for Alcoholism, *Markku Linnoila*; Current Approaches to Medication Development for Mental Illness, *Donald S. Robinson.* Organized by: *Frank J. Vocci, Betty C. Tai*

The Control of Infectious Diseases: New Aspects of Vaccines (Fri/am)

Polio Eradication in the Western Hemisphere, *Ciro DeQuadros*; Control of Vaccine-preventable Diseases in the United States, *Walter Orenstein*; The National Vaccine Program, *Kenneth Bart*; New Approaches in Vaccine Development, *John La Montagne*; Prospects for an AIDS Vaccine, *Gordon Ada.* Organized by: *Donald A. Henderson*

Scientific and Statistical Inferences in Modeling Animal Research (Fri/am)

Animal Organisms as Individuals: Implications for Research, *Strachan Donnelley;* Interesting Errors Caused by the Use of Animal Models, *Leo Vroman;* Statistical Aspects of Animal Modeling Research, *William DuMouchel*; The Concept of "Alternatives" to the Use of Animals in Research: Slogan or Useful Tool? *Jerrold Tannenbaum*; Values and Conflicts in Living versus Nonliving Systems Research, *Marcia Coleman-Adebayo*

Health Care & Policy

Consequences of HIV/AIDS in Eastern Africa (Sat/pm)

HIV Transmission: The Solution Is Men, *Christine Obbo;* AIDS Control and History in Northwestern Tanzania, *Frederick J. Kaijage;* Mapping the Politics of AIDS: Illustrations from East Africa, *Goran Hyden;* Designing Appropriate Invervention Strategies in Southern Africa, *Subhash Hira, Peter H. Perine;* How Bad Will It Be? Modeling the Epidemic in Eastern Africa, *Peter O. Way;* The Impact of HIV/AIDS on the Mortality of Mothers and on Orphaned Children, *Linda A. Valleroy.* Discussant: *Francis P Conant.* Organized by: *Priscilla Reining*

AIDS: Scientific Research and Public Policy (Sat/am)

Speakers and topics to be announced. Organized by: *Andrew A. Sorensen*

Modeling the Geographic Diffusion of the AIDS Epidemic (Fri/pm)

Introduction: AIDS in Its Geographic Dimensions, *Peter R. Gould;* Geography's Role in the Decline of AIDS Cases Growth Rate, *Wilpen Gorr;* Expansion Modeling of the Spatial Spread of AIDS, *Emilio Casetti;* The Bronx Is Dying: Urban Burnout, Forced Migration, and AIDS, *Rodrick Wallace;* Predicting the Next Maps: Spatial Adaptive Filtering in Pennsylvania, *Joseph R. Kabel.* Organized by: *Peter R. Gould*

The Father and the Fetus: Facts and Fallacies (Sun/am)

Paternal Influence in Mid-19th- and Early 20th-Century Hereditarian Theories, *Joy Harvey;* Protecting Fetal Health Through Legal Constraints on the Behavior of Women, *Renee Landers;* Toxicants That Affect Sperm Cell Function May Have Fetal Consequences, *Leonard Nelson;* The Effects of Paternal Exposure to Xenobiotics on Subsequent Progeny, *Gladys Friedler.* Organized by: *Gladys Friedler*

Challenges to Dentistry for the '90s (Mon/am)

Manpower Needs for the '90s and Beyond, *Richard R. Ranney;* Fluoride: A Reassessment, *Preston A. Littleton, Jr.;* Dry Mouth: An Aging Problem, *Lawrence A. Tabak;* Caries: Another Extinct Disease? *William H. Bowen;* Mercury Amalgams: Where Are We? *Thomas W. Clarkson.* Organized by: *William H. Bowen*

Technical Sessions:

Balance and "Dizziness": Assessment and Rehabilitation *(Tue/am).* Postural control, oculomotor control, balance physiology, basic science and clinical implications. *Lewis Nashner, Neil T. Shepard, Charles Stockwell, Joseph M. R. Furman, Robert G. Turner*

Firearm Injury Prevention: Scientific and Public Policy Directions *(Tue/pm).* Regulation, homicide rates. *Garen Wintemute, Arthur Kellerman, Fred Rivara, Colin Loftin, Steve Teret, James A. Mercy*

Improving Drug Development and Regulation via Pharmacokinetic/Pharmacodynamic Procedures *(Mon/pm).* Pharmacokinetic and pharmacodynamic modeling, regulatory research, therapeutics. *Carl C. Peck, Robert E. Desjardins, Louis Sheiner, John G. Harter, Meyer Katzper*

Agriculture

Economically Useful Plants for Developing Countries: From Research to Market (Fri/am)

New and Effective Compounds from Tropical Plants, *James A. Duke;* Bioassays as Guide to Fractionation of Natural Products Extracts, *Jack R. Plimmer;* "Bench-Top" Bioassays for the Discovery of Bioactive Natural Products, *Jerry L. McLaughlin;* Simple Bioassay-directed Fractionation Applied to African Medicinal Plants: Antimicrobial Agents, *Lester A. Mitscher;* Industrial Utilization of Natural Products and Wastes Through Chemistry, *James P. Kutney.* Organized by: *Barbara N. Timmermann, Robert H. Maybury*

Advancing Biotechnology: International Issues Regarding Biosafety Policy and Practice (Sat/am-pm)

Session I: International Collaborative Research Programs in Biotechnology and Biosafety, *Joel T. Cohen, Kerri Ann Jones;* Domestic and International Regulatory Responsibilities of USDA: Global Harmonization, *Terry L. Medley;* African Perspective on International Issues Regarding Biosafety Policy and Practice, *Thomas R. Odhiambo;* A Commercial Perspective on Technology Advancement, *Roger Salquist;* Collaborative Vaccine Development for Thailand: Transfer of Technology and Biosafety Issues, *Chariya R. Brockelman*

Session II: Biotechnology and Biosafety at International Agricultural Research Centers, *Richard L. Sawyer;* USDA Guidelines: An Approach for Evaluating Risks of Field Tests and Commercial Releases, *Alvin L. Young;* EPA Regulation of Biotechnology: Domestic Responsibilities and International Perspective, *Elizabeth Milewski;* Environmental Perspective on International Regulation of Genetically Engineered Organisms, *Margaret G. Mellon;* International Biosafety Arrangements, *John Barton.* Organized by: *Joel I. Cohen, Judith A. Chambers, Marshall Phillips, Robert F. Barnes*

Biological and Biotechnological Alternatives to Chemical Insecticides (Sun/am-pm)

Session I: Classical Biological Control: Successful Examples and Perspectives, *James R. Nechols;* Emerging Technologies with Predators and Parasites in Biological Control, *Marjorie Hoy;* Uses and Limitations of Conventional Microbial Insecticides, *Robert R. Granados;* Recombinant Microbial Insecticides: Actual and Potential, *Brian Federici;* Transgenic Insecticidal Crops, *David Fischhoff*

Session II: Microbial Insecticides: Making Promises Match Reality, *Ruedi B. Sandmeier;* Commercial Criteria for Biopesticide Development, *Wendy Gelernter;* Impact of Regulatory Policy on Innovation in Biological Control, *Charles Benbrook;* U.S. EPA Policy: Promoting or Impeding Change? *Anne Lindsay;* University Extension: Changing Pest Management Education, *Richard Weinzierl.* Organized by: *Brian Federici, Richard Weinzierl, Ron Arp*

Pest Resistance to Control Tactics: Impact on Sustainable Pest Management (Fri/pm)

Resistance and Its Management in IPM Systems, *Mark E. Whalon;* Impact of Pest Resistance to Pesticides on the Agricultural Chemical Industry, *Homer M. LeBaron;* Potential for Pest Resistance to Genetically Engineered Plants and Microbes, *Fred L. Gould;* Resistance Management Through Multisectoral Cooperation, *Diana M. Horne;* Resistance Management and Agricultural Policy, *William A. Stiles, Jr.* Organized by: *Robert M. Hollingworth, Mark E. Whalon*

Technical Sessions:

The Economic Potential for Aquaculture in the United States *(Sat/am).* Clams, shrimp, salmon, catfish, bass. *Charles M. Adams, Kenneth J. Roberts, James L. Anderson, Douglas W. Lipton, Henry W. Kinnucan, Ivar Strand, Curtis L. Marshall, Morton M. Miller*

Knowledge-based Systems in Agriculture: A Developmental Perspective *(Fri/pm).* Expert systems, productivity enhancement. *Adel El-Beltagy, Ahmed Rafea, P. K. Nair, Merrill Warkentin, Stephen R. Ruth*

Bovine Somatotropin: Biotechnology Product and Social Issues in the U. S. Dairy Industry *(Tue/pm).* Safety, regulatory approval, social and ethical issues. *Dale Bauman, Greg C. Guyer, James W. Lauderdale, Richard Fallert, Frederic Halbert, Jeffrey Burkhardt, Joseph J. Molnar, Robert G. Zimbelman*

Value-added Products from Agriculture *(Sun/am).* Fermentation, process innovations, fibers, foods, Hendricks award. *Arthur I. Morgan, Andrew G. Jordan, William M. Doane, Timothy L. Mounts, Gerhard Maerker, Frank C. Greene, James C. Craig, Jr., Arthur E. Humphrey, Ruxton H. Villet, William H. Tallent*

Ecology; Evolution

Inheritance of Acquired Characteristics: Evolutionary Origins of New Significant Traits (Sat/pm)

Bacterial Horizontal Gene Transfer, *Ricardo Guerrero;* Symbiosis and Sex: Acquisition of Partners, *Lynn Margulis;* Frequency of Spontaneous Transfer of Plasmids from *E. coli* to Mammalian Cells Cultured Under Various Conditions, *Juan López-Pila;* Kinetosomal Inheritance, *Michael Adams;* Environmentally Induced Heritable Changes in Flax, *Christopher A. Cullis.* Organized by: *David G. Bermudes, Ricardo Guerrero*

Defining Ecosystem Health: Science, Economics, or Ethics? (Fri/am-pm)

Session I: Aldo Leopold's Concept of Land Health, *J. Baird Callicott;* Environmentalists and Economists and Philosophers and Biologists, *Talbot Page;* Ecosystem Health/Integrity as Applied in the Great Lakes Basin, *Henry A. Regier;* Environmental Integrity: A Positive or Privative Concept? *Mark A. Sagoff;* Ecological Health: Problems of Scale and Context, *Bryan G. Norton*

Session II: Ecosystem Health and Ecological Theories, *David Ehrenfeld;* Trophic Flow Networks as Indicators of Ecosystem Health, *Robert E. Ulanowicz;* Fauna and Flora: Necessary Definitions of Ecosystem Health, *Larry D. Harris;* Alternative Models of Ecosystem Restoration, *Susan P. Bratton;* Toward an Operational Definition of Ecosystem Health, *Robert Costanza.* Organized by: *Bryan G. Norton*

Strategic Approaches to Conserving Genetic Resources in Natural Habitats (Mon/am)

Strategies for Plant Conservation Worldwide, *Peter H. Raven;* Managing Wild Biodiversity Resources for Economic Development in Costa Rica, *Daniel Janzen;* Diversity and Economic Enrichment in Managed Forests of Kalimantan and Amazonia, *Christine Padoch;* Development Strategies for African Forest and Primate Conservation, *William Weber;* Biological Diversity and Conservation of Ancient Forests of the Pacific Northwest, *David Wilcove.* Organized by: *Joel I. Cohen, Christopher S. Potter*

Nonrandom Evolution: Matter, Life, Mind (Tue/am)

Cosmological Conditions Necessary for Biology, *John D. Barrow;* Nonrandom Protein in Prelife-to-Life Transition, *Sidney Fox;* Studies on the Origin of the Genetic Code, *Cyril Ponnamperuma;* Biological Form and Organization in Evolution, *Mae-Wan Ho;* Determination of Human Psychological Traits: Convergent or Divergent Processes? *Thomas J. Bouchard, Jr.* Organized by: *Sidney Fox*

Seeds Since Columbus: Crop Germplasm of the Americas (Sun/pm)

Crop Migration Between the Old and New Worlds, *Hugh L. Popenoe;* American Crops That Didn't Make the Columbian Interchange, *Calvin R. Sperling;* The Spice Trade Before and After Columbus, *James A. Duke;* "Difficult" Seeds: Perspective on Their Conservation, with Special Reference to the Palm Family, *Dennis V. Johnson;* Conservation of Useful Crop Diversity: What Has to Be Done? *Trevor J. Williams.* Organized by: *Douglas H. Boucher*

Stakes in the Tropical Forests (Sat/am-pm)

Session I: Tropical Forests and the Global Carbon Cycle, *Richard A. Houghton;* Atmospheric Chemistry, *Peter S. Bakwin;* Climatic Impacts of Amazon Deforestration, *Jagadish Shukla;* Soil Types and Productivity, *Pedro A. Sanchez;* Bio-hydrological Coupling, *Helmut Elsenbeer*
Session II: The Urgent Transition to Sustainability: Policy Options, *Robert Goodland;* Tropical Forest Economics, *Jan K. Lewandrowski;* Nonwood Forest Products, *Robert O. Mendelsohn;* Debt-for-Nature Swaps, *Thomas E. Lovejoy;* Making Development and Conservation Compatible, *Brian M. Boom.* Organized by: *Robert L. Randall*

Science and Management of Large Marine Ecosystems (Mon/am-pm)

Session I: Biomass Yields and Management of LMEs, *William W. Fox, Jr.;* The Science and Management of the Antarctic Ecosystem, *R. Tucker Scully;* Legal Mandates for the Management of LMEs, *Martin H. Belsky;* A Regional Geographic Strategy for LMEs, *Lewis M. Alexander;* The Utility of the LME Concept to Ocean Management, *Robert W. Knecht*
Session II: Global Ecosystem Dynamics and LMEs, *Brian J. Rothschild;* The Ecological Basis for the Management of Living Marine Resources in LMEs of Western European Seas, *K. Vagn Hansen;* Research and Management in the Northern California Current Ecosystem, *Daniel L. Bottom;* Management of Insular Pacific LMEs, *Joseph R. Morgan;* The Ecological Basis for the Management of Living Marine Resources of the Northwest Atlantic Continental Shelf Ecosystem, *Kenneth Sherman.* Organized by: *Kenneth Sherman, Lewis M. Alexander, Barry D. Gold*

Technical Sessions:

Policy Issues in Coastal Zone Management *(Tue/pm).* Estuaries, economics, land use. *Donald F. Boesch, R. Scott Farrow, Rita R. Colwell, Leonard A. Shabman, Wallace E. Oates, James R. Kahn, Robert Costanza, George R. Parsons, Leon E. Taylor, John H. Cumberland*

Ecosystem Perspectives of Multiple-use Management *(Tue/am).* Forest ecosystems, biodiversity, balancing competing objectives. *Hal Salwasser, Frederick J. Swanson, James R. Gosz, James W. Hornbeck, Rebecca R. Sharitz, Wayne T. Swank, David H. Van Lear*

Tropical Biology: Historical Perspectives and Contemporary Issues *(Sun/am).* European and North American attitudes, early 19th to late 20th century. *Michael Osborne, George Angehr, David Frodin, Joel Hagen, Donald Stone*

Advances in Zoo Biology and Conservation *(Mon/pm).* Reproduction, reintroduction, species survival plans. *Michael Hutchins, Elizabeth Franke Stevens, Richard J. Montali, Nancy Czekala, Benjamin B. Beck, Lou Ann Dietz*

Biomedical Ethics

Alternative Approaches to Clinical Trials in AIDS: Ethics and Methodology (Sun/am-pm)

Session I: Controlled Trials and Expanded Access: Can We Do Both? *Ellen C. Cooper;* Developing New Approaches to Clinical Trials in AIDS, *Susan S. Ellenberg;* Design Options for AIDS Trials, *David P. Byar;* Large, Simple Trials: An Unexploited Opportunity, *Paul Meier;* Community Consultation in Clinical Trials, *Robert J. Levine*
Session II: How AIDS Will Change the Way We Test Drugs, *Jim Eigo;* Mechanisms for Incorporating Community Input into Trial Design, *Rebecca Smith;* An Ethical Assessment of Clinical Trials of AIDS Treatments, *James F. Childress;* Patient Demands, Therapeutic Obligations, and Clinical Trials, *Loretta M. Kopelman.* Discussant: *Samuel Bozette.* Organized by: *Kenneth F. Schaffner*

Ethical and Clinical Issues in Carrier Screening for Cystic Fibrosis (Mon/pm)

History and Lessons from Carrier Screening Programs, *Robert F. Murray;* Test Validity: Technical, Ethical, and Regulatory Issues, *Neil A. Holtzman;* Informed Consent and Decisions About Reproduction, *Jeffrey R. Botkin;* A Parent's Perspective on CF, *Gayle Greenberg;* CF, Ethics, and the New Genetics, *Thomas H. Murray.* Organized by: *Jeffrey R. Botkin, Deborah Runkle*

DNA-based Identification Systems: Issues in Application (Fri/am)

Statistical Problems in DNA-based Identification Systems, *Donald A. Berry;* The FBI Program in DNA-based Identification, *Bruce Budowle;* Legal Issues in the Use of DNA-based Identification Systems, *Marjorie M. Shultz;* The Public Policy Response to DNA-based Identification Systems, *Jeroo S. Kotval;* The Impact of DNA-based Identification Systems on Civil Liberties, *Philip L. Bereano.* Organized by: *Paul Billings, Nachama Wilker*

Scientists' Responsibilities When Research Is Socially Sensitive and Liable to Misinterpretation (Mon/am)

Medical Journal Editors and the Public's Right to Know, *Marcia Angell;* Scientists' Responsibilities When Information of Potential Societal Significance Is Uncertain, *Dale Hattis;* Scientific Responsibility and Public Concern About Risk, *Roger Kasperson;* Responsible Risk Assessment, *Donald Millar.* Organized by: *Caroline Whitbeck*

International Aspects of Ethical and Social Issues in Human Genome Research (Tue/pm)

Role of HUGO, *James Wyngaarden;* International Aspects of Genome Research: Ethical/Social Issues, *Thomas M. Murray;* Participation of Small Countries in the Human Genome Project, *Vaclay Paces;* State of the Debate in Japan, *Rihito Kimura.* Discussants: *Victor A. McKusick, Eric Juengst, Diane Hinton.* Organized by: *Robert Mullan Cook-Deegan, Daniel Wikler*

Psychology; Neurobehavior

Reassessing Freud and Psychoanalysis (Mon/am)

The Dreaming Brain: Reassessing Freud's Model of the Mind, *J. Allan Hobson;* Reassessing Freud's Case Histories: The Social Construction of Psychoanalysis, *Frank J. Sulloway;* The Psychoanalytic Enterprise in Scientific Perspective, *Adolf* Grünbaum; The Nature of Theory Change in Psychoanalysis, *Morris Eagle;* Unconscious Person Schemas and Control Processes, *Mardi J. Horowitz.* Organized by: *Frank J. Sulloway*

A Critical Examination of the Concept of Critical Periods (Sat/pm)

The Critical Period Concept: A Probabilistic Epigenetic Phenomenon, *Gilbert Gottlieb;* Visual and Auditory Sensitive Periods: A Search for Lessons, *Richard D. Walk;* Constraints and Development, *Susan C. Oyama;* Sensitive for What? *Gerald Turkewitz.* Discussant: *Michael Studdert-Kennedy.* Organized by: *Thomas J. Tighe, Barbara Lust, Bert Moore*

Critical Periods in Second Language Acquisition (Sat/am)

Brain Bases for Possible Critical Periods, *Lorraine K. Obler;* The Effects of Delayed Language Acquisition on Acquisition of Grammar and Cerebral Organization, *Susan Curtiss;* How Critical Is Age in Second Language Acquisition? *Suzanne Flynn, Gita Martohardjono;* Critical Periods in First and Second Language Learning: Evidence and Models of the Effect of Maturation on Language Acquisition, *Elissa L. Newport.* Discussant: *Lila Gleitman.* Organized by: *Suzanne Flynn, Barbara Lust*

Current Conceptions of Intelligence (Sun/pm)

From Intelligence to Intelligences and Beyond, *Howard Gardner;* Beyond IQ: A Triarchic Theory of Human Intelligence, *Robert J. Sternberg;* Identical Twins Reared Apart: What They Reveal About Human Intelligence, *Thomas J. Bouchard, Jr.;* General Mental Ability: From Psychometrics to Biology, *Arthur R. Jensen;* Current Theories from a System Perspective, *Douglas K. Detterman.* Organized by: *Thomas J. Tighe, Bert Moore*

Cognitive Aging Among Intellectually Able Individuals: Patterns, Precursors, and Implications (Fri/am)

Overview, *Douglas H. Powell;* Quantitative Patterns of Normative and Superior Aging, *Dean K. Whitla;* Patterns of Cognitive Change with Aging in Physicians: Computerized Assessment, *Sandra Weintraub;* Patterns of Cognitive Aging Among Superior Septuagenerians, *Edwin R. Shneidman;* Biopsychosocial Approaches to Physical and Cognitive Vigor in the Aging, *Carl Eisdorfer.* Discussant: *David R. Challoner.* Organized by: *D. H. Powell*

Cults and the Courts: Use of "Brainwashing" Theory by Expert Witnesses (Sun/am)

Voluntary Motives Versus Involuntary Causes: Conflicting Interpretations of Research on Cults and Communist Thought Reform, *Dick Anthony;* The Scientific and Popular Status of Brainwashing, *Perry London;* Social Scientists, the Law, and Expert Testimony, *James T. Richardson;* Methodological Issues in the Scientific Investigation of the Brainwashing Conjecture, *Benjamin Zablocki;* Pathways to Krishna: Conversion, "Brainwashing," and the Ethical Uses of a Cult Researcher's Insider Information, *Larry D. Shinn.* Organized by: *William H. Swatos, Jr., David G. Bromley*

Fragrance Research: Effects of Fragrances on Behavior, Mood, and Physiology (Tue/am)

Development of Olfactory Perception in Infancy and Early Childhood, *Hilary J. Schmidt;* Effects of Fragrances on Performance and Mood in a Sustained-attention Task, *William N. Dember;* Effects of Fragrances on Sustained Attention and Visual-evoked Potentials, *Raja Parasuraman;* Fragrance as a Source of Environmentally Induced Positive Affect: Effects on Negotiation, Conflict, and Motivation, *Robert A. Baron;* Social Behavior and Fragrance Use, *John B. Nezlek.* Organized by: *William N. Dember*

Evolution of Cognitive Functions in Ecological-Cultural Context (Mon/pm)

Can Natural Selection Yield Universal Principles of Mind? *Roger N. Shepard;* Evolutionary Psychology of Social Exchange, *Leda Cosmides;* Logic of Threat: Evidence for Another Cognitive Adaptation? *John Tooby;* Natural Language and Natural Selection, *Paul Bloom.* Organized by: *A.A. Pontius*

Technical Session:

Cognitive Equilibrium *(Tue/pm).* Decision theory, artificial intelligence. *Benjamin J. Broome, Alexander N. Christakis, John N. Warfield, Milan Zeleny*

General Meeting Information

Location: Sessions will be held in the Sheraton Washington and Omni Shoreham hotels, located across the street from each other. The Dupont Plaza Hotel, one Metrorail stop from the Sheraton and Shoreham, is used for guest accommodations only. The Exhibition and the *SB&F* Science Film Festival will be in the Sheraton.

Housing: Reduced-rate guest rooms are available at the Sheraton, Shoreham, and Dupont Plaza, if you call the "800" number for the AAAS Housing Bureau before 15 January. (See page 1436.)

Registration: AAAS offers reduced advance registration fees if you use the form on page 1436 and return it to the address shown before 11 January. Fees will be higher after that date. Your registration badge and a voucher for the program and other materials will be mailed in mid-January. The voucher can be redeemed at the AAAS registration desk (Atrium, Sheraton Washington Hotel) during the following times: Thursday (14 February), 10:00 am to 8:00 pm; Friday–Monday (15–18 February), 7:30 am to 5:30 pm; and Tuesday (19 February), 8:00 am to noon. Refunds for advance registration cancellations must be requested by letter, telegram, or FAX (202-289-4021) and received no later than 5 February 1991.

Transportation: **Discounted air fares** are available on United and Delta; for details, see page 1442. **Ground transportation: From Washington Dulles International,** "Washington Flyer" coaches run every 30 minutes and stop at both the Sheraton Washington and Omni Shoreham hotels. Fare: $12, one way; $22 round trip. Taxi: $35–$40. **From Washington National,** take Metrorail Blue Line to Metro Center, transfer to Red Line (to Grosvenor or Shady Grove), and get off at Dupont Circle station for Dupont Plaza Hotel, or at Woodley Park–Zoo station for Sheraton or Shoreham hotels. Fare: $1.40 during rush hour; 85¢ at other times. Taxi: $10–$15. The **Metrorail and Metrobus** system operates throughout the Washington area; fares vary, depending on distance traveled. **Parking:** All-day rates (no in-and-out privileges) at Sheraton, $12 for self-parking and $14 for valet parking; at Shoreham, $9 for self-parking.

Other Services: **Child care:** The hotels' concierges can provide telephone numbers for licensed agencies. **Messages** may be posted at the Message Center, or called in during registration hours (202-328-2000, ask for the AAAS Message Center). AAAS will operate an **Employment Exchange** in which corporate and academic recruiters can review job applications and interview candidates. For information and application forms, call Jacquelyn Roberts, 202-326-6737. A **Resource Room for Disabled Registrants** will be available in the Sheraton (Lanai Room 144, 1st floor). If you require special services due to a disability, state your needs when you contact the AAAS Housing Bureau for guest room reservations, and on your advance registration form; or contact the AAAS Project on Science, Technology, and Disability, 202-326-6671 (TDD available).

Social Sciences & Science Policy

General Social Sciences & Policy

The Anthropology of Science and Scientists (Fri/pm; Sat/am-pm; Sun/am)

Session I: Conservation and Resource Management in Amazonia, *Dominique Irvine;* Medical Ethnobotany in Southern Mexico: An Example of Mayan Ethnoscience, *Brent Berlin;* Knowledge Construction Among James Bay Cree Hunters: Metaphors and Literal Understandings, *Colin Scott;* A Native System of Ocean Navigation in the Western Pacific, *Ward Goodenough;* Science and/as Everyday Practice, *Jean Lave*
Session II: The Prism of Heritability and the Sociology of Knowledge, *Troy Duster;* Gender and the Deconstruction of the Race Concept in the Sciences, *Leonard Lieberman;* Constructing Knowledge Across Social Worlds: The Case of DNA Sequence Data Bases in Molecular Biology, *Joan H. Fujimura;* Socialization of Scientific Discourse, *Elinor Ochs;* Immunology and the Immune System, *Emily Martin*
Session III: The Anthropology of Geography, *David R. Stoddart;* Psychiatric Discourse on Post-traumatic Stress Disorder, *Allan Young;* Political Structuring of the Institutions of Science, *Charles Schwartz;* The Culture of Science and the Regulation of Biotechnology, *Usher Fleising;* Rituals of Empowerment Among Nuclear Weapons Scientists, *Hugh Gusterson*
Session IV: The Role of Chaos in Creating Fishery Management Chaos, *M. Estellie Smith;* Conflicting Belief Systems of Scientists and Administrators in the Creation of a Covert Technological Surveillance System, *Charles Ziegler, David Jacobson;* Tinkering with/in Japan: The Practice of International Collaboration in High-Energy Physics at KEK, Tsukuba Science City, Japan, *Sharon Traweek;* Japanese and Western Approaches to Primatology: Limits Set to Questions, *Pamela J. Asquith;* Inuit Indigenous Knowledge and Science in the Arctic, *Ellen Bielawski.* Organized by: *Laura Nader*

Anthropology; Archaeology

Indigenous Peoples and the Rain Forest: Science, Marketing, and Human Rights (Fri/am-pm)

Session I: The Yanomami and Land Rights, *Alcida R. Ramos;* Satellite Images and Scientific Research as Tools to Assist Brazilian Rubber Tappers in Forest Management, *Foster Brown;* Can a "Green Consumer Democracy" Function in the Rain Forest? *Darrell A. Posey;* Diversity and Importance of Plants Useful to Indigenous Peoples in Amazonia, *Brian M. Boom;* Chemical Prospecting: Can It Pay Off for Conservation? *Thomas Eisner;* Kayapo Land Management, *Speaker to be announced*
Session II: Biodiversity in the Rain Forest: What Can Science Do? *Thomas E. Lovejoy;* Marketing Rain Forest Products, *Jason Clay;* Sustainable Extraction in Brazil, *Jose Lutzenberger;* Marketing Forest Products: The Indigenous Peoples' View, *Evaristo Nugkuag Ikanan;* Challenges for the 1990s: Tropical Forest Peoples, Conservation, and Pharmaceutical Discovery, *Steven R. King.* Organized by: *Janet Gruschow, Richard P. Claude*

Evolutionary Interrelationships Between Technology, Language, and Social Behavior (Sat/am)

Tools, Language, Social Behavior, and Information-processing Capacities, *Kathleen R. Gibson;* From Pan to Man: The Language Link, *Sue Savage-Rumbaugh;* The Development and Evolution of Hierarchically Organized Behavior, *Patricia Marks Greenfield;* Early Stone Technologies and Linguistic Cognitive Inference, *Nicholas Toth;* Tool Use, Sociality, and Intelligence in Human Cultures, *Tim Ingold.* Discussant: *William Calvin.* Organized by: *Kathleen R. Gibson, Tim Ingold*

The Evolution of Deception: A Biocultural Approach (Sat/pm)

Molecular Deception, *Ursula W. Goodenough;* Deception in Evolutionary Perspective, *Robert L. Trivers;* Deception in Primates, *Robert W. Sussman;* The Negotiation of Self-Realities: Psychic Shootout at the "I'm OK" Corral, *C. Richard Snyder.* Organized by: *Loyal D. Rue, Ursula W. Goodenough*

Ethnography of Drug Use in Traditional and Modern Societies (Mon/am-pm)

Session I: Use of Psychoactive Plants in Amerindian Civilization, *Wade E. Davis;* Marijuana, Pregnancy, and Child Health and Development in Jamaica, *Melanie C. Dreher;* Unintended Consequences of Crop Substitution Policy for Social Controls on Opium Use Among Highland Growers in Thailand, *Jacquetta Hill;* The Weakening of Alcohol Policy in a U.S. Industry: Company Versus Union, *Genevieve M. Ames*
Session II: A Vehicle for Long-denied Masculinity in the Inner City, *Tony L. Whitehead;* Why Do Addicts Share Needles? *Stephen K. Koester;* Managing Addictions in an Environment of Risk: Comparing Male and Female Injection Drug Users, *Theresa Mason;* Informal Economics of Drug Distribution in the Inner City: Ganja Versus Crack, *Ansley A. Hamid;* Panel discussion, previous speakers. Organized by: *Willett Kempton*

The Deterioration of Human Health in Economic and Political Development: From Ancient Egypt to 20th-Century United States (Sun/pm)

Introduction, *Anna C. Roosevelt;* The Impact of Political Change on Health and Nutrition of an Ancient Nubian Population, *Dennis P. Van Gerven;* Nutrition and Health Consequences of Prehistoric Economic and Political Centralization in North America, *Alan H. Goodman, George J. Armelagos;* Delocalization and Diets: Impacts in the Third World, *Gretel H. Pelto, Pertti J. Pelto;* The Health Crisis in Africa, *Samuel Ofosu-Amaah.* Discussant: *Anna C. Roosevelt.* Organized by: *Anna C. Roosevelt*

Technical Session:

Uses of Light Stable Isotopes in the Natural and Social Sciences *(Tue/am).* Paleoclimates, food webs, epidemiology, Greek and Roman marbles. *Larry L. Tieszen, Michael L. Bender, Richard C. Fairbanks, Peter D. Klein, John M. Hayes, Norman Herz, Nikolaas J. van der Merwe, Thure Cerling*

Demography; Political Science

Scientific and Technical Personnel: Issues for the 1990s (Fri/am-pm)

Session I: The Implications of Changing National Priorities, *Eli Ginzberg;* Age and Performance in Academe, *Pamela Ebert Flattau;* Managing Our Federal Science/Engineering Workforce, *Allan (Scottie) Campbell*
Session II: The Education and Human Resources Budget, *Luther Williams;* Retention/Attrition in the Educational Pipeline, *Sue Berryman;* Barriers to Careers: A Study of Female Science/Engineering Students, *Henry Etzkowitz;* The Role of HBCUs in Producing Black Scientists and Engineers, *William Trent.* Discussants: *Harvey Brooks, Paula Stephan, Darryl Chubin, Shirley Malcom, Cheryl Leggon, Linda Dix, Willie Pearson, Betty Vetter.* Organized by: *Alan Fechter*

The Social, Economic, and Distributional Consequences of the Rapidly Increasing Physician Supply (Sat/am)

Assessing the Adequacy of Physician Supply, *William D. Marder;* How Many Physicians Are Enough for Adequate Medical Care? *Alvin Tarlov;* Distributional Considerations Associated with Physician Supply, *Itzhak Jacoby;* Training Physicians for the 1990s and Beyond, *Paul Jolly;* Technology and Physician Manpower Projections: Past Practice and Future Directions, *Louis P. Garrison, Jr.;* A Skeptic Looks at the Physician Supply, *Eli Ginzberg.* Organized by: *Herbert Traxler, Jerald Katzoff*

Technical Sessions:

Science Policy for Women in Science: Lessons from Historical and Contemporary Case Studies *(Sun/am).* Gender and research productivity, NSF educational programs, scientific labor markets in developed and developing countries. *Judy Weis, Barbara B. Mandula, Mary Frank Fox, Beatriz Ruivo, Merle Waxman, Margrete S. Klein, Daryl E. Chubin, Patricia L. Devaney, Henry Etzkowitz, Pnina Geraldine Abir-Am*

Voting: Mathematical Foundations and Political Reality *(Mon/am).* Social choice, voting schemes, electric circuit analogies. *Alan D. Taylor, Samuel Merrill, III, William S. Zwicker, Jack Nagel, Steven J. Brams*

Supply and Demand for Scientists and Engineers in Emerging Markets *(Sat/pm).* Salary sensitivity, market projections. *Ronald Kutscher, Eileen L. Collins, Lawrence R. Forest, Judith I. Gill, Joe G. Baker*

Workshop:

Women of Science: Secrets of Success *(Tue/am).* Career paths, balancing with outside priorities. *Harriet H. Kagiwada, Ariel C. Hollinshead, Suzanne L. Phinney, Elizabeth Rodrigues, Elizabeth L. Anderson, Margaret M. Lobnitz*

Sociology

Drugs, Crime, and Violence: What Do We Know? *(Sun/am)*

Experimental Studies of Drugs and Aggression, *Stuart P. Taylor;* Human Laboratory Studies of Drugs and Aggressive Behavior, *Don R. Cherek;* Context and Contingency in Drug-related Violence, *Jeffrey Fagen;* Drug Use: Its Role in Predatory and Violent Offending, *Jacqueline Cohen;* Drugs and Violence: Clinical and Epidemiological Studies, *Kenneth Tardiff.* Organized by: *Paul J. Goldstein*

Violence and Youth: Research and Prevention Programs *(Sat/am)*

Predicting Teens' Violence Risk: A Developmental Taxonomy, *Terrie Moffitt;* Development of Violent and Assaultive Youth, *Robert B. Cairns, Beverley D. Cairns;* Developmental Epidemiology, Vulnerability, and Prevention Research on Early Risk Behaviors, *Sheppard G. Kellam;* Community-based Skills Development Program as a Preventive Strategy, *Dan R. Offord, M.B. Jones.* Organized by: *Felton J. Earls*

Family Violence: Etiology, Impact, and Prevention of Child Abuse *(Sat/pm)*

Risk Factors Associated with Child Abuse, *Roy C. Herrenkohl, Ellen C. Herrenkohl;* Effects of Physical Abuse on the Development of Young Children, *Byron E. Egeland;* Long-term Consequences of Early Child Abuse and Neglect, *Cathy Spatz Widom;* Prevention of Child Maltreatment, *David L. Olds.* Organized by: *Cathy Spatz Widom*

The Social Pathology of Large Cities *(Fri/pm)*

Black Philadelphia Then and Now: The "Underclass" of the Late 20th Century Compared with the Poorer African-Americans of the Late 19th, *Roger Lane;* Emerging Settlement Patterns: Implications for the Inner City Poor, *Mark Alan Hughes;* Does a Growing Underclass Threaten to Undermine Black Progress? *Sarah McLanahan;* Why Homelessness Won't Go Away, *Michael Dear;* Crimes in the Capital City: Case Study of Washington, DC, *DeWitt Davis, Jr.* Organized by: *Keith Harries*

Mental Health and Violence *(Sun/pm)*

Major Mental Disorder and Violence, *Sheilagh Hodgins;* Crime and Mental Disorder Among Male Jail Detainees, *Linda A. Teplin;* Situational Aspects of Violent Behavior, *Edward T. Milvey;* The Role of Serotonergic Activity in the Modulation of Violent Behavior, *John J. Mann;* Clinical Treatment Approaches to Violence, *Kenneth Tardiff.* Organized by: *Cathy Spatz Widom*

Technical Session:

Rural Development Aspects of Recreation Enterprises *(Tue/am).* Private access, economics, demand. *Laurence R. Jahn, James E. Miller, Jane E. Luzar, Linda L. Langner, Brett A. Wright, John C. Becker, Eric M. Thunberg, Anthony Ferrise, Dennis Smith, Dale Colyer*

Economics; Competitiveness

Systematic Economic Analysis: Policy on Monopoly and Competition *(Fri/am)*

Economic Analysis of Predatory Pricing Allegations, *Allen R. Ferguson;* Anticompetitive Effects of Exclusive Licensing, *Sharon Oster;* The Causes and Costs of Thrift Institution Failures: A Structure-Behavior-Outcome Approach, *Lawrence J. White;* Methodology for Economic Analysis of Mergers, *Robert D. Willig.* Organized by: *Allen R. Ferguson*

Frontiers of Research in Experimental Economics *(Sun/am)*

Introduction to Frontier Research in Experimental Economics, *Vernon L. Smith;* Market Engineering: Using the Laboratory as a Test-Bed for Designing Computer-assisted Markets, *Stephen J. Rassenti;* Designing Trading Institutions That Reduce Price Volatility, *Kevin A. McCabe;* Incentives and the Regulation of Public Utilities, *Paula-Ann Cech;* Horizontal Mergers: Concentration and Performance, *Charissa P. Wellford.* Organized by: *Vernon L. Smith*

Sustainable Economic Development: Substance or Rhetoric? *(Fri/pm)*

Sustainable Growth: An Impossibility Theorem, *Herman Daly;* Sustainable Development: Some Implications for U.S. Policy, *Robert Repetto;* Energy and Sustainable Development, *Adam Rose;* Economic-Environmental Interactions, *Anil Markandya.* Organized by: *Gardner M. Brown, Jr.*

Technology Transfer from the University or National Laboratory to the Market Place *(Mon/am-pm)*

Session I: Transfer of Biomedical Technology: *Theodore A. Bruinsma; Norman Friedland; Edward L. McCordy; Robert P. Charrow;* Transfer of Energy/Environment Technology: *William S. Bradley; Edward H. Blum; Robert Muir; Patrick Von Bargen*

Session II: Transfer of Manufacturing Technology: *Don Walukas; Gerald A. Marxman; Byron C. Winn; Harry L. Rook;* Transfer of Information Technology: *George W. Arnold; A. R. Gale; Averett S. Toombes; Charles W. Bernard.* Organized by: *David Hsi, Edward H. Blum, Gerold Yonas*

Manufacturing's Future: Policy, Strategy, and the New Global Challenge *(Sat/am-pm)*

Session I: Challenges to U.S. Manufacturing, *William G. Howard, Jr.;* An Assessment of U.S. Manufacturing: All Is Not Well, *Julie Fox Gorte;* U.S. Productivity Performance: (At Least So Far) It's Better Than You Think, *William J. Baumol;* Manufacturing's Health and the Standard of Living, *Lawrence Mishel;* The Manufacturing World of Tomorrow: New Technology, New Strategy, and New Structure, *Joel D. Goldhar*

Session II: Educating Leaders for Tomorrow's Manufacturing Enterprises, *Kent H. Bowen;* Supporting a Competitive Manufacturing Industry, *William Phillips;* International Cooperative Research in Manufacturing, *Hiroyuki Yoshikawa;* Cooperative Research for Manufacturing Survival, *Edward A. Miller;* Federal Support for Manufacturing R&D, *John A. Simpson.* Organized by: *Christopher T. Hill*

Mineral Resources and the Changing International Economy of the '90s *(Sun/pm)*

The Global Shift from Strategic Priorities to Economic Competitiveness, *Bruce C. Netschert;* Technological, Financial, and Political Pressures on

World Mineral Endowment, *Eugene A. Thiers;* Perestroika and the End of the Cold War: Possible Mineral Trade Implications for the USSR and Eastern Europe, *Istvan Dobozi;* The Minerals Industry in an Interdependent World: Can Industry Deliver the Goods? *Simon D. Strauss;* Federal Minerals and Materials Policy in a Changing World, *David S. Brown.* Organized by: *Carroll Ann Hodges, John J. Schanz, Jr.*

Systems Perspective for the Quality of Health Care (Sat/am)

Optimizing a System: Profound Knowledge, *W. Edwards Deming;* Epidemiologic Oversight of the Effectiveness of Medical Care, *Henry Krakauer;* Hospital-wide Quality Improvement: Beginning the Journey, *Paul B. Batalden;* Quality Management for Health Care Delivery, *Brent C. James;* Learning from Others: The Application of Total Quality Management to Health Care Organizations, *Donald M. Berwick.* Organized by: *R. Clifton Bailey, W. Edwards Deming*

Technical Sessions:

Economic Microsimulation for Public Policy Analysis *(Sat/pm).* NRC report, labor supply, socioeconomics. *Eric Hanushek, Gary T. Burtless, George Sadowsky, Paul B. Cotton, Richard A. Kasten, Reuben Snipper, Daniel H. Weinberg*

Ecological Economics *(Sun/pm).* Environmental management, sustainability. *Michael E. Colby, Robert Costanza, Richard B. Norgaard, Robert Goodland, Herman E. Daly*

Science & International Security

Defense Technology and Policy After the Cold War (Sat/am-pm; Sun/am-pm)

Session I: New Thinking and Defense Technology, *Ashton B. Carter;* Administration Views on Defense Technology, *Charles Herzfeld;* Export Controls on Technology: Do They Still Have a Role? *M. Granger Morgan;* American Defense Needs After the Cold War, *Janne E. Nolan;* National Security and Economic Competitiveness, *Daniel F. Burton, Jr.*
Session II: National Security and Economic Competitiveness: *James L. Hecht; Frederick Heldring; Frank J. Gaffney; Joseph S. Nye;* The Shrinking Defense Budget: Economic Impact and Industry Response, *Gordon M. Adams*
Session III: Using DOD Data on Prime Contract Awards to Assess Cutbacks in the U.S. Defense Contractor Employment, *Joseph V. Cartwright;* Impact of Defense Spending Reductions on the U.S. and Selected Regional Economies, *G. Wayne Glass*
Session IV: Environmental and Health Effects of Nuclear Weapons Production, *Robert Alvarez;* Where Values Collide: Public Interest and Nuclear Weapons Facilities, *Beatrice Brailsford;* The Politics and Organizational Culture of Nuclear Weapons Production, *Kosta Tsipis;* In from the Cold: Policy Implications for the U.S. Nuclear Weapons Industry, *John C. Tuck.* Organized by: *Amy Crumpton, Ashton B. Carter, Elizabeth Kirk, James L. Hecht, John R. Kort*

Still Needed: Arms Control in a Radically Changed Environment (Sat/am)

Is Arms Control Still Necessary? The Issues, *Jonathan Dean;* Does the United States Need Naval Arms Control? (Senior U.S. naval officer speaker to be announced); Does the Soviet Union Still Need Arms Control? (Senior Soviet officer speaker to be announced); Does Europe Still Need Arms Control?(Senior German expert speaker to be announced); Is Arms Control Still Needed? Multilateral Aspects, *John B. Rhinelander.* Organized by: *Jonathan Dean, John B. Rhinelander*

Soviet Politics and National Security Policy (Fri/am)

Overview of Changing Shape of Soviet Politics and National Security Policy, *Cynthia A. Roberts;* The Impact of Domestic and International Changes on Soviet Arms Control, *Raymond L. Garthoff;* Military Reform in the Soviet Union, *Phillip A. Petersen;* Civil-Military Relations in the Soviet Union, *Speaker to be announced;* The Impact of Political Change on Soviet Security Policies, *Speaker to be announced.* Organized by: *Cynthia A. Roberts*

Implications of Proliferating Advanced Weaponry: Nuclear, Chemical, Missile, and Naval Forces (Tue/am)

Economic and Sociopolitical Implications of High-tech Arms Race in the Middle East, *Andrei V. Shoumikhin;* Implications of Proliferating Advanced Weaponry: Nuclear, Chemical, Missile, and Naval Forces, *Ravinder Pal Singh;* Preventing Regional Nuclear Weapon Proliferation: The Case for the Establishment of a Nuclear Weapon Free Zone in the Middle East, *Mahmoud M. Karem;* The Implications of and Responses to Chemical Weapons Proliferation, *Elisa D. Harris;* Regional Security and Weapons Proliferation: The Middle East Crisis, *Geoffrey Kemp.* Organized by: *Janne E. Nolan*

Chemical and Biological Weapons: Elimination or Proliferation (Mon/pm)

Current Negotiations, *Robert Mikulak;* Principal Issues and Possible Resolutions, *Nikita Smidovich;* Chemical Proliferation and Disarmament: A Congressional Perspective, *Martin Lancaster;* Dealing with Proliferation With and Without a Treaty, *Seth Carus;* Chemical Proliferation and Disarmament: An Industry Perspective, *Will D. Carpenter.* Organized by: *Matthew Meselson*

Verifying and Implementing Arms Control Agreements in the 1990s (Fri/pm)

The Future Arms Control Agenda, *S. Read Hanmer;* Future Verification Regimes, *Sidney N. Graybeal;* On-site Inspection Agency's Future Role, *Roland Lajoie;* Verification and Ratification, *John Keliher;* Implementation Problems and Prospects, *Frank W. Jenkins.* Organized by: *Sidney N. Graybeal, Patricia Bliss McFate*

Scientific Approaches to the Study of International Conflict Resolution (Mon/pm)

Understanding Nationalism as a Source of International Conflict, *Richard W. Cottam;* Negotiating Resolutions to International Conflict, *William I. Zartman;* Crisis Management, Cooperation, and Deterrence: Lessons of the Superpower Relationship for International Conflict Resolution, *Alexander L. George;* Sociological Aspects of International Conflict and Its Resolution, *Martin Patchan.* Organized by: *Eric H. Arnett, Richard Cottam*

Technology and Military-Civilian Conversion in the Soviet Union (Mon/pm)

Efforts to Convert Soviet Enterprise from Weapons Work to Serving Civil Markets, *Ashton B. Carter and a panel of representatives of the Soviet aerospace, electronics, nuclear weapons, and heavy manufacturing industries.* Organized by: *Ashton B. Carter*

Technical Sessions:

Naval Forces and Arms Control: Implications for U.S. Security *(Sat/pm).* Cruise missiles, confidence and security-building measures. *James McCoy, James E. Goodby, Steve Fetter, Eric H. Arnett, Donald C. F. Daniel*

Fissile Materials from Nuclear Arms Reductions: A Question of Disposition *(Mon/am).* Regulatory, economic, proliferation issues; USSR perspective. *L. Charles Hebel, M. H. Killinger, P. L. Hendrickson, C. H. Bloomster, John J. Taylor, David H. Albright, Spartak T. Belyaev, Warren H. Donnelly, William G. Sutcliffe, Milo D. Nordyke*

Science & Technology Policy

Policy Issues in Science and Technology (Fri/am-pm)

Speakers and topics to be announced. Organized by: *Leon Lederman, Albert H. Teich*

Science Advice to National Leaders (Sat/am)

Advising the President of the United States, *D. Allan Bromley;* Science Advice in the Soviet Union, *Yuri A. Ossipyan;* Scientific Advice to the Prime Minister of the United Kingdom, *W. D. P. Stewart;* Science and Technology Advice to the Top Levels of Government: The Japanese Experience, *Wataru Mori.* Organized by: *Albert H. Teich, William T. Golden*

Organization for Science and Technology in the Executive, Legislature, and Judiciary (Sun/am-pm)

Session I: The Role of the President's Council of Science and Technology Advisors in Presidential Decision Making, *David Z. Beckler;* Confronting a World Transformed: The Carnegie Commission on Science, Technology, and Government, *David Z. Robinson;* Better Use of Science in Science-based Regulation, *Douglas Costle;* Science in the Courthouse, *Maurice Rosenberg;* Science and Technology Analysis at the Congressional Support Agencies, *John H. Gibbons*
Session II: Responding to the Environment and the Economy Together, *H. Guyford Stever;* Role of Science and Technology in Economic Performance, *Lewis M. Branscomb;* New Thinking and American Defense Technology, *Ashton B. Carter;* Dual-use Technologies in Military and Commercial Domains, *Charles A. Zraket.* Organized by: *Jonathan Bender, David Krisch*

Conflict Between National and International Roles of Universities (Fri/am)

The View from Universities, *Harold K. Jacobson;* The View from the State, *Richard F. Celeste;* The View from Congress, *Ted Weiss;* The View from Industry, *John A. Armstrong;* Contradictions and Complexities: International Comparisons in the Training of Scientists and Engineers, *Dorothy S. Zinberg.* Organized by: *Thomas H. Moss*

Making Witnesses Out of Wizards: Bringing Oz Into the Courtroom (Mon/am)

The View from the Bench, *Ruth C. Burg;* Science Experts in Civil Lawsuits, *Maurice Rosenberg;* Taming the Expert Witness, *Rubin Bressler;* The Engineer as Expert Witness, *Neal Fitzsimons;* Tapping the Right Expert, *Marshall J. Doke, Jr.* Organized by: *Ruth C. Burg, Mark Frankel*

Technical Sessions:

Improving the Functioning of Government Agencies *(Tue/am).* Organizational development, science/technology personnel. *Bruce L. R. Smith, Eric E. Anschutz, Marilyn Bott, Roberta Balstad Miller, Marilyn K. Gowing, Stephen D. Nelson*

Risk Perception and Public Policy *(Sun/pm).* Radon, pesticides in food, global climate management, media impacts. *Paul Slovic, Eileen van Ravenswaay, Sheldon Krimsky, Cristine Russell, Ortwin Renn, Steven Rayner, Michael A. Kamrin, Daniel A. Bronstein*

Allocating Public Funds for Science: Practice and Possibilities *(Mon/am).* Peer review, earmarking. *Elizabeth M. Robinson, James M. McCullough, Deborah L. Seltzer, Peter H. Aranson, Christopher T. Hill, Rita Colwell, David D. Moran, Jack Sommer*

Knowledge Synthesis: An Ethical Imperative for Policy Development *(Mon/pm).* Ignorant policies, biospheric survival threat. *Richard R. Harwood, John M. Culbertson, Nicole Morgan, Langdon Gilkey, Timothy C. Weiskill, Aristide H. Esser, Digby J. McLaren, Keith Wilde*

Workshops:

Government Hearings and Expert Witnesses: Giving Effective Testimony *(Sat/pm).* Hearing types, substance, style, legal considerations. *Paul S. Rundquist, Grace L. Ostenso, Parris Glendening, William G. Wells, Jr., Dennis Barnes, John C. Graybow, Stephen D. Nelson*

Communicating with Policymakers: Strategies for Scientists and Engineers *(Sat/am).* Access points, federal budget process, congressional members/committees. *Anthony Fainberg, Norine E. Noonan, Michael L. Telson, Dana Isherwood, Herbert Lin, Stephen D. Nelson, Aviva Brecher*

History & Philosophy of Science

The Beginning and the End of the World: Historical Perspectives (Sun/am)

Impermanence Enters the Astronomical Universe: Comets, Novae, Solar Radiation, 1400–1650, *Peggy A. Kidwell;* From Genesis to Apocalypse: Newton's God, Newton's Science, *James E. Force;* Nebular Birth and Heat Death, 1754–1905, *Stephen G. Brush;* Redshifts, Galaxies, and General Relativity: Ideas on the Creation and End of the Universe in the Early 20th Century, *Robert W. Smith;* The End of the Universe, *Frank J. Tipler.* Organized by: *Stephen G. Brush*

Metaphors and Models in the Brain Sciences: Historical Perspectives (Sat/pm)

Brain Wars in England: Richard Owen's Lost Cause, *Christopher Smith;* Evolutionary Assumptions in the Neurosciences, *Terrence W. Deacon;* Brain Science and the Cultural Uses of Metaphors, *Anne Harrington.* Organized by: *Edward Manier*

Mathematics in Times of Social Upheaval (Mon/am)

Mathematicians versus Humanists in the Göttingen Philosophical Faculty, 1900–1919, *David E. Rowe;* The Antireligious Campaign and Moscow Mathematics, *Charles Ford;* The Case of Nikolai Lusin, *Aleksey Levin;* Warren Weaver, Vannevar Bush, and the Applied Mathematics Panel in World War II, *Larry Owens;* Mathematics and Nazi Politics: Three Examples, *Sanford L. Segal.* Organized by: *Sanford L. Segal*

Creative Couples and Gender Complementarity: Cross-disciplinary Perspectives (Fri/pm)

Dividing the Research and the Credit: Marie and Pierre Curie, *Helena M. Pycior;* The Scientific Relationship of Albert and Mileva Einstein, *John J. Stachel;* Mary Putnam Jacobi and Abraham Jacobi: Mixing Medicine with Politics, *Joy Harvey;* Contrasting Sex Roles in American Botanical/Ecological Couples, *Nancy G. Slack;* The Localization of Complementarity, *Mary Catherine Bateson.* Discussants: *Stephen G. Brush, Audrey B. Davis.* Organized by: *Helena M. Pycior, Nancy G. Slack, Pnina Geraldine Abir-Am*

AAAS in Public Affairs, 1848–1975 (Sun/pm)

Power Through Persuasion: The AAAS and National Science Initiatives in the 19th Century, *Sally Gregory Kohlstedt;* The AAAS and the "Science and Society" Movement in 1930s America, *Peter J. Kuznick;* AAAS and the Establishment of the National Science Foundation, *Dael Wolfle;* AAAS and the Public Understanding of Science, 1945–1975, *Bruce V. Lewenstein; Science* Magazine and Public Policy, 1900–1945, *Michael M. Sokal.* Organized by: *Albert H. Teich, Michele Aldrich*

Technical Sessions:

Beyond Historical Impressionism: Testing Theories of Scientific Change *(Mon/pm).* Nature of scientific change, innovation, philosophy of science. *David L. Hull, Arthur L. Donovan, Frank J. Sulloway, David Faust*

Neurobiology and Narrative: The Novels and Essays of Walker Percy, M.D. *(Tue/am).* Science and literature, neuropsychiatry, medical ethics. *James H. Schwartz, Lewis Lawson, Stephen H. Watson, Patrick Samway, Edward Manier*

Measuring Similar Processes at Multiple Levels of Biological and Social Systems *(Sat/am).* Systems dynamics, nonequilibrium dynamics, energy flows, economics. *Howard T. Odum, James G. Miller, Len Troncale*

Technical Change and the State in the 20th Century: Case Studies *(Fri/am).* Nuclear power (France), space program (India), all-metal airplane (United States). *Gabrielle Hecht, Raman Srinivasan, Eric Schatzberg, David Shearer*

Workshop:

Science in National Life: A Videohistory Workshop *(Tue/am).* Lab techniques, artifact perservation. *David H. DeVorkin, Stanley Goldberg, Pamela Henson, Ramunas Kondratas*

Science & Technology Education

Cross-national Perspectives on the Public Understanding of Science (Fri/am-pm)

Session I: Public Understanding of Science and Technology in the European Community, *Jean Gabolde, Wim Van Deelen;* Public Attitudes Toward Science in France, *Daniel Boy;* The Public Understanding of Science in Britain, *John Durant, Martin Bauer;* The Public Understanding of Science in Canada, *Edna F. Einsiedel;* Public Understanding of Science in the United States, *Jon D. Miller*
Session II: The Public Understanding of Science in Japan, *Tatsuzo Suzuki, Hajime Nagahama;* Public Attitudes Toward Nuclear Power in Japan, *Fujio Niwa, Yasumasa Tanaka;* Empirical Comparisons of the Public Understanding of Science in Japan and the United States, *Jon D. Miller;* Communicating

Science to the Japanese Public: A Journalist's View, *Kenji Makino;* Some American Observations on the Public Understanding of Science and Technology in Japan, *Charles W. Wallace.* Organized by: *Jon D. Miller*

Animals in the K–12 Classroom (Mon/am)

Animals or Alternatives: The Current Status, *Juliana Texley;* Perceptions of the Students, *Linda J. LaScola;* The Price of Ignorance, *Jerod M. Loeb;* Values in the Classroom, *Joseph McInerney;* Animals at the (Science) Fair, *William R.M. Ritter;* Teaching the Teachers, *Margaret D. Snyder.* Organized by: *Deborah C. Runkle, Jerod M. Loeb, J. Fredrick Cornhill*

Science for the Nonscience Major (Sun/pm)

Two Cheers for the Higher (and Lower) Vulgarization of Science, *Derek Davenport;* Just About Life, *William Loomis;* Quantum Physics for Poets, *Leon Lederman;* Cosmology: The Science of the Universe, *Edward Harrison;* Planet at Risk, *Cesare Emiliani.* Science for College Students: It's Up to Us, *David S. Saxon.* Discussant: *David S. Saxon.* Organized by: *Cesare Emiliani*

Science and the Media: Information Controls and Reporting of Science (Sun/am)

Media Coverage of the Environmental Effects of Weapons Production, *Keith Schneider;* How Open Should Government Be? *John F. Ahearne;* Dealing with the Press in Areas of Sensitive Science, *Mary Joy Jameson;* Public Access to Sensitive Information: A 20-year Perspective, *Jane Kirtley.* Discussant: *Carol L. Rogers.* Organized by: *Cristine Russell, Carol L. Rogers, Fred Jerome*

Technical Sessions:

Advocacy Journalism: Reporting on Sustainable Development *(Mon/pm).* Environment, third world. *James Detjen, Joy Rudder, Bunmi Makinwa, Yanina Rovinski, Darryl D'Monte, Helene Knorre, Josephine Mwasi, Manuel S. Satorre, Jr., Tensie Whelan, James Cornell*

Minority Mathematics and Science: Successful Programs at Community Colleges *(Sat/pm).* Career opportunity enhancements. *Judith Eaton, Isiah O. Sewell, Yvette Kinlaw, Judith H. Williams, Isaura Santiago Santiago, Henry Estrada, Estrella M. Triana, Eugenio Barrios*

Satellite Delivery of Education: From Elementary School to the Working World *(Mon/pm).* Interactive video/satellite, networks, conferencing. *Linda G. Roberts, Linda K. DeGrand, Smith L. Holt, Louis C. Nevins, Charles F. Urbanowicz, Peter Lykos, Cyrelle Gerson, Philip Parfitt, Patricia S. Curlin*

Reform of Scope, Sequence, and Coordination: A Progress Report *(Fri/pm).* Curriculum, science education, teaching methods, model programs. *Bill G. Aldridge, Linda Crow, Thomas Sachse, David Andrews, John Penick, Manuel Gomez, Russell Aiuto, Marily DeWall*

Workshops:

Progress in Public Understanding of Science *(Sun/am-pm).* Audience, impact assessment, art of explanation. *Philip Morrison, John Riccobono, Brian Wynne, Janine M. Jason, John M. Ziman, Mark St. John, Valerie Crane, Eve R. Hall, Jon Miller, Tom Siegfried, Michael Spock, Katherine E. Rowan, Libby Palmer, Jon Ward, Marcel LaFollette, Sheila Grinell, Pat Curlin*

Scientist-Teacher Partnerships in Middle School Science and Technology Education *(Fri/am).* New teaching methods/materials in information and communications technology. *Gerald Kulm and others*

Project 2061: What Can We Expect People to Learn About the Nature of Science? *(Tue/am).* Developmental maps, idea networks. *Jo Ellen Roseman, Andrew Ahlgren, Steven Kornguth*

Science & Technology Curricula

Assessment and Its Role in Curricular Reform (Sun/pm)

Assessment: A Policy Perspective, *Richard P. Mills;* Curriculum and Assessment: A View from California, *Thomas Sachse;* The Impact of Science Assessment on Classroom Practice, *Nancy S. Cole;* State Initiatives in Assessing Science Instruction, *Jane Armstrong;* Assessment in Mathematics, *Mary Harley Kruter;* Assessment Implications of the New Science Curricula, *Mary Budd Rowe*

Learning Science and Mathematics: Constructivist Perspectives (Sat/pm)

Constructivist Perspectives, *Ernest von Glassersfeld.* Discussants: *Rodger Bybee, Jere Confrey, Audrey B. Champagne, Penny Gilmer, Kenneth Tobin.* Organized by: *Kenneth Tobin*

Fulfilling the Promise: Biology Education in the Nation's Schools (Sat/am)

Fulfilling the Promise: Biology Education in the Nation's Schools, *Timothy Goldsmith.* Discussants: *Jane Butler Kahle, Wilma Toney, Joseph McInerney, Shirley M. Malcom, John A. Moore.* Organized by: *Donna M. Gerardi*

Mathematics and Mathematics Education: Beyond Reports (Fri/am-pm)

Session I: Formulating and Implementing a National Plan, *Alvin W. Trivelpiece;* Leading Curriculum Reform in Mathematics: Changes in Practice and Content, *Iris M. Carl;* What Does It Mean to Be Number One in Mathematics Education? *Lamar Alexander;* Minority Successes in Mathematics, *Asa G. Hilliard III;* Mathematics Matters for All Students, *Jackie B. Goldberg*

Session II: Revitalizing Undergraduate Mathematics, *William E. Kirwan;* Opening the Pipeline via Innovative Programs, *Uri Treisman;* The Changing Role of the Professor, *John S. Toll;* Moving Forward with the Recommendations of "Renewing U.S. Mathematics," *Phillip A. Griffiths;* A Reaction and Response from the Community, *Michael Artin;* The View from Washington, *Erich Bloch.* Organized by: *Ronald G. Douglas, James Voytuk, Lawrence H. Cox*

NSF-supported Innovations in Undergraduate Education (Mon/pm)

Comprehensive Regional Centers for Minorities, *James M. Rosser;* Teaching a Mass-market Dinosaur Course, *Kevin Padian;* From Feasibility to a Focus on Laser Physics, *John R. Brandenberger;* An Integrated, First-year Curriculum in Science, Engineering, and Mathematics: One Year's Experience, *Jeffrey E. Froyd;* Calculus & Mathematica, *Jerry J. Uhl.* Organized by: *Robert F. Watson*

Science and Mathematics Curriculum Reform: How Do They Relate? (Mon/am)

Science Curriculum Reform as Related to Mathematics, *F. James Rutherford;* Mathematics Curriculum Reform as Related to Science, *John A. Dossey.* Discussants: *Jaime Oaxaca, Howard Goldberg, Iris Carl.* Organized by: *Robert L. Russell*

The Progress and Impact of Project 2061 (Mon/pm)

The Response to *Science for All Americans, F. James Rutherford;* Impact of Project 2061 in California, *Tom Sachse;* The Design of Phase II of Project 2061, *F. James Rutherford;* The Process of Creating the Curriculum of the Future, *Clara Tolbert;* Working with Teachers in Phase II, *Steven Kornguth.* Organized by: *F. James Rutherford*

Science and Mathematics Education in the United States: A Report from the Longitudinal Study of American Youth (Sat/pm)

Mathematics Achievement in Middle School and High School, *Alan Osborne, Jon D. Miller;* What Happened to the Gender Difference in Mathematics? *Elizabeth Fennema, Robert Suchner;* Science Achievement in Middle School and High School, *Thomas B. Hoffer, Shelagh Gallagher;* Does Inquiry-based Science Instruction Make a Difference? *Arthur Reynolds, Robert W. Suchner, Thomas B. Hoffer;* Tomorrow's Scientists, Mathematicians, and Engineers, *Thomas Hilton, Jon D. Miller, Karen Brown.* Discussants: *F. James Rutherford, Andrew Porter.* Organized by: *Jon D. Miller*

Technical Session:

Calculus Reform: Some Examples *(Sat/am).* Reports on five projects. *James J. Callahan, Edward D. Gaughan, Deborah Hughes Hallet, David A. Smith, Jerry J. Uhl, Thomas W. Tucker*

AAAS☆91 SESSION PLANNER

This planner includes all symposia, technical sessions, and workshops. It does not include short courses, plenary lectures, or the neurosciences seminar. Titles of some sessions have been shortened.

		Friday, 15 February	Saturday, 16 February	Sunday, 17 February	Monday, 18 February	Tuesday, 19 February
	General Sciences; Popular Science	**AM/PM:** The Frontiers of the Physical Sciences: 1991. **PM:** The Anthropology of Science and Scientists.	**AM/PM:** The Anthropology of Science and Scientists.	**AM:** The Anthropology of Science and Scientists. **AM/PM:** Science for the Naked Eye; or, The Physics of Everyday Experience, XVIII.	**AM:** Chemistry Is Fun! **AM:** Science, Technology, Intelligence, and Espionage. **PM:** Consciousness in Life.	
PHYSICAL SCIENCES & TECHNOLOGY	***Computing; Communications***	**AM:** Computer Virus Legislation: Problems and Pitfalls. **PM:** Global Initiatives in High-performance Computing and Networking.	**AM/PM:** Global Initiatives in High-performance Computing and Networking.	**AM/PM:** Scientific Communication in a Changing World.	**AM:** Electronic Publishing and the Science Library Crisis. **AM:** Information Technology for Research. **PM:** Mathematics in Public Policy.	**AM:** Stereo Computer Imaging and Analysis in Science. **PM:** Robotics and Mathematics.
	Energy; Technology	**AM:** Energy R&D Policy in the USA. **PM:** Scientific Advances in Emerging Solar Energy Technologies.	**AM:** The Interaction of Science and Engineering in the Modern Age. **PM:** Energy Technologies for Developing Countries.	**AM:** Changing Lives: New Technology for People with Disabilities. **PM:** Engineering in Japan.		**AM:** Geophysical Imaging Systems: From Medical Microcosm to Outer Space.
	Physics; Chemistry	**AM:** Seventy-five Years of General Relativity. **PM:** Elementary Particle Physics: Present Status and Future Prospects.	**PM:** Status of High-temperature Superconductivity.	**AM:** Current Directions in Musical Acoustics. **PM:** Mathematics in the Materials Sciences.	**AM/PM:** Chemistry Rediscovers Materials Science.	**AM:** Quantum Mechanics of Single Atoms. **PM:** Revisionist's Kinetics: New Views of Nature's Throttle.
	Astronomy; Planetary Science		**AM:** Cosmology: Our Knowledge of the Universe.	**AM/PM:** The Human Exploration of Space.	**AM:** The Rationale for Human Exploration of Mars. **PM:** Adverse Environmental Threats to Astronomy.	**AM:** Science with the Hubble Space Telescope.
	Geoscience; Climate	**AM:** Impacts of Climate During the 1980s in the United States. **PM:** Coastal Erosion Zone Management.		**PM:** Human Response to Sea-Level Rise. **PM:** Global Change and the Carbon Cycle in Terrestrial Ecosystems.	**AM:** Earthquakes: Prediction/Validation. **AM/PM:** Human Response to Sea-Level Rise. **PM:** Impacts of Climate in US Regions.	
	Global Change	**PM:** Informed Decisions: The Role of Satellite Observations. **AM/PM:** Science in Africa. **PM:** Human Activity and the Global Ecosystem.	**AM/PM:** Informed Decisions: The Role of Satellite Observations. **AM/PM:** Science and Technology and Third World Economic Security.	**AM/PM:** Humankind in Global Change: Indicators and Prospects.	**AM/PM:** Humankind in Global Change: Indicators and Prospects. **PM:** The Resourceful Species: The State of the Human Enterprise.	**AM/PM:** Humankind in Global Change: Indicators and Prospects.
	Environment	**PM:** Meta-analysis and Risk Assessment: A Tool for the '90s?	**AM:** Cleaning Up the DOE Nuclear Weapons Complex. **PM:** Assessing the Impacts of Nuclear Waste Facilities: The State of the Art Updated.	**PM:** Proof of Environmental and Natural Resource Damages in Litigation.	**AM:** Science: A Basis for Environmental Policy? **PM:** Role and Responsibilities of Scientists and Engineers in Environmental Debates.	**AM:** Is Superfund Working?
LIFE SCIENCES	***Molecular & Cellular Biology***	**PM:** The Revolution in Developmental Biology.	**AM:** The Revolution in Developmental Biology. **PM:** New Perspectives on Cellular Signaling.		**PM:** New Interactions Between Topology and Science.	**AM:** National and International Efforts in Plant Genome Mapping.
	Medical Sciences	**AM:** Control of Infectious Diseases. **AM:** Modeling Animal Research. **PM:** Molecular Determinants of Human Cancers. **PM:** Immunocontraception.	**AM/PM:** The Progesterone Antagonist RU-486: Science and Science Policy.	**AM:** Aging and Cancer Interface: Multidimensional Research Perspectives. **PM:** New Molecular Insights into "Old" Genetic Disorders.	**PM:** Gene Therapy: Scientific Prospects and Societal Implications.	**AM:** Development of Medications for Treatment of Brain/Behavior Disorders.
	Health Care & Policy	**PM:** Modeling the Geographic Diffusion of the AIDS Epidemic.	**AM:** AIDS: Scientific Research and Public Policy. **PM:** Consequences of HIV/AIDS in Eastern Africa.	**AM:** The Father and the Fetus: Facts and Fallacies.	**AM:** Challenges to Dentistry in the '90s. **PM:** Better Drug Development & Regulation via Pharmacokinetic/Pharmacodynamic Procedures.	**AM:** Balance and "Dizziness": Assessment and Rehabilitation. **PM:** Firearm Injury Prevention: Scientific and Public Policy Directions.

LIFE SCIENCES	***Agriculture***	**AM:** Economically Useful Plants for Developing Countries. **PM:** Pest Resistance to Control. **PM:** Knowledge-based Systems in Agriculture.	**AM:** The Economic Potential for U.S. Aquaculture. **AM/PM:** Advancing Biotechnology: International Issues of Biosafety Policy and Practice.	**AM:** Value-added Products from Agriculture. **AM/PM:** Biological and Biotechnological Alternatives to Chemical Insecticides.		**PM:** Bovine Somatotropin: Biotechnology Product and Social Issues in the U.S. Dairy Industry.
	Ecology & Evolution	**AM/PM:** Defining Ecosystem Health: Science, Economics, or Ethics?	**AM/PM:** Stakes in the Tropical Forests. **PM:** Inheritance of Acquired Characteristics: Evolutionary Origins of New Significant Traits.	**AM:** Tropical Biology: Historical Perspectives; Contemporary Issues. **PM:** Seeds Since Columbus: Crop Germplasm of the Americas.	**AM:** Conserving Genetic Resources in Natural Habitats. **AM/PM:** Large Marine Ecosystems. **PM:** Zoo Biology/Conservation.	**AM:** Nonrandom Evolution: Matter, Life, Mind. **AM:** Ecosystem Perspectives: Multiple-use Management. **PM:** Coastal Zone Management.
	Biomedical Ethics	**AM:** DNA-based Identification Systems: Issues in Application.		**AM/PM:** Alternative Approaches to Clinical Trials in AIDS: Ethics and Methodology.	**AM:** When Research Is Socially Sensitive and Liable to Misinterpretation. **PM:** Ethical/Clinical Issues in Carrier Screening for Cystic Fibrosis.	**PM:** International Aspects of Ethical and Social Issues in Human Genome Research.
	Psychology; Neurobehavior	**AM:** Cognitive Aging Among Intellectually Able Individuals: Patterns, Precursors, and Implications.	**AM:** Critical Periods in Second Language Acquisition. **PM:** A Critical Examination of the Concept of Critical Periods.	**AM:** Cults and the Courts: Use of "Brainwashing" Theory by Expert Witnesses. **PM:** Current Conceptions of Intelligence.	**AM:** Reassessing Freud and Psychoanalysis. **PM:** Evolution of Cognitive Functions in Ecological-Cultural Context.	**AM:** Fragrance Research: Effects of Fragrances on Behavior, Mood, and Physiology. **PM:** Cognitive Equilibrium.
SOCIAL SCIENCES & SCIENCE POLICY	***Anthropology; Archaeology***	**AM/PM:** Indigenous Peoples and the Rainforest: Science, Marketing, and Human Rights.	**AM:** Evolutionary Interrelationships: Technology, Language, and Social Behavior. **PM:** The Evolution of Deception: A Biocultural Approach.	**PM:** The Deterioration of Human Health in Economic and Political Development: From Ancient Egypt to 20th Century United States.	**AM/PM:** Ethnography of Drug Use in Traditional and Modern Societies.	**AM:** Use of Light Stable Isotopes in the Natural and Social Sciences.
	Demography; Political Science	**AM/PM:** Scientific and Technical Personnel: Issues for the 1990's.	**AM:** Consequences of the Rapidly Increasing Physician Supply. **PM:** Supply/Demand for Scientists and Engineers in Emerging Markets.	**AM:** Science Policy for Women in Science: Lessons from Historical and Contemporary Case Studies.	**AM:** Voting: Mathematical Foundations and Political Reality.	**AM:** Women of Science: Secrets of Success.
	Sociology	**PM:** The Social Pathology of Large Cities.	**AM:** Violence and Youth: Research and Prevention Programs. **PM:** Family Violence: Etiology, Impact, Prevention of Child Abuse.	**AM:** Drugs, Crime, and Violence: What Do We Know? **PM:** Mental Health and Violence.		**AM:** Rural Development Aspects of Recreation Enterprises.
	Economics; Competitiveness	**AM:** Systematic Economic Analysis: Policy on Monopoly and Competition. **PM:** Sustainable Economic Development: Substance or Rhetoric?	**AM:** Quality of Health Care. **AM/PM:** Manufacturing's Future: New Global Challenge. **PM:** Economic Microsimulation for Public Policy Analysis.	**AM:** Frontiers of Experimental Economics. **PM:** Mineral Resources and the '90s Changing International Economy. **PM:** Ecological Economics.	**AM/PM:** Technology Transfer from the University or National Laboratory to the Market Place.	
	Science & International Security	**AM:** Soviet Politics and National Security Policy. **PM:** Verifying and Implementing Arms Control Agreements in the 1990's.	**AM:** Arms Control in a Changed Environment. **AM/PM:** Defense Technology/Policy After the Cold War. **PM:** Naval Forces / Arms Control.	**AM/PM:** Defense Technology and Policy After the Cold War.	**AM:** Fissile Materials Disposition. **PM:** Chem./Biol. Weapons. **PM:** International Conflict Resolution. **PM:** USSR Military-Civilian Conversion	**AM:** Implications of Proliferating Advanced Weaponry: Nuclear, Chemical, Missile, and Naval Forces.
	Science & Technology Policy	**AM:** Conflict Between National and International Roles of Universities. **AM/PM:** Policy Issues in Science and Technology.	**AM:** Science Advice to National Leaders. **AM:** Strategies for Communicating with Policymakers. **PM:** Giving Effective Expert Testimony.	**AM/PM:** Organization for Science and Technology in the Executive, Legislature, and Judiciary. **PM:** Risk Perception and Public Policy.	**AM:** Oz in the Courtroom. **AM:** Public Funds for Science. **PM:** Math in Public Policy. **PM:** Knowledge Synthesis: Ethical Imperative for Policy.	**AM:** Improving the Functioning of Government Agencies.
	History & Philosophy of Science	**AM:** Technical Change and the State in the 20th Century: Case Studies. **PM:** Creative Couples and Gender Complementarity.	**AM:** Measuring Similar Processes at Multiple Levels: Biological and Social Systems. **PM:** Metaphors and Models in the Brain Sciences.	**AM:** The Beginning and the End of the World: Historical Perspectives. **PM:** AAAS in Public Affairs, 1848–1975.	**AM:** Mathematics in Times of Social Upheaval. **PM:** Beyond Historical Impressionism: Testing Theories of Scientific Change.	**AM:** Neurobiology and Narrative: The Novels and Essays of Walker Percy, M.D. **AM:** Science in National Life: A Videohistory Workshop.
	Science & Technology Education	**AM:** Scientist-Teacher Partnerships. **AM/PM:** Cross-national Public Understanding of Science. **PM:** Scope, Sequence, and Coordination Reform.	**PM:** Minority Mathematics and Science: Successful Programs at Community Colleges.	**AM:** Information Controls and Science Reporting. **AM/PM:** Progress in Public Understanding of Science. **PM:** Science for Nonscience Majors.	**AM:** Animals in the K-12 Classroom. **PM:** Satellite Delivery of Education. **PM:** Advocacy Journalism.	**AM:** Project 2061: What Can We Expect People to Learn About the Nature of Science?
	Science & Technology Curricula	**AM/PM:** Mathematics and Mathematics Education: Beyond Reports.	**AM:** Biology Education in U.S. Schools. **AM:** Calculus Reform. **PM:** Constructivist Perspectives. **PM:** Longitudinal Study Report.	**PM:** Assessment and Its Role in Curricular Reform.	**AM:** Science and Math Curriculum Reform. **PM:** NSF-supported Innovations in Undergrad. Ed. **PM:** Progress and Impact of Project 2061.	