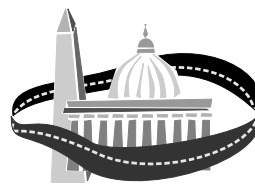


Teacher-Scientist Alliance Workshop

From January 11-15, 11 teams of scientist and science educators, 51 in all, from selected sites around the country participated in the third Elementary Science Education Reform Institute of the APS's Teacher-Scientist Alliance Institute. For five intense days, the participants examined a whole range of issues emphasizing the hands-on approach to teaching and systemic reform. The APS is playing a major role in the emerging national consensus on what constitutes a good science education for children. Funding for this program is provided by the APS-AAPT Campaign for Physics.



Snapshots of teachers and scientists preparing to take the hands-on teaching approach back to their school systems across the U.S.



INSIDE THE BELTWAY

Will a Thaw Follow the Hard Freeze?

by Michael S. Lubell, APS Director of Public Affairs

Late last fall, a hard freeze hit the heartland of America. The same could have been said for federal science budgets. Even as the last presidential ballots were being counted, science administrators were being warned to expect nothing more for FY 1998 than they had received the previous year. Adjustments for inflation were out of the question. Budgets for basic research would be frozen hard at FY 1997 levels across the federal government.

For some agencies, the news was extraordinarily good. The Department of Energy, for example, had been promised cuts of more than 25 percent over the next three years. For DOE's programs, a freeze at FY 1997 levels represented a victory beyond expectations. Knowledgeable sources attributed some of the success to the thousands of letters from scientists that flooded the White House in September and October.

For other agencies, including the National Science Foundation, the projection was disheartening. The NSF had lobbied hard to restore parity with the National Institutes of Health. During the last two years, NSF administrators had watched with some dismay as Congress boosted spending for NIH at annual rates approaching 7 percent. At the same time, appropriators kept NSF tightly in check, not even permitting the Foundation's budget to keep pace with increases in the cost of living.

Whatever the vantage point, the projections served as a reality check. Without

containment of entitlements, the long-term prospects for all discretionary programs remains bleak. A few key figures serve to put this into perspective.

Thirty-five years ago, Washington spent barely one out of every three federal dollars on entitlements. Most of the money went for Social Security and child welfare benefits.

Today the burgeoning costs of Medicare, Medicaid and service on the national debt have forced the federal government to fence off two out of every three dollars it ultimately pays out. Spending on these programs is locked in by law. The remaining dollar, the only one that appropriators can tinker with, is now split almost equally between defense and civilian programs.

Unless the growth of entitlements is reined in, federal spending on all discretionary programs, from scientific research to crime prevention, will slowly wither away. In the near term, the only alternative is continued deficit spending. But in the long term, the consequence will be the same.

What, then, are the prospects for entitlement reform? At first blush, the possibilities seem remote. When the Republican majority in the 104th Congress incorporated constraints on Medicare and Medicaid spending into their balanced budget plans, they received a thorough thrashing at the hands of the Democrats.

(Continued on page 2)

Council Elects 1996 APS Fellows

The APS Council elected 179 members as Fellows of the Society at its November 1996 meeting. For the names and citations of new APS fellows, see pages 8-11.

Nominations for fellowship are received by the APS headquarters throughout the year, and are forwarded for review to the appropriate division and topical group fellowship committees. These in turn forward their recommendations to the APS Fellow-

ship Committee, chaired in 1996 by APS Vice President Andrew Sessler (Lawrence Berkeley Laboratory).

Fellowship nomination forms may be obtained from the January 1997 issue of *APS News*, writing to the APS Fellowship Office, One Physics Ellipse, College Park, MD 20740-3844; calling (301) 209-3268 or visiting the Fellowship Page on the APS website, www.aps.org.

THE UNITS CONVOKE...

Representatives from the APS divisions, forums, topical groups and geographical sections gathered at APS Headquarters in College Park, Maryland in January for the annual Unit Convocation. The event featured a morning session on APS information services and unit budgets, in addition to tips on improving newsletter publication, increasing unit membership, improving unit-sponsored meetings, and a lunchtime demonstration of the Society's electronic journals. There were also reports on activities from each unit and afternoon discussions on planning for the upcoming APS Centenary Celebration in 1999 and getting the physics community involved in the political process.



Above, Mary Pat Paris, manager of the APS membership department, addresses the group.

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Inside the Beltway (Continued from page 1)

The GOP had made a crucial political mistake. The savings they had proposed to extract from Medicare and Medicaid matched almost dollar for dollar the tax cut they had laid on the table simultaneously. For more than a year, the Democrats capitalized on the blunder. Medicare cuts for the poor to pay for tax cuts for the rich was the refrain heard over and over again.

And it paid off. President Clinton, whose popularity had sunk to unimaginable lows prior to the 1994 election, rebounded in 1996 and was re-elected with room to spare. But he failed to carry Congress with him. By the time

the dust settled, the Republicans found themselves with a narrow twenty-vote margin in the House and a less-than-filibuster-proof majority in the Senate.

The American electorate had sent both parties a message: We don't trust either of you to govern alone. But on the campaign trail, candidates in both political parties also heard another message: Cut out the partisan bickering and learn to work together!

And so as the 105th Congress convened and President Clinton took his oath of office for a second time, both sides promised to seek common ground. Almost immediately, the Presi-

dent offered up a Medicare-Medicaid proposal that met the Republicans more than half way. Many congressional Democrats viewed the move with some alarm. But Senate Majority Leader Trent Lott of Mississippi, who has assumed the role of Republican honcho on the Hill in the aftermath of House Speaker Newt Gingrich's ethics problems, greeted the overture warmly.

How far into the congressional session bipartisan collegiality will extend is not clear, but for now both sides are talking deal. Case in point: A non-partisan commission may soon be established to deal with the thorny issue of Social Security reform. Even before that happens, however, a consensus may form around the Boskin committee's argument that the Consumer Price Index overstates cost of living increases by 1.1 percent annually. Every year, the federal government by statute must apply changes in the CPI to spending on entitlements. If the Boskin analysis is adopted, more than 1 trillion dollars will be wrung out of entitlement programs over the next decade. While such a change is not a panacea for all that ails the federal budget, it certainly is a move in the right direction.

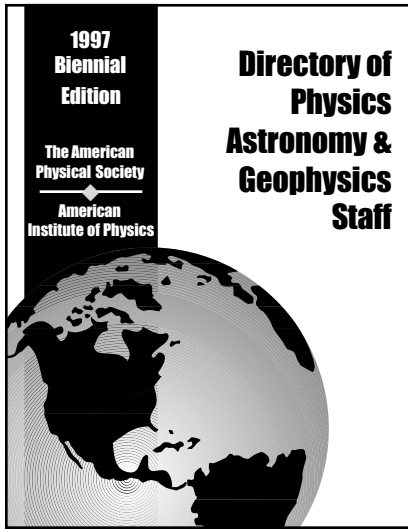
There is another motivator for bipartisan action on the Hill. Members of Congress, above all else, are masters of practical politics. They know that without a bipartisan consensus, entitlement reform is impossible, and without such reform, the discretionary programs they use to build constituent support will

slowly erode. Reining in entitlement spending is good public policy, but it is also good politics.

In the glow of expressions of bipartisan cooperation, science, which has been caught in the crossfire of political sniping for two years, may again emerge as the nonpartisan issue it ought to be. An early indicator is Senate Bill S. 124, *The National Research Investment Act of 1997*. The bill authorizes the federal government to double its investment in basic science and medical research over ten years.

A scant six months ago, such legislation, which argues for more broad-based federal spending, rather than less, might only have been imagined as emanating from the liberal Democratic caucus. The current bill, however, is sponsored by Texas Republican Senator Phil Gramm and is cosponsored by two of his conservative GOP colleagues, Senators Connie Mack of Florida and Kay Bailey Hutchison of Texas.

While authorizers do not wield the power of appropriators, who ultimately determine how much federal money will be spent and where it will go, the mere presence of Senate Bill S. 124 may presage a period of political cooperation in which American science will thrive once more. A thaw in the frozen budgets may yet be possible. What Members of Congress need to hear now are the voices of scientists applauding them on adopting such a course of action.



Directory of Physics, Astronomy & Geophysics Staff To Be Mailed in March

In late-March to early-April, APS members will receive the 1997 Directory of Physics,

Astronomy and Geophysics Staff (DPAGS), a listing of physicists, astronomers and geophysicists in North America published by the American Institute of Physics (AIP) and the APS. This edition contains information on more than 31,000 scientific staff members at more than 2,000 institutions and organizations. Please note that it is NOT a replacement for the APS Membership Directory, but rather an organizational and geographic based listing. Hence, some APS members are not listed, while others that are listed may not be APS members. APS members are advised to retain their current copies of the APS Membership Directory.

The DPAGS directory is the 29th in a series that began in 1959. Originally it was a directory of academic physics departments, but has steadily expanded in scope and size. It now covers a wider range of organizations, including governmental agencies and laboratories, large corporations and small firms, as well as academic institutions. The 1997 edition also contains expanded information on societies that serve the physics and related communities, including contact information for AIP, its member societies, over 30 related U.S. societies, and more than 150 physics societies around the world.

Electron Centennial Broadcast in April

APS members and other interested parties are invited to explore exciting new advances in atomic-level science and technology during a student-oriented symposium, to be broadcast live via satellite from Central Michigan University on Wednesday, April 9, 1997. The program will feature award-winning scientists, including Roald Hoffmann, a professor of chemistry at Cornell University and recipient of the 1981 Nobel Prize in Chemistry; Marvin Cohen, University Professor of Physics at the University of California, Berkeley and recipient of the 1994 APS Lilienfeld Prize; and Max Lagally, E.W. Mueller Professor of Materials Science at the University of Wisconsin and recipient of the 1994 APS David Adler Lectureship and the 1995 APS Davison-Germer Prize. The project is sponsored in part by the National Science Foundation, GTE, and Central Michigan University. Information on down-linking to this free broadcast can be obtained by calling 517-774-3487, or by visiting the Electron Birthday web-site at <http://www.phy.cmich.edu/electron>.

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Letters to the editor are welcomed from the membership. Letters must be signed and should include an address and daytime telephone number. The APS reserves the right to select and to edit for length or clarity. All correspondence regarding *APS News* should be directed to: Editor, *APS News*, One Physics Ellipse, College Park, MD 20740-3844, email: letters@aps.org.

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Physicists to be Honored at 1997 March Meeting

Eight APS prizes and awards will be presented during a special ceremonial session at the 1997 APS March Meeting in Kansas City, Missouri, to be held later this month. Citations and biographical information for each recipient follow.

1997 IRVING LANGMUIR PRIZE

The Langmuir Prize was established in 1964 by the General Electric Foundation (now the GE Fund) to recognize outstanding interdisciplinary research in chemistry and physics, in the spirit of Irving Langmuir.

Jack Herschel Freed
Cornell University

Citation: "For his development of new magnetic resonance methods and theory, including computational algorithms for the stochastic Liouville equation, time-domain ESR methods for the study of molecular dynamics in liquids, applications of ESR to surface science, and the discovery of nuclear spin-waves in spin-polarized H atoms."

Freed received his PhD from Columbia University in 1962 and joined the faculty of Cornell University the following year, where he has remained ever since. His current research interests focus on the application of magnetic resonance to problems in chemical physics and biophysics, including the further development of two-dimensional and Fourier-transform ESR techniques to enhance the sensitivity to motional dynamics in complex fluids.

1997 LARS ONSAGER PRIZE

The Onsager Prize was established in 1993 by an endowment from Drs. Russell and Marian Donnelly. It is intended to recognize outstanding research in theoretical statistical physics, including the quantum fluids.

Robert H. Kraichnan
Los Alamos National Laboratory

Citation: "For his deep contributions and sustained leadership in the field of turbulence theory. His quantitative predictions for the inverse cascade in two-dimensional turbulence, his treatment of passive scalar transport, and his direct interaction approximation are landmark achievements."

Kraichnan received his PhD in theoretical physics from MIT in 1949. He has been a research member at the Institute for Advanced Study and Bell Laboratories, and a research associate at Columbia University and the Courant Institute at New York University, but has been self-employed for much of his professional career. A past recipient of the Otto LaPorte Award, he has served as a consultant, contractor or grantee for the Naval Research Laboratory, NASA, Woods Hole Oceanographic Institute, the Institute for Defense Analysis, the National Science Foundation and the U.S. Department of Energy.

1997 OLIVER E. BUCKLEY PRIZE

Established in 1952 by an endowment from AT&T Bell Laboratories, the Oliver E. Buckley Prize is intended to recognize and encourage outstanding theoretical or experimental contributions to condensed matter physics in America.

James S. Langer
*University of California
Santa Barbara*

Citation: "For contributions to the theory of kinetics of phase transitions particularly as applied to nucleation and dendritic growth."

Langer received his PhD in mathematical physics at the University of Birmingham, England, in 1958 and returned to join the faculty of Carnegie-Mellon University, where he had received his B.S. degree three years earlier. In 1982, he became professor of physics and a permanent member of the Institute for Theoretical Physics at UCSB, serving as the institute's director from 1989 to 1995. His research has been in the theory of nonequilibrium phenomena in condensed matter, specifically in such areas as quantum many-body theory of transport in solids, the kinetics of first-order phase transitions, dendritic pattern formation in crystal growth, and most recently, the dynamics of earthquake and fracture. He is chair-elect of the APS Division of Condensed Matter Physics, which he will chair in 1997.

1997 DAVISSON-GERMER PRIZE

The Davison-Germer Prize was established in 1965 by AT&T Bell Laboratories. It is intended to recognize and encourage outstanding work in atomic physics or surface physics.

Jerry Tersoff
IBM/T.J. Watson Research Center

Citation: "For insightful, creative theoretical descriptions of surface phenomenology; particularly of crystal growth dynamics, surface structures and their probes."

Tersoff received his PhD from the University of California, Berkeley in 1982 and spent two years as a postdoc at Bell Laboratories before joining the research staff at the IBM/T.J. Watson Research Center, where he has remained ever since. He has worked in a variety of areas relating to surface and interface physics and materials physics, including theories of scanning tunneling microscopy, model interatomic potentials, stress effects at surfaces, and strain relaxation in epitaxial thin films. Most recently he has addressed ways in which, during heteroepitaxial growth, strain can lead to controllable self-assembly and self-organization of nanostructures such as quantum dots and quantum wires.

1997 HIGH POLYMER PHYSICS PRIZE

The High Polymer Physics Prize was established by an endowment from the Ford Motor Company to recognize outstanding accomplishment and excellence in contributions to high polymer physics research.

Frank Steven Bates
University of Minnesota

Citation: "For outstanding contributions to the physics of polymer-polymer phase behavior and the self-assembly of block-polymers."

Bates received his PhD in chemical engineering from the Massachusetts Institute of Technology in 1982 and promptly joined the technical staff at

Bell Laboratories. In 1989 he moved to the University of Minnesota, where he is presently a Distinguished McKnight University Professor. He was awarded the Dillon Medal in 1989, and is a divisional associate editor of *Physical Review Letters*. Bates has investigated a variety of topics related to the thermodynamics and dynamics of polymers and polymer mixtures, including isotope-driven phase separation, order and disorder in block copolymers, and critical phenomena in block copolymer-homopolymer blends. He is currently studying non-equilibrium phenomena in self-assembled soft materials in bulk and thin film forms.

1997 EARLE K. PLYLER PRIZE

The Earle K. Plyler Prize was established in 1976 by the George E. Crouch Foundation to recognize and encourage notable contributions to molecular spectroscopy.

Roger Ervin Miller
*University of North Carolina
Chapel Hill*

David Nesbitt
JILA/University of Colorado

Citation: "In recognition of their spectroscopic investigations that have elucidated the structure and eigenstate resolved dynamics of weakly bound complexes. They have each pioneered a novel method of high resolution infrared spectroscopy and have used their respective methods in a series of insightful investigations of a wide range of chemically important complexes."

Miller received his PhD from the University of Waterloo in Canada in 1980, where his research focused on the development and use of a new and powerful laser spectroscopic method, now well-known as Opto-Thermal Spectroscopy. He then spent four years at the Australian National University as a research fellow, where he set up a new laboratory for the study of intermolecular forces. He also applied this method to the study of weakly bound complexes and in crossed molecular beam scattering studies. In 1985 he joined the faculty at the University of North Carolina, where he was recently appointed as John B. Carroll Professor. He has worked in such areas as spectroscopy and dynamics of weakly bound complexes, surface sciences, atmospheric chemistry, and combustion.

Nesbitt received his PhD at the University of Colorado in 1981. He is presently Adjunct Professor at the Joint Institute for Laboratory Astrophysics, the National Institute of Standards and Technology, and the Department of Chemistry and Biochemistry at the University of Colorado. A past recipient of the APS Wilson Prize, Nesbitt's experimental research at JILA has involved application of direct absorption IR laser techniques to study flash kinetic

spectroscopy of transient radicals, unimolecular energy flow in vibrationally excited states, state-to-state collisional energy transfer dynamics in crossed beams, and spectroscopy of weakly bound van der Waals and hydrogen bonded complexes in silt supersonic jet expansions.

1997 DAVID ADLER LECTURESHIP AWARD

The David Adler Lectureship Award was established in 1988 by contributions from friends of David Adler. Its purpose is to recognize an outstanding contributor to the field of materials physics, who is noted for his or her research, review articles, and lecturing.

John D. Joannopoulos
Massachusetts Institute of Technology

Citation: "For his pioneering use of modern computational tools for the calculation of the electronic, vibrational and optical properties of amorphous, crystalline and photonic bandgap materials, including their surfaces and defects, and for his excellence in lecturing, writing and training students in these areas."

Joannopoulos received his PhD from the University of California, Berkeley, in 1974 and promptly joined the faculty of MIT, where he is currently a professor of physics. His research efforts have been in theoretical condensed matter physics, and he is responsible for the development of numerous calculational schemes and techniques for the study of complex solid systems. He has authored or co-authored more than 275 journal articles and one textbook, and holds six U.S. patents.

1997 JOHN H. DILLON MEDAL

The John H. Dillon Medal was established in 1983 by the Division of High Polymer Physics to recognize outstanding research accomplishments by a young polymer physicist.

Nitash Prevez Balsara
Brooklyn Polytechnic University

Citation: "For innovative and illuminating optical and neutron experiments to probe the state of order in multi-component polymer systems."

A native of India, Balsara received his PhD in chemical engineering from Rensselaer Polytechnic Institute in 1988, and then did postdoctoral work at the University of Minnesota and at Exxon Research and Engineering Company. In 1992 he joined the faculty at Polytechnic University in Brooklyn, New York, where he is currently an associate professor of chemical engineering. A recipient of the NSF's Young Investigator Award in 1994, Balsara's research is concerned with microstructure formation and phase transitions in multicomponent polymer materials.

APS Prize, Award and Fellowship Information [<http://aps.org>]

Visit the APS home page for detailed information about the APS honors program. This site gives detailed information about each award, procedures and deadlines for submitting nominations, selection committees and sponsors, and background information on previous recipients.

NOMINATIONS FOR 1998 APS PRIZES AND AWARDS

The following prizes and awards will be bestowed at meetings of the Society in the coming year. Members are invited to nominate candidates to the respective committees charged with the privilege of recommending the winners. A brief description of each prize and award is given below, along with the addresses of the selection committee chairs to whom nominations should be sent. Please refer to the APS Membership Directory, pages xxiii-xxxix, or the APS Home Page [http://aps.org] under the Prize and Award button, for complete information regarding rules and eligibility requirements for individual prizes and awards.

PRIZES

JULIUS EDGAR LILIENFELD PRIZE

Sponsored by the Lilienfeld Trust.

Purpose: To recognize a most outstanding contribution to physics.

Nature: The prize consists of \$10,000, a certificate citing the contributions made by the recipient, and expenses for three lectures by the recipient given at an APS general meeting, a research university, and a predominantly undergraduate institution.

Send the name of candidates, biographical information and supporting letters to: David L Goodstein, 114-36, Caltech, Pasadena, CA 91125, Phone: (818) 356-4319, Fax: (818) 683 9060, Email: david_goodstein@Starbase1.Caltech.edu. Nominations must be received no later than 1 July 1997.

LARS ONSAGER PRIZE

Endowed by Russell and Marion Donnelly.

Purpose: To recognize outstanding research in theoretical statistical physics, including the quantum fluids.

Nature: The prize consists of \$10,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Katepalli Raju Sreenivasan, Dept of Mech Engr, Yale Univ, PO Box 208286, New Haven, CT 06520, Phone: (203) 432-4345, Fax: (203) 432-7654, Email: k.sreenivasan@yale.edu. Nominations must be received no later than 1 July 1997.

ARTHUR L. SCHAWLOW PRIZE IN LASER SCIENCE

Endowed by the NEC Corporation.

Purpose: To recognize outstanding contributions to basic research that uses lasers to advance our knowledge of the fundamental physical properties of materials and their interaction with light.

Nature: The prize consists of \$10,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Thomas J McIlrath, APS, One Physics Ellipse, College Park, MD 20740, Phone: (301) 209-3220, Fax: (301) 209-0844, Email: mcilrath@aps.org. Nominations must be received no later than 1 July 1997.

HANS A. BETHE PRIZE

This prize is endowed by contributions from the Division of Astrophysics, the Division of Nuclear Physics and friends of Hans A. Bethe.

Purpose: To recognize outstanding work in theory, experiment or observation in the areas of astrophysics, nuclear physics, nuclear astrophysics, or closely related fields.

Nature: The prize consists of \$7,500 and a certificate citing the contributions made by the recipient.

Send names of candidates, biographical information and supporting letters to: Ernest Henley, Dept of Phys, Univ of Washington, PO Box 351560, Seattle WA 98195, Phone: (206) 543-2896, Fax: (206) 685-0635, Email: henley@phys.washington.edu. Nominations must be received by 1 July 1997.

WILL ALLIS PRIZE FOR THE STUDY OF IONIZED GASES

Purpose: To recognize and encourage outstanding research into the microscopic or macroscopic behavior of ionized gases.

Nature: The Prize consists of \$5,000 and a certificate citing the contributions made by the recipient. An allowance will be provided for travel expenses of the recipient to the meeting of the Society at which the Prize is bestowed.

Send nomination letters, biographical information and supporting letters to: Kurt H Becker, Department of Physics and Engineering Physics, Stevens Institute of Technology, Hoboken, NJ 07030, Phone/Fax: (201) 216-5671, Email: kbecker@stevens-tech.edu. Nominations must be received by 1 July 1997.

DANNIE HEINEMAN PRIZE FOR MATHEMATICAL PHYSICS

Endowed by the Heineman Foundation for Research, Educational, Charitable, and Scientific Purposes, Incorporated through the American Institute of Physics.

Purpose: To recognize outstanding publications in the field of mathematical physics.

Nature: The prize consists of \$7,500 and a certificate citing contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Stanley Deser, Dept of Phys, Brandeis Univ, 415 South St, Waltham, MA 02254, Phone: (617) 736-2845, Fax: 617 736 2915, Email: deser@binah.cc.brandeis.edu. Nominations must be received no later than 1 July 1997.

TOM W. BONNER PRIZE IN NUCLEAR PHYSICS

Endowed by Friends of Tom W. Bonner.

Purpose: To recognize and encourage outstanding experimental research in nuclear physics, including the development of a method, technique, or device that significantly contributes in a general way to nuclear physics research.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Noemie Benczer, Dept of Physics, Rutgers University, New Brunswick, NJ 08903, Phone: (908) 932-2525, Fax: (908) 932-4343. Nominations must be received no later than 1 July 1997.

BIOLOGICAL PHYSICS PRIZE

The Prize was established in 1981 by friends of the Division of Biological Physics.

Purpose: To recognize and encourage outstanding achievement in biological physics research.

Nature: The Prize consists of \$5,000, an allowance for travel to attend the meeting at which the Prize is awarded, and a certificate citing the contributions made by the recipient or recipients.

Send nomination letter, biographical summary and supporting letters to: John J. Hopfield, Beckman Institute, Caltech 139-74, Pasadena, CA 91125, Phone: (818) 397-2808, Fax: (818) 792-7402, Email: john@hope.caltech.edu. Nominations must be received by 1 July 1997.

OLIVER W. BUCKLEY CONDENSED MATTER PHYSICS PRIZE

Endowed by AT&T Bell Laboratories.

Purpose: To recognize and encourage outstanding theoretical or experimental contributions to condensed matter physics.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: John Clarke, Dept of Phys, UCB, 366 LeConte Hall, Berkeley, CA 94720, Phone: (510) 642-3069, Fax: (510) 642 1304, Email: jclarke@physics.berkeley.edu. Nominations must be received no later than 1 July 1997.

DAVISSON-GERMER PRIZE

Sponsored by AT&T Lucent Technologies.

Purpose: To recognize and encourage outstanding work in atomic physics or surface physics.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient. This annual prize will normally be awarded alternatively for outstanding work in atomic physics one year and for outstanding work in surface physics the following year. The 1998 prize will be awarded for outstanding work in surface physics.

Send the name of candidates, biographical information and supporting letters to: Andrew C Tam, 21463 Continental Cir., Saratoga CA 95070, Phone: (408) 927-1943, Email: ACTAM@almaden.ibm.com. Nominations must be received no later than 1 July 1997.

HIGH POLYMER PHYSICS PRIZE

Sponsored by the Ford Motor Company.

Purpose: To recognize outstanding accomplishments and excellence of contributions in high polymer physics research.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Timothy P Lodge, Dept of Chem, Univ of Minnesota, 207 Pleasant St SE, Minneapolis, MN 55455-0431, Phone: (612) 625-0877, Fax: (612) 624-1589, Email: lodge@chemsun.chem.umn.edu. Nominations must be received no later than 1 July 1997.

FRANK ISAKSON PRIZE

The prize is supported by *Solid State Communications* (Elsevier Science Ltd.).

Purpose: To recognize and encourage outstanding contributions to the field of optical effects in solids.

Nature: The Prize consists of \$5,000, an allowance for travel to the meeting of the Society at which the prize is being presented and a certificate citing the contributions made by the recipient.

Send nomination letters, biographical information and letters of support to: Thomas Timusk, Dept of Phys, McMaster Univ, Hamilton ON L8S 4M1 Canada, Fax: (905) 546-1252, Email: timusk@mcmaster.ca. Nominations must be received by 1 July 1997.

GEORGE E. PAKE PRIZE

Endowed by the Xerox Corporation.

Purpose: To recognize and encourage outstanding work by physicists combining original research accomplishments with leadership in the management of research or development in industry.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Venkatesh Narayanamurti, Off of the Dean, Coll of Engr, UCSB, Santa Barbara, CA 93106, Phone: (805) 893-3141, Fax: (805) 893-8124, Email: venky@engrhub.ucsb.edu. Nominations must be received no later than 1 July 1997.

W.K.H. PANOFSKY PRIZE

Sponsored by the friends of W.K.H. Panofsky and the Division of Particles and Fields.

Purpose: To recognize and encourage outstanding achievements in experimental particle physics.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: James E Pilcher, Enrico Fermi Inst, Univ of Chicago, 5640 S Ellis Ave, Chicago, IL 60637, Phone: (312) 702-7443, Fax: (312) 702 1914, Email: pilcher@uchep.uchicago.edu. Nominations must be received no later than 1 July 1997.

EARLE K. PLYLER PRIZE

Sponsored by the George E. Crouch Foundation.

Purpose: To recognize and encourage notable contributions to molecular spectroscopy.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Terry A Miller, Dept of Chem, Ohio State Univ, 140 W 18th St, Columbus, OH 43210, Phone: (614) 292-2569, Fax: (614) 292-1948, Email: tamiller+@osu.edu. Nominations must be received no later than 1 July 1997.

PRIZE TO A FACULTY MEMBER FOR RESEARCH IN AN UNDERGRADUATE INSTITUTION

Sponsored by the Research Corporation.

Purpose: To honor a physicist whose research in an undergraduate setting has achieved wide recognition and contributed significantly to physics and who has contributed substantially to the professional development of undergraduate physics students.

Nature: The prize consists of a \$5,000 stipend to the recipient, a certificate citing the contribution of the recipient, and a separate \$4,000 unrestricted grant for the research of the recipient to the awardee's institution.

Send the name of candidates, biographical information and supporting letters to: Thomas D Rossing, Dept of Phys, Northern Illinois Univ, De Kalb, IL 60115, Phone: (815) 753-6493. Nominations must be received no later than 1 July 1997.

ANEESUR RAHMAN PRIZE

Sponsored by the IBM Corporation.

Purpose: To recognize and encourage outstanding achievement in computational physics research.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Malvin H Kalos, 521 ETC Bldg, Cornell Univ, Hoy Rd, Ithaca, NY 14853-3801, Phone: (607) 254-8691, Fax: (607) 254-8888, Email: kalos@tc.cornell.edu. Nominations must be received no later than 1 July 1997.

J.J. SAKURAI PRIZE FOR THEORETICAL PHYSICS

Endowed by the family and friends of J.J. Sakurai.

Purpose: To recognize and encourage outstanding achievement in particle theory by a young physicist.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: William J Marciano, Dept of Phys, Brookhaven Natl Lab., Upton, NY 11973, Phone: (516) 282-3151, Email: marciano@bnlcli.bnl.gov. Nominations must be received no later than 1 July 1997.

ROBERT R. WILSON PRIZE

Endowed by friends of Robert R. Wilson.

Purpose: To recognize and encourage outstanding achievement in the physics of particle accelerators.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Claudio Pellegrini, Dept of Phys, UCLA, 405 Hilgard Ave, Los Angeles, CA 90024-1547, Phone: (310) 206-1677, Fax: (310) 206-1091, Email: claudio@vesta.physics.ucla.edu. Nominations must be received no later than 1 July 1997.

AWARDS

JOSEPH F. KEITHLEY AWARD FOR ADVANCES IN MEASUREMENT SCIENCE

This Award is being endowed by Keithley Instruments, Inc. and the Instrument and Measurement Science Topical Group (IMSTG).

Purpose: To recognize physicists who have been instrumental in the development of measurement techniques or equipment that have impact on the physics community by providing better measurements.

Nature: The prize consists of \$5,000 and a certificate citing the contributions made by the recipient, plus travel to the meeting at which the prize is bestowed.

Send nomination letter, biographical information and supporting letters to: Robert J Erdman, Keithley Instruments Inc, 28775 Aurora Rd, Solon OH 44139, Phone: (216) 248-0400, Fax: (216) 248-6168, Email: erdman_bob@keithley.com. Nominations must be received by 1 July 1997

LEROY APKER AWARDS

Endowed by Jean Dickey Apker, in memory of LeRoy Apker.

Purpose: To recognize outstanding achievement in physics by undergraduate students, thereby providing encouragement to young physicists who have demonstrated great potential for future scientific accomplishment.

Nature: Two awards may be made, one to a nominee from an institution that offers a Ph.D. program in physics, the other to a nominee from an institution that does not. The award to each recipient consists of \$3,000, an allowance for travel to the meeting of the Society at which the award is being presented, and a certificate citing the work and school of the recipient. Each of the finalists in the annual competition will receive an honorarium of \$1,000 and a certificate as an Apker Award Finalist. Certificates and grants equal to 50 percent of the recipient and finalist awards will be presented to the home institutions.

Send the name of candidates, biographical information and supporting letters to: Barrett Ripin, Administrator, Apker Award Selection Committee, The American Physical Society, One Physics Ellipse, College Park, MD 20740-3844, Phone: (301) 209-3233, Fax: (301) 209-0865, email: ripin@aps.org. Nominations must be received no later than 13 June 1997.

MARIA GOEPPERT-MAYER AWARD

Sponsored by the General Electric Foundation.

Purpose: To recognize and enhance outstanding achievement by a woman physicist in the early years of her career, and to provide opportunities for her to present these achievements to others through public lectures.

Nature: The award consists of \$2,500, plus a \$4,000 travel allowance to provide opportunities for the recipient to give lectures in her field of physics at four institutions of her choice and at the meeting of the Society at which the award is bestowed. Nominee must be a female physicist having U.S. citizenship or a permanent U.S. resident and received her Ph.D. after Sept. 1, 1987.

Send the name of candidates, biographical information and supporting letters to: Anne Kernan, 33605 Moonsail Drive, Dana Point, CA 92629-4483, (H)Phone: (714) 488-7750, (H) Fax: (714) 488-7729, email: a.kernan@worldnet.att.net. Nominations must be received no later than 30 May 1997.

JOSEPH A. BURTON FORUM AWARD (Formerly the Forum Award)

Endowed in 1997 by Jean Dickey Apker

Purpose: To recognize outstanding contributions to the public understanding or resolution of issues involving the interface of physics and society.

Nature: The award consists of \$3,000, a certificate citing the contributions of the recipient, and an allowance for travel to the meeting of the Society at which the award is presented. It will be awarded annually.

Send nomination letter, biographical information and supporting letters to: Tina Marie Kaarsberg, Vista Tech, 7101 Woodland Ave, Takoma Park, MD 20912, Phone: (301) 270-0646, Fax: (301) 270-5359, Email: tina.kaarsberg@hq.doe.gov. Nominations must be received by 1 July 1997.

LEO SZILARD AWARD FOR PHYSICS IN THE PUBLIC INTEREST

Purpose: To recognize outstanding accomplishments by a physicist in promoting the use of physics for the benefit of society in such areas as the environment, arms control, and science policy.

Nature: The award consists of a certificate citing the contributions of the recipient and a sculpture to be held one year and passed on to the next recipient.

Send the name of candidates, biographical information and supporting letters to: Send nomination letter, biographical information and supporting letters to: Tina Marie Kaarsberg, Vista Tech, 7101 Woodland Ave, Takoma Park, MD 20912, Phone: (301) 270-0646, Fax: (301) 270-5359, Email: tina.kaarsberg@hq.doe.gov. Nominations must be received by 1 July 1997.

MEDALS AND LECTURESHIPS

DAVID ADLER LECTURESHIP AWARD

Sponsored by the friends of David Adler.

Purpose: To recognize an outstanding contributor to the field of materials physics who is noted for the quality of his/her research, review articles, and lecturing.

Nature: The award consists of an award an honorarium for the lecturer, and a certificate citing the contribution made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Jim Roberto, Oak Ridge National Laboratory, MS6033 Solid State Div., P.O. Box 2008, Oak Ridge, TN 37831, Phone: (615) 576-0227, Fax: (615) 574-4143, Email: robertojb@ornl.gov. Nominations must be received no later than 1 July 1997.

EDWARD A. BOUCHET AWARD

Sponsored by the Research Corporation.

Purpose: The Bouchet Award is intended to promote the participation of under-represented minorities in physics by publicizing the recipients work and career development to the physics community, especially to young minority physics students.

Nature: The lectureship consists of a stipend of \$3,000 plus support for travel to an APS general meeting where the recipient will receive the award and give his/her first address. In addition, the recipient will be invited to lecture at least three academic institutions where the impact of the visit on minority students would be significant.

Send the name of candidates, biographical information and supporting letters to: Kennedy J Reed, L-41, Lawrence Livermore National Lab., Livermore, CA 94550, Phone: (510) 423-1112, Fax: (510) 423-7228, Email: reed5@LLNL.GOV. Nominations must be received no later than 1 July 1997.

JOHN H. DILLON MEDAL

The medal is sponsored by *Polymer*, (Elsevier Science Ltd.)

Purpose: To recognize outstanding accomplishments by young polymer physicists.

Nature: The award consists of \$2,000, the John H. Dillon Medal, an allowance to travel to the meeting at which the medal is to be presented, and a certificate citing the contributions made by the recipient.

Send the name of candidates, biographical information and supporting letters to: Timothy P Lodge, Dept of Chem, Univ of Minnesota, 207 Pleasant St SE, Minneapolis, MN 55455-0431, Phone: (612) 625-0877, Fax: (612) 624-1589, Email: lodge@chemsun.chem.umn.edu. Nominations must be received no later than 1 July 1997.

DISSERTATION AWARDS

AWARD FOR OUTSTANDING DOCTORAL THESIS RESEARCH IN BEAM PHYSICS

Supported by the Universities Research Association.

Purpose: To recognize doctoral thesis research of outstanding quality and achievement in beam physics and engineering.

Nature: The award consists of \$1,500 and a certificate to be presented at an awards ceremony at the Division of Physics of Beams Annual Meeting.

Send the name of candidates, biographical information and supporting letters to: Alexander Wu, SLAC, Stanford Univ, PO Box 4349, Stanford, CA 94309, Phone: (415) 926-2985, Fax: (415) 926-4999, Email: achao@slac.stanford.edu. Nominations must be received no later than 1 July 1997.

DISSERTATION IN NUCLEAR PHYSICS AWARD

Endowed by members and friends of the Division of Nuclear Physics.

Purpose: To recognize a recent Ph D in Nuclear Physics.

Nature: The Award consists of \$1,000 and an allowance for travel to the annual Spring Meeting of the Division of Nuclear Physics, when the award will be presented.

Send nomination letters, biographical information, and supporting letters to: Bunny C Clark, Phys Dept, The Ohio State Univ, 174 W 18th Ave, Columbus OH 43210, Phone: (614) 292-1843, Fax: (614) 292-7557, Email: bcc@mps.ohio-state.edu. Nominations must be received by 1 July 1997.

OPINION

APS VIEWS

PGNet and You

by D. Allan Bromley (APS President) and Robert Schrieffer (APS Past President)

The following message summarizes the 1996 grassroots legislative affairs of the American Physical Society. It was sent to the nearly 1,000 APS members who have volunteered to contact their Member of Congress when they receive an alert from the APS Washington Office. The activities of these APS members have been critical to the welfare of the entire physics community. We applaud their efforts and on behalf of the APS we express our thanks.

The APS established the Physics and Government Network (PGNet) three years ago to respond to the federal budget challenges that were then already evident on the science horizon. Today, the PGNet has grown to 1,000 participants, far beyond our original expectations. Indeed, as members of the network, many of you have played a significant role in helping to shape federal science policy during these very difficult times by ably responding when we called upon you for congressional action.

During 1996, we issued five PGNet alerts. In each instance, we notified only those of you whose Members of Congress were playing key roles in pending legislation. To those of you whom we contacted, we say thank you for your help on behalf of the APS membership. Below, we provide you with a summary of the 1996 issues in which PGNet participated and what the results were.

If we did not contact you last year, please remember that we still need you. Committee assignments have been reshuffled in the new 105th Congress, and the critical issues may change. If your Representative and Senators were not heavily involved in science policy activities in 1996, they may well be in the coming year.

One lesson that we learned well from our 1996 activities is that our success on policy issues improves whenever the scientific community speaks with a broad, consistent and strong voice. Therefore, as part of our APS efforts in 1997 we are attempting to improve our cooperation with other scientific societies. We hope, too, that with vigilance, we may avoid some of the crises that erupted in 1996. Still, some crises are inevitable, and your participation in the PGNet is crucial if we are to preserve our nation's leadership in science.

SUMMARY OF 1996 PGNET ACTIVITIES

ALERT 1. HELIUM

ISSUE: Proposed sale of the nation's strategic helium reserve.

STRATEGY: The APS Council issued a statement urging Congress to halt the sale. The APS Washington Office publicized the issue in major print media. Letters were sent to all Members of Congress with the APS Council statement and press clippings included. Meetings were held with White House and congressional staff and key industrial leaders. An alert was sent to PGNet members matched to key members of the Senate Energy and Natural Resources Committee.

OUTCOME: Bipartisan acceptance of an amendment to require the National Academy of Sciences to report on the technological implications of selling the helium reserve before any sale can occur. The amendment was included in the final legislation and was signed into law.

ALERT 2. NSF FULL YEAR APPROPRIATION

ISSUE: Lack of full year appropriations for NSF with potential loss of \$75 million for FY 1996.

STRATEGY: An alert was sent to all PGNet members and then to all 20,000 APS members with listed e-mail addresses. The alerts resulted in more than 2000 direct contacts by physicists to Members of Congress. Other science societies carried out similar initiatives. The APS Washington Office also initiated direct contact with Appropriations Committee Chairman Bob Livingston.

OUTCOME: Livingston pledged to take up the NSF issue at the earliest possible date. An omnibus appropriations bill passed in March that restored full funding to NSF.

ALERTS 3 & 4. DOE RESEARCH BUDGET

ISSUE: Proposed major cuts to the DOE's FY 1997 research budget.

STRATEGY: The APS Council issued a statement urging the Administration and Members of Congress to maintain funding for the DOE Office of Energy Research (OER). The APS Council statement was sent to members of the House Budget Committee, House Science Committee, Senate Energy and Natural Resources Committee, House and Senate Appropriations Committees, and Executive Branch officials. Early in the budget cycle, an alert was sent to members of the PGNet who were constituents of members of the House Budget Committee. Then, last September, an alert was sent to PGNet members who were constituents of the conference committee for Energy and Water Appropriations.

OUTCOME: The Senate Appropriations Bill increased spending for OER by 2.5%; the House Bill called for flat funding. The House and Senate conferees split the difference, resulting in slightly more than a 1% increase in spending for OER relative to FY 1996.

ALERT 5. NSF 1997 APPROPRIATION

ISSUE: Late in the budget cycle last June, the conferees on the Budget Resolution agreed to increase domestic discretionary funding by \$4 billion, adding 350 million to the VA-HUD Appropriations Subcommittee which funds the NSF.

STRATEGY: An alert was sent to PGNet members who were constituents of the House VA-HUD Appropriations Subcommittee. Appropriators were urged to put some of the additional money into the NSF budget. The NSF itself was unable to make headway.

OUTCOME: No money was added to the NSF budget.

LETTERS

More On: Is Science a Victim of its Own Success?

In his December 1996 Back Page article, "Is Science a Victim of Its Own Success," John Horgan continues to parade his fundamental misunderstanding of science. His misconceptions are most clearly evidenced by his use of the concept of "truth" in scientific contexts. In reality, there is no such thing as a "scientific truth" or "scientific fact"; the best that can be found are models that work (for now) and patterns of observation for which no counterexample has yet been found. Science can never make the pronouncement, "Verily, it is so;" all that it can say is, "It is as though..."

Eternal truths, which by their very nature are and ever shall be incontrovertible, are the constructs of religion, not of science. Of course, we cannot help but acquire a certain confidence in theories and experiments that have worked for generations, but that does not mean that they are true, or that our confidence is justified. Though we stand indeed upon the shoulders of giants, we have no guarantee that those shoulders provide us a secure footing.

Those who would like to believe that scientific progress consists in the creation of ever-widening circles of certain knowledge would do well to read "A History of Theories of the Aether and Electricity," by Sir Edmund Whittaker, or, for a perspective on phlogiston, "Three Centuries of Chemistry," by Sir Irvine Masson. As concepts, phlogiston and the ether each neatly explained (for a time) all that was known in a particular field, but

phlogiston was eventually washed away by a rising tide of contrary experiments, and the ether by a single big wave.

One might have hoped that science would at least prove to be a continually improving succession of approximations to some perfect model of the universe, but even that monotonicity is denied us. Abandoned concepts like the corpuscular theory of light and the transmutability of elements, long thought to be safely buried, must sometimes be resurrected in the light of inconvenient later observations.

Horgan pours scorn once more on what he calls "ironic science." I am in no way qualified to give an opinion on superstring theory, but I would point out that a theory is indeed scientific if, and only if, it is in principle falsifiable. It will not become a model, however, until it is shown that in addition to being as yet unfalsified, it makes novel predictions in accord with observation. It is such considerations that will decide the fate of superstring theory, not Horgan's inability to think in ten dimensions.

As scientists, our most valuable knowledge is the recognition of what we do not know, and our most valuable attitude the willingness to question that which we think we do. Perhaps science writers should study also these aspects of science, as well as the day-to-day nuts and bolts of theory and experiment.

J.B. Gunn

Mount Kisco, New York

Defending The End of Science

I hate to kick someone when they're down, but I must respond to the letters addressing my December 1996 essay, "Is Science a Victim of its Own Success?" In this issue, J.B. Gunn attempts to rebut me with the notorious postmodernism gambit. There is no such thing as absolute truth; therefore science—and, more importantly, funding for science—can never come to an end. How convenient.

What separates science, real science, from philosophy and other less potent modes of knowledge is that science establishes certain facts beyond a reasonable doubt. Does Mr. Gunn think that we lack sufficient evidence to believe in electrons, or thermonuclear fusion, or the recession of galaxies? What about the proposition that the earth is round and not flat?

Gordon Kane and Christopher Kolda suggest (*APS News*, February 1997) that superstring theory may also one day be empirically validated, because it is "testable." Well, sort of. Certain low-energy predictions of superstring

theory, such as the existence of supersymmetric particles, are indeed testable. But other less extravagant theories make the same predictions. (The same is true of inflation, which is based on exotic, Planck-scale effects that can never be verified.)

Most prominent superstring proponents, such as Edward Witten and Steven Weinberg, have conceded that particle accelerators will never gain access to the realm that superstrings supposedly inhabit; mathematical consistency and logic rather than direct empirical evidence will have to suffice for "proof."

I suspect that most physicists would agree with Sheldon Glashow that logic and consistency cannot be a substitute for empirical data; the latter is what separates modern physics from philosophy. But of course Glashow is just an "expert," so true believers like F.R. Tangherlini can ignore him and keep their faith intact.

John Horgan

New York, N.Y.

(Correction: F.R. Tangherlini's name was misspelled in the February issue)

How to Join PGNet

If you are interested in joining the PGNet, please send an e-mail message to Francis Slakey, APS Associate Director of Public Affairs: slakey@aps.org. Your participation can make a significant difference to our nation's science policy.

The Citizen Scientist: A Model for Professional Survival

by P.W. Hammer

This has been quite a century for physicists and the physics profession. The development of modern physics in the early part of this century ushered in major World War II R&D initiatives such as the development of radar and the Manhattan Project. Physicists showed the public that science could make significant contributions to national needs, particularly military security. In the post-War era, especially as the Cold War heated up, the public rewarded physicists and the broader science community with generous funds for research. For half a century the physics profession bloomed, its fruits providing national security and bringing forth a new economic age dominated by silicon-based industries. The technical spillover into other fields such as biotechnology and medicine has had similarly profound economic impacts.

The Cold War ended abruptly, yet significant collateral damage to national economies remains. U.S. victory was bought on credit, leaving the public to reckon with large federal budget deficits and stifling payments on the national debt. These new economic constraints have had two major effects. First, the public, through its elected representatives, seems no longer willing to make the generous, broad-based investments in science and technology that physicists used to take for granted. Second was the Republican revolution in the last Congress, characterized by an anti-government attitude and a lack of experience in governing. These Members were elected on their promise to upend the federal government by slashing spending, eliminating programs (if not whole agencies), and shifting governing responsibility back to the states. The pervasive attitude in Congress has been one of distrust in the federal government and its role in our society.

Additionally, because over one-third of the members of the 105th Congress are in their first or second term (in the last Congress about half were freshmen

or sophomores), they lack basic experience and knowledge about governing and the intricacies of how the federal government functions. Congressional inexperience is particularly threatening in areas of science policy, where the science programs being funded are not readily understood by the typical member of Congress and where federal support is critical for these programs to survive.

This does not mean that members of Congress should all be scientists, yet the role of science in national policy does involve technical subtleties and judgement, as well as understanding of how science functions institutionally. A glaring example of this lack of understanding has been the false dichotomy in the recent debate over science versus technology, or basic versus applied research. Most worrisome, however, in this era of budget cutting is that federal spending priorities must be set to higher tolerances. The lack of sophistication among members of Congress about the workings of the federal science infrastructure creates the specter of priorities being set willy-nilly, without much basis in rationality.

This current state of affairs threatens the physics profession and leads me to conclude that the cloistered physicist is a dinosaur. A new generation of citizen scientists is needed to confront the new realities of the post-Cold War era and to address the challenges we face professionally. In the old days, the cloistered scientist was the model, and politics was considered dirty and manifestly unscientific. Life is different now and it is imperative for physicists, individually and collectively, to assume a new, expanded civic role. Citizen scientists are needed to educate members of Congress about the role of science in society and to help set national priorities for federal spending under flat or declining budgets.

Educating members of Congress is best achieved on a personal basis,

whereby you as a physicist establish a relationship with your local representatives. There are numerous ways to do this. One is to invite your congressperson to your university to see the lab and talk to students and faculty, to learn about what is happening on campus, and to see how federal dollars are being put to work. Be prepared to talk about why your specific research is useful, but more important is to convey the general usefulness to the country of federally funded scientific research.

Another strategy is to arrange a meeting with your congressperson, either in the district office or on your next trip to Washington. Similarly, your goal would be to talk about the importance of federal investment in R&D in educating the next generation of innovators and for the US to remain competitive in the global economy. You may end up meeting with a staff person, but that is fine. Staff are powerful; they control the message and filter information, and if you ally yourself with a key staffer you will have made great progress toward influencing Congress.

The goal in engaging your representatives should be to establish their confidence in your ability to provide reliable advice on science-related issues. Increasingly, public policy has technical content, yet members of Congress and their staffs are generally not technically trained. Thus, they will readily welcome your help if you provide information and advice in a consumable form. In so doing, recognize that policy making is not rational by scientific standards, and that in politics there are legitimate competing interests. Try to present all sides of an issue, give options, and be willing to accept compromise. Be humble; you may be the expert scientist, but that staffer is the expert policy maker who controls the flow of information you are trying to transmit. Most important, do not forget that your member of Congress serves you. Do not be shy about

expressing your opinion by giving positive feedback or conveying your disappointment.

As in research or teaching, being an effective citizen scientist requires education and practice. Preparation is key. There are many resources available through professional societies that provide updates on science policy issues and advice on how to convey your message most effectively. The American Institute of Physics publishes a free electronic newsletter called FYI, which provides weekly updates on science policy in Washington, DC. It can be found on AIP's home page [<http://www.aip.org>]. Science magazine provides a weekly summary of science policy, both domestic and international, as well as readable summaries of important discoveries across the disciplines. AIP also publishes a useful brochure called "Communicating With Congress." A more comprehensive treatment of the subtleties of Congress and how to communicate in this environment is *Working With Congress*, by William Wells (AAAS Press, 1996). The APS letter-writing campaign in support of the NSF was organized by its Office of Public Affairs' PGNet program (see APS VIEWS). The APS also coordinates a successful Congressional Visits program.

With practice, your input and advice will make a difference and you will benefit science, our profession, and the society we serve. Furthermore, taking positive action in times of uncertainty can be psychologically beneficial and personally empowering. In many ways, the old models describing science and society are no longer valid. Alternatively, a community of citizen scientists stands an excellent chance of entering the next era strengthened by a new compact with society.

P. W. "Bo" Hammer is Assistant Manager of the AIP Education Division. He was an APS Congressional Science Fellow.

Lessons Learned from an Industrial Outreach Program

by Kenneth C. Hass

Since 1984, scientists at Ford Motor Company's Scientific Research Laboratories in Dearborn, Michigan have provided educational enrichment opportunities for high school students and teachers. The Ford High School Science and Technology Program was recently recognized by the Industrial Research Institute as one of 11 "winning" pre-college education programs nationwide. Its two main components are (1) a series of 6 to 10 Saturday morning sessions — on such topics as "Physics in the Auto Industry" — each of which consists of a lecture and related laboratory/plant tours, demonstrations and hands-on activities; and (2) four-week summer internships for selected high school juniors and seniors.

Last year, the program reached more than 600 different students and teachers from over 100 area high schools, provided 30 summer internships, and made use of approximately 150 employee volunteers. As a long-time contributor to this program, I have often reflected on what general lessons the Ford experience might provide to

others involved in K-12 outreach.

1. Have well-defined goals that play to your strengths. There is certainly no shortage of needs in the area of K-12 science education. It is also clear that not every institution can address every need. The most effective use of limited resources is therefore to restrict your focus to something that you can conveniently, and perhaps uniquely, provide to satisfy a need in your community. The lack of such a focus often results in a dilution of effort and loss of effectiveness.

Our program at Ford suffered a bit in this respect after its initial growth. By refocusing on our strengths — diverse, multi-disciplinary volunteer base, state-of-the-art facilities, and demonstrable success in applying science and math to technological and environmental problems — we clarified our program objective to increase awareness of technical careers and the importance of science and math in industry. This, in turn, has improved the quality of our efforts through a more effective alignment and concentration

of resources.

2. Strive for longevity and continuous improvement. All outreach activities ultimately have greater impact if they can be sustained and institutionalized. Of course, sustainability is particularly difficult in volunteer programs, where enthusiasms may wane, key volunteers burn out, etc. From the beginning, efforts were made to keep the Ford program fresh by continuously improving it based on participant feedback.

3. Remember that random acts of kindness are better than none at all. The more one learns about and gets involved in K-12 science education, the more insurmountable many of the problems appear to be. Many experts, especially those who are strong proponents of systemic reform, sometimes refer somewhat disparagingly to small-scale outreach activities like the Ford program as "random acts of kindness." The implication is that while such programs may help a few students and allow volunteers to feel good about themselves, they have a negligible overall impact. There is perhaps some truth

to this. The Ford program tends to attract highly-motivated students who would undoubtedly succeed whether we were there or not. On the other hand, this argument provides too convenient an excuse for busy professionals not to get involved at all. I would prefer to see people "think globally and act locally" about K-12 education, as they do in other human endeavors, including scientific research. When faced with a challenging research problem, most scientists simply do what their talents and resources allow, content with the knowledge that seemingly minor contributions often lead through the collective enterprise of science to significant advances and unforeseen solutions. Shouldn't we view K-12 outreach the same way?

Kenneth C. Hass is a theoretical solid state physicist and a member of the Physics Department at Ford since 1987. This article originally appeared in the Fall 1996 newsletter of the APS Forum on Education.

Horst Werner Schmidt-Boecking

University of Frankfurt

Forum on International Physics

For pioneering work in the development of new devices to study multiparameter cross sections in atomic interactions.

Kenneth Steven Schweizer

University of Illinois

High Polymer Physics

For the pioneering development of microscopic liquid-state theories of the structure, thermodynamics, phase transitions, and dynamics of polymer fluids.

Robert F. Sekerka

Carnegie Mellon University

Materials Physics

For outstanding and significant contributions to the theory of crystal growth, especially for explaining the role of morphological instabilities.

Gerald H. Share

Naval Research Laboratory

Astrophysics

For his important gamma-ray line observations of the products of nucleosynthesis, which have advanced our understanding of the production rates and distribution of galactic nucleosynthesis.

Edward V. Shuryak

State University of NY, Stony Brook

Nuclear Physics

For his seminal contributions to the study of the quark-gluon plasma.

Wesley Harold Smith

University of Wisconsin

Particles & Fields

For systematic investigation of the structure of hadrons using muon, neutrino and electron deep inelastic scattering and for electronic innovations to detector design.

Johanna Barbara Stachel

SUNY - Stony Brook

Nuclear Physics

For providing compelling evidence that a hot and dense, nearly equilibrated, fireball is formed in the AGS relativistic heavy ion reactions.

Paul H. Steen

Cornell University

Fluid Dynamics

For major contributions to interfacial and non-linear dynamics.

James H. Stith

The Ohio State University

Forum on Education

For his contributions to physics education on both a national and international scale, especially in the areas of educational standards and assessment, and with regard to involvement of minorities in physics education.

Arthur Marshall Stoneham

London Imperial College

Materials Physics

For seminal and extensive contributions to the theory of defects and defect processes in solids through research articles and books, and for the promotion of physics research through effective management.

Laurance J. Suter

Lawrence Livermore National Lab.

Plasma Physics

For pioneering work and leadership in the design, modeling, and analysis of experiments using laser heated hohlraums that quantify and control x-ray drive, symmetry, and pulse shaped implosions.

Charles Tandy

Kent State University

Few Body Systems Topical Group

For significant contributions to the study of composite particles in nuclear and particle physics.

John Joseph Taylor

Electric Power Research Inst. (retired)

Forum on Physics & Society

For leadership in developing safer reactors, especially the concept of small, passive designs; and for contributions to disposition of plutonium from dismantled nuclear weapons.

Ctirad Uher

University of Michigan

DCMP (Condensed Matter)

For studies of the low temperature proper-

ties of semimetals, metallic multilayers, magnetic superlattices, and high temperature superconductors.

John Unguris

NIST

DCMP (Condensed Matter)

For the development of experimental methods using polarized electrons applied to studies of surface multilayer magnetism.

Sukekatsu Ushioda

Tohoku University

Forum on International Physics

For his contributions to the Raman spectroscopy of surface excitations, and the elucidation of light emission mechanisms from tunneling electrons.

Marthe Bacal Verney

Laboratoire de Physique des Millieu

Plasma Physics

For her study of negative ion production in hydrogen plasma and the associated development of laser photodetachment diagnostics, and for the development of the volume H- source for neutral beam injection and other applications.

Oscar Edgardo Vilches

University of Washington

DCMP (Condensed Matter)

For studies of adsorbed monolayer and multilayer films of isotopes of helium and hydrogen.

Petr Vogel

Caltech

Nuclear Physics

For his innovative theoretical work in double-beta decay and in neutrino interactions, including his definitive calculations of reactor neutrino spectra.

Robert M. Wald

Enrico Fermi Institute

Gravitational Topical Group

For his contributions to the understanding of classical and quantum gravity; especially for his seminal role in the development of a rigorous basis for quantum field theory in curved spacetime.

Gwo-Ching Wang

Rensselaer Polytechnic Institute

Materials Physics

For her contributions to the fundamental understanding of ordering and scaling in surfaces and overlayers, and for her pioneering work in ultrathin-film magnetic scaling.

Bernard Allen Weinstein

SUNY at Buffalo

DCMP (Condensed Matter)

For applications of the diamond anvil cell to semiconductor physics, and experimental studies of the effects of pressure on vibrational, optical, and phase-transition phenomena in semiconductors.

Rainer Weiss

M.I.T.

Gravitational Topical Group

For his pioneering work in the development of laser-interferometric detectors for gravitational radiation, and his contributions to the study of the spectrum and anisotropy of the cosmic microwave background.

Michael Widom

Carnegie Mellon University

DCMP (Condensed Matter)

For theoretical contributions to our understanding of quasicrystals and the role played by disorder in their stabilization.

Hartmut Zabel

Ruhr Universit., Bochum

Materials Physics

For his seminal contributions to our understanding of the structure and dynamics of hydrogen-metal systems, graphite intercalation compounds and magnetic metallic multilayers.

George B. Zimmerman

Lawrence Livermore Nat. Lab.

Computational Physics

For his creation, and subsequent development, of the LASNEX simulation code, which has been used extensively to guide the development of the National ICF program from its inception, to this day.

INTERNATIONAL NEWS

**Catching Up With EPS Activities in 1996**

While the APS went about its business with meetings, educational outreach, journal publishing, and public policy concerns throughout 1996, sister organization, the European Physical Society (EPS) was busily engaged with organizing international conferences on solar physics and atomic spectroscopy, and expressing concern over proposed budgetary changes at CERN and future support for basic research within the European Union.

Solar Physics. Approximately 170 scientists from 24 countries gathered in Thessaloniki, Greece, in May for the 8th triennial sectional conference, organized by the Solar Physics Section of the joint EPS-European Astronomical Society Astrophysics Division. The invited review talks covered such traditional topics as the solar interior and oscillations, the physics of flux tubes and waves, restructuring of magnetic fields, and particle acceleration physics, as well as current issues in the heliosphere and cosmic rays and new instrumentation. A special afternoon session was devoted to SOHO, a satellite with important European involvement that was in orbit at the time of the conference.

EPS Opinion on Basic Research. In August, the EPS Executive Committee circulated a letter commenting on the policy underlying the European Union's framework programs, which are largely application-oriented. The letter emphasized the widely recognized role of basic research for the long-term development of technology, industry and economy. "We do not expect that physics should enjoy privileged treatment, but it should obtain an adequate support if account is taken of its benefits to society in the general understanding of Nature, in applications in technology and medicine, and as the methodological basis for other sciences, such as chemistry, biosciences and geosciences," the committee wrote. "It has also pioneered the introduction of communication networks, new methods of teaching and the use of large facilities. Research networks in physics have been spearheading international collaboration in an outstanding way."

The EPS Executive Committee offered several specific suggestions for strengthening the scientific infrastructure in Europe. These include (1) continued strong support for training in high-level research; (2) increased support of scientific conferences, which contribute to better cooperation between countries, as well as improved relations between academia and industry; (3) increased support of large research facilities, which provide an excellent infrastructure for interdisciplinary research and international cooperation; and (4) awarding grants to small companies, often developed in the incubator units of universities, which act as seeds of future growth for European industry, as well as ideal interfaces between the academic and commercial worlds.

EGAS Conference Highlights. Atomic spectroscopy continues to flourish and develop rapidly, judging from the numerous presentations featured at the 28th Conference of the European Group for Atomic Spectroscopy (EGAS), held in July at the Technical University of Graz' Institute for Experimental Physics. The entire manifold of atomic spectroscopy was covered in the invited and contributed papers, including atomic theory, hyperfine structures, spectroscopic instruments, trapped neutrals and ions, atomic collisions, interactions with photons, radiative lifetimes, XUV and X-ray emission, plasma spectroscopy, and highly resolved molecular spectra.

The conference opened with a talk by M.O. Scully (Texas Laser Lab) on accomplishments and perspectives of lasers without inversion, discussing the first experimental realization of such a laser and its theoretical modelling, based on quantum interferences, as well as its potential for future applications. The session also featured a talk on the interaction of multicharged ions with solid surfaces, particularly the production of hollow atoms and related phenomena. Electrons from the surface are captured by these ions into highly excited electronic states, which then emit x rays. Other processes that accompany the interaction include emission of Auger electrons and potential sputtering.

Another session focused on spectroscopy and quantum optics with trapped ions, giving special attention to several mechanisms of laser cooling of trapped ions. These trapped, ultra-cold particles can in turn be used to perform quantum mechanical experiments, such as the investigation of quantum jumps. The session also featured a discussion of the extension of spectroscopic applications of ion traps to hyperfine states of excited states using coherent Raman excitation (the so-called "dark resonances"). Also presented were recent results on light-induced mixing of autoionizing states, and on modifying continua structures by intense light pulses in one-valence electron systems and doubly excited states.

A special symposium on lasers in medicine opened with an overview of new developments in the field, concentrating on non-thermal applications of laser light for therapeutic and diagnostic purposes. It especially emphasized spectroscopic methods and applications. For example, using laser-induced auto-fluorescence of human tissue, regions of cancers at the surface can be distinguished from healthy tissue using the profile of the fluorescence spectrum. Laser-induced fluorescence analysis can easily be performed inside the body by combining it with endoscopic techniques.

Another lecture in the lasers in medicine symposium by G. Nilsson of Linkoping University introduced a new method of blood-flow diagnostics, based on investigating the Doppler broadening of laser light reflected from skin. In this case, a fast spectroscopic technique disperses the scattered light. The resulting information can be used, for example, to determine blood flow after severe burns to identify areas where a skin graft is necessary.

EPS High Energy Statement. In November, the Board of the EPS High Energy and Particle Physics Division issued a statement in response to indications that Germany and other CERN member states wished to reduce their CERN contributions for the coming year. The statement expressed appreciation of the unanimous support of the CERN member states for the Large Hadron Collider program, while expressing concern over the dramatic proposed budget changes. The CERN Council was urged to adopt long-term budgetary measures to allow CERN to complete the LHC on time, in a safe and responsible manner, without reducing drastically the generous support of the overall scientific program.

LIMERICK CONTEST

Finalists & Winners

A total of 190 limericks were received since the contest was announced in the December issue of *APS News*. Although most entrants sent in one or two limericks, one sent in 22 and a 'team' from Harvard sent a record 37. Schrödinger's cat, which was the favorite subject, has reason to feel paranoid; reviewers for *Phys Rev* came in a close second. The longest poem, a finalist, had 13 limerick-form stanzas.

A note on the selection process: The editor collected opinions from members of the March and April meeting program committees, APS visitors and staff members. They had diverse tastes, to say the least, and many limericks not included among the finalists below had ardent admirers. The final selection was mine (as is the blame for most of the titles). Some are acknowledged 'groaners' — but punsters have to live too; some don't scan so well, but had other redeeming qualities. As promised, each author will receive a dunking bird; the winners [shaded] will receive a flock (3). Most submissions (except for a few) may be viewed on the APS website at: <http://www.aps.org/apsnews/limericks.html>. Enjoy.

Barrie Ripin, *APS News* Editor



Classical

Doin' its Own Thing

by Edward H. Green

The first law of Newton I sing
My voice has a relevant ring:
"An object left free
Of hassles will be
Engrossed in just doing its thing."

v

May the Force Be With You

by David Morin, Eric Zaslow, E'beth
Haley, John Golden, and Nathan
Salwen

On a merry-go-round in the night,
Coriolis was shaken with fright.
Despite how he walked,
'Twas like he was stalked,
By some fiend always pushing him right.

v

Condensed Story of Ms Farad

by A. P. French

Miss Farad was pretty and sensual
And charged to a reckless potential;
But a rascal named Ohm
Conducted her home —
Her decline was, alas, exponential.

v

Wish I Were a Fly on the Wall

by Robert D. Cowan

There once was a fly on the wall
I wonder why didn't it fall
Because its feet stuck
Or was it just luck
Or does gravity miss things so small?

v

A Brief History of Gravity

by Bruce Elliot

It filled Galileo with mirth
To watch his two rocks fall to Earth.
He gladly proclaimed,
"Their rates are the same,
And quite independent of girth!"

Then Newton announced in due course
His own law of gravity's force:
"It goes, I declare,
As the inverted square
Of the distance from object to source."

But remarkably, Einstein's equation
Succeeds to describe gravitation
As spacetime that's curved,
And it's this that will serve
As the planets' unique motivation.

Yet the end of the story's not written;
By a new way of thinking we're smitten.
We twist and we turn,
Attempting to learn
The Superstring Theory of Witten!

v

Limerico di Galileo

[13 stanzas]

by Martin J. Murphy

While watching a cannonball's motion,
Galileo conceived of the notion

That natural laws,
Not a mystical Cause,
Ruled the physical world's locomotion.

Though its own view was mostly con-
fused,
The Church was not greatly amused
With this flaunting of Deo
By old Galileo

And ordered it quickly defused.
[See APS home page [aps.org] APS News button
for stanzas 3-12]

In spite of the Vatican's dissuasion
Galileo still rose to the occasion.

Though once deemed heretical,
He proved more prophetic
Than those of a clerical persuasion.

v

Cole's Lost Soul

by A. P. French

There was a young fellow named Cole
Who ventured too near a black hole.
His dv by dt
Was quite wondrous to see
But now all that's left is his soul.

v

On Liquor Production

by David M. Smith

A friend who's in liquor production
Owns a still of astounding construction.
The alcohol boils
Through old magnet coils;
She says that it's "proof by induction."

v

Goodnight Irene

by Ken Kiger

There once was a girl named Irene,
who lived on distilled kerosene.
But she started absorbin'
A new hydrocarbon,
And since then has never benzene!

v

Cool Cruel Test

by Kay R. Devicci

The thermo exam was quite near-o,
And he thought everything was quite
clear-o;
"Why study this junk
I'm sure I won't flunk,"
But they gave him an Absolute Zero.

'Modern'

The Bose-Einstein Story (Condensed)

by Jonathan P. Dowling

A couple of young guys in Boulder,
Cooled their gas cloud down colder
and colder.

Then with much exhortation,
They hit Bose Condensation,
And beat out their rivals (much older).

Relatively Good Advice

by Edward H. Green

Dear S': I note with distress

The length of your yardstick is less
And please wind your clock
To make it tick-tock
More briskly. Your faithful friend, S.

v

Proton Decay

by David Halliday

A proton once said, "I'll fulfill
My long-term belief in free will.
Though theorists (may) say
That I ought to decay
I'm damned if I think that I will."

v

And Then There Were Photons

by William Rolnick

An electron, while trav'ling in space,
Met a positron there "face-to-face."
The electron then sighed,
At the sight of his bride
And they "died" in a loving embrace.

v

Einstein, Podolsky and Rosen

by David Halliday

Two photons, close-coupled at start,
Flew several parsecs apart.
Said one, in distress,
"What you're forced to express
Removes any choice on my part."

v

Fussy Electrons

by David Morin, Eric Zaslow, E'beth
Haley, John Golden, and Nathan
Salwen

An electron is sure hard to please.
When spread out, it sometimes will
freeze.

Though agoraphobic,
It's still claustrophobic,
And runs off when put in a squeeze.

v

The Cat in the Tree

by Peter Price

Another great Dane has made free
With a question of Be or Not be.
Now might Schrödinger's puss,
In descending by Schuss,
Leave one track on each side of a tree?

v

Protecting Schrödinger's Cat

by Devlin Gualtieri

PETA was out in full force,
But not for a dog or a horse.
At Schrödinger's place
They pleaded their case
For the sake of his cat, of course

General

Desperately Surfing for Science

by David Morin, Eric Zaslow, E'beth
Haley, John Golden, and Nathan
Salwen

Who needs the balance and check?

Screw peer review —what the heck!
Send all of your crap
To the internet —zap!
Who cares if it's nothing but dreck!

v

On What's New and True

author unknown

A certain *Phys Rev* referee
Considers all papers with glee:
"What's new is not true,
And what's true is not new,
Unless it was written by me."

[Editors Note: Several variants on this theme were submitted.]

v

The Past Isn't What it Used To Be

by Bruce Elliott

A professor of Physics named May
Complains of the classroom today,
"The problem, you know,
Is that they're too slow.
We were far better students than they."

His friend, a professor named Beecham,
Said "It's true, you don't seem to reach
'em.

But they're not to blame,
For they haven't the same
Class of teachers that we had, to teach 'em!"

v

See You at Work

by Steve Langer

The chairman of AT&T
Said, "Your graduate physics degree
Is not worth a — penny,
Of your kind we've too many.
Perhaps you can program in C?"

v

Great Lies

by Beall Flower

There are several Great Lies that we
know.
One is "I'll love you tomorrow."
Here's another false word
That we've recently heard,
"With less money your research will
grow!"

v

Quark-Dork Symmetry Group

by Kay R. Devicci

When we physicists talk about quarks,
And "sleptons," "sneutrons," and
"squarks,"

We shouldn't be stunned
When the Congress won't fund
Our big projects - they think that we're
dorks!

v

A Physicist from Nantucket

by Michael Van Leeuwen

There once was a man from Nantucket
Who...
...oops...just got a life.