APS NEWS

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Centennial Meeting Alert II

4 Months to Go

APS centennial

March 20-26, 1999

www.aps.org/centennial

APS Establishes Travel Grants for Student Centennial Attendance

The APS is sponsoring a matching travel grant program to encourage the participation of physics undergraduate and first-year graduate students in the APS Centennial Meeting in Atlanta, Georgia, March 20-26, 1999. Approximately 850 physics departments throughout the nation were notified of the availability of the $250 matching grants to support the travel and subsistence of students selected to attend the APS Centennial. Proposals to help support the student travel program from the Department of Energy and the National Science Foundation are under review.

"The APS envisions a Centennial celebration that will seek out and include talented students," said APS Director of International Scientific Affairs Irving Lerch about the rationale behind the program. "Our objective is to give the next generation of physicists an appreciation of what has made the past century so vital to the intellectual and economic development of modern industrial society." Departments are encouraged to support as many students as possible. Even though there will be several hundred travel grants available, the APS will only be able to support a limited percentage of the students expected to apply. Final selection of students will be made by APS staff physicists in early January.

Selected students will have their registration fee waved, and be able to attend the numerous special Centennial events. These include the Nobel Discoveries reception and exhibit; special Centennial symposia, including talks by more than 20 Nobel Laureates; plenary sessions devoted to general interest lectures on a wide variety of topics; international round tables; a special student luncheon; and the "Physics Festival," featuring physics-related photography and art exhibits, as well as physics demonstrations. In addition, the numerous college and university reunions being organized will provide an opportunity for students to meet and speak with members of the physics community of which they may one day be a part. At the meeting's conclusion, students will be encouraged to provide brief reports assessing their experiences for presentation to their departments and for possible coverage of the event in *APS News*.

"We hope this meeting will provide students with an occasion to explore their chosen field of study in an environment beyond the usual classroom," said Lerch.

Photo courtesy of Georgia World Congress Center

Centennial Meeting to be held in the Georgia World Congress Center

"It will be an opportunity for career development, mentoring, and networking that they might not otherwise have at this stage in their education. And hopefully this program will encourage wide participation among physics departments nationwide who may wish to fully support more students on their own."

The deadline for receipt of nominations for the APS Centennial Matching Travel Grant Program is December 10, 1998. For more information and nomination requirements, see the announcement on page 7, or contact Erika Ridgway, APS Headquarters, One Physics Ellipse, College Park, MD 20740; 301-209-3269; ridgway@aps.org.

Inside...

Topical Symposia Arranged for Centennial Meeting

In addition to the invited plenary talks to be featured at the APS Centennial Meeting in Atlanta, individual APS divisions, topical groups and forums have organized a series of special scientific symposia intended for all attendees and covering nearly every subfield of physics. An alphabetical listing of the various symposia, along with a brief description of each and the sponsoring unit, can be found below. For a preliminary list of scheduled invited speakers for each session, check the special Centennial Meeting program booklet mailed to all APS members in October, or access the APS Centennial Meeting Web site at http://www.aps.org/centennnial.

Applications of Lasers and New Physics (DLS) Lasers with precise frequency, directionality, high intensity or short-pulse duration have many technological and research uses. Here are some far-reaching new applications in science and medicine.

APS Ephemera Wanted!

To help tell the history of the APS at the upcoming Centennial, the exhibit planning group asks members to ply their memories, go through their files and look into the back of drawers for APS-related ephemera. We are particularly interested in graphic items or objects that would not be in the Society's archives, such as personal photographs, old banquet tickets, handouts from APS meetings during the Vietnam war era, buttons (such as those urging relocation of the 1970 annual meeting in Chicago), and the like. If you have treasures of this kind that you would be willing to lend or donate, please contact Amy Halsted by mail, phone (301) 209-3266 or email halsted@aps.org.

APS Centurions

We would also like to identify and recognize the oldest living APS members, those born in 1899 (Centennial centurions), and members belonging to the APS the longest. These members will be our guests at the black-tie optional Fernbank Museum Gala at the Centennial Meeting. Let us know if you can help identify these hardy members.

Atomic Clocks in Science and Technology (DAMOP, GPMFC) The development of the atomic clock has led to important advances in a surprisingly wide range of fields in science and technology.

The Atomic Nucleus: A 20th Century Journey into the Microcosm of Matter (DNP) This symposium describes the exploration and the evolution of our understanding of the atomic

Continued on page 6

CRITICAL CENTENNIAL MEETING DEADLINES

ABSTRACTS

Usual March Program Topics (Including CCP '99)	**11/13/98**	**Early Registration Deadline** (To be eligible for the lowest registration fees)	**1/15/99**
Usual April Program Topics (Including Sherwood)	**12/04/98**	**Housing Deadline**	**2/20/99**

See Enclosed *APS Meeting Announcements* for complete Centennial Meeting Abstract and Registration Information

Leo Szilard Lectureship Award is Endowed

The APS has received nearly $70,000 for the purpose of endowing a Leo Szilard Lectureship Award, intended to provide exposure for physicists who have applied their science for the benefit of society. Starting with the APS Centennial Meeting this March, the recipient of this lectureship (formerly the unfunded Leo Szilard Award) will receive a $1000 honorarium and travel money for lectures at least two institutions whose audiences include young physicists. Any living physicist is eligible, and nominations are active for three years.

Photo courtsey of AIP Niels Bohr Library

Leo Szilard

According to William Colglazier Jr., Chair of the APS Forum on Physics and Society, the rationale for the lectureship is to increase the visibility of physicists working for the public good and thereby to provide positive role models. Public policy issues increasingly involve a scientific or technical component: In addition to questions of energy use and nuclear weapons, citizens are now asked to evaluate the evidence for global warming, the possible health effects of power lines, the claims for and against new medical technologies and even the risk of asteroid impacts.

"In the dawn of the nuclear age, prominent physicists led the debate over the control of nuclear weapons; subsequently physicists lent their insights to the discussion of such issues as the safety of nuclear power, the antiballistic missile treaty and Star Wars," said David Hafemeister, 1996 recipient of the Szilard Award and a former Chair of FPS. "But physicists involved in public service seem to be less visible today, so that younger physicists have fewer positive examples to follow."

At the same time, he added, young PhDs are under great pressure to get and keep a job, and they are often shown only traditional paths. "We would like to expose them to new directions, introducing them to many individuals who have done excellent physics to solve or elucidate problem of importance to society."

The endowment goal was reached through the generosity of several individuals and foundations, including the Packard Foundation, the Energy Foundation, and the MacArthur Foundation. Additional contributions from the APS membership are welcome.

Leo Szilard Award 'Dolphin' Statue. The dolphin is a reference to Szilard's novelette, *The Voice of the Dolphins*.

Physicists To Be Honored at November Meetings

Five physicists will be honored for their work in fluid dynamics and plasma physics in November. The 1998 James Clerk Maxwell Prize, Excellence in Plasma Physics Award, and the Outstanding Doctoral Thesis in Plasma Physics Award will be presented during the annual fall meeting of the Division of Plasma Physics in New Orleans. The 1998 Fluid Dynamics Prize and Otto Laporte Award will be presented during the annual fall meeting of the Division of Fluid Dynamics in Philadelphia.

James Clerk Maxwell Prize for Plasma Physics

Established in 1975 and supported by Maxwell Technologies, Inc., the James Clerk Maxwell Prize recognizes outstanding contributions to the field of plasma physics.

Boris Kadomtsev
Kurchatov Institute
Moscow, Russia

Citation: *"For fundamental contributions to plasma turbulence theory, stability and nonlinear theory of MHD and kinetic instabilities in plasmas, and for international leadership in research and teaching of plasma physics and controlled thermonuclear fusion physics."*

A pioneering researcher of the world fusion program, Kadomtsev graduated in physics from Moscow University in 1951. He worked at the Institute of Physics and Energetics in Obninsk until 1956, when he joined the Kurchatov Institute. In 1970 he was named Academician of the USSR Academy of Sciences, and awarded the State Prize of the USSR. The following year he assumed a Chair of Plasma Physics at the Moscow Institute of Physics and Technology. He eventually was named director of the Institute of Nuclear Fusion at the Kurchatov Institute. Kadomstev passed away in August, shortly after the announcement that he had been selected as the 1998 recipient of the Maxwell Prize.

Excellence in Plasma Physics Research Award

Established in 1981 by donations from friends of the Division of Plasma Physics. This award recognizes a particular recent outstanding achievement in plasma physics research.

Robert C. Cauble
Peter M. Celliers
Gilbert W. Collins
Luiz B. Da Silva
Lawrence Livermore National Laboratory

Citation: *"For an exquisite series of experiments using high intensity lasers to measure the high pressure properties of hydrogen across the molecular insulator to monatomic metal transition."*

Cauble received his PhD in nuclear engineering in 1980 from the University of Michigan and then joined Berkeley Research Associates working at the Naval Research Laboratory in Washington, DC. Since 1985 he has been at Lawrence Livermore National Laboratory.

Celliers received his PhD in physics from the University of British Columbia, Canada in 1987. After one year at the Max-Planck Institute for Quantum Optics in Garching, Germany, he returned to UBC as a research associate. From 1992-1994 he worked in industrial developing spectrometers, and then joined Lawrence Livermore National Laboratory.

Collins received his PhD in physics in 1989 from the Ohio State University, after which he became a staff scientist at Lawrence Livermore National Laboratory. He is currently leader of the Cryogenics Group in the inertial confinement fusion program.

Da Silva received his PhD in physics in 1988 from the University of British Columbia. In 1988 he joined the University of California, Berkeley and then in 1992 he became a staff scientist at Lawrence Livermore National Laboratory on the development and application of x-ray lasers to probe high density plasmas.

Outstanding Doctoral Thesis in Plasma Physics Award

Established in 1985 and endowed by General Atomics in 1997, recognizes young scientists whose doctoral thesis work is of outstanding quality and achievement in the area of plasma physics.

Darin Ernst
Massachusetts Institute of Technology

Citation: *"For elucidating the role of radial electric field shear in reducing local heat transport in supershot tokamak plasmas."*

Ernst received his PhD in physics from MIT in 1997, spending summers at the Joint European Torus and Institute for Fusion Studies. In 1992, he moved to the Princeton University Plasma Physics Laboratory (PPPL) to play an active role in three years of historic Tokamak Fusion Test Reactor deuterium-tritium experiments, returning to MIT in late 1995. As an undergraduate, he gained experience at the Trane Company, Wisconsin Synchrotron Radiation Center, Wisconsin Tandem Van deGraaf Laboratory, and IBM. Now an associate research physicist at PPPL, Ernst continues work on the effects of radial electric field shear on transitionless enhanced confinement, pursuing collaborations on several tokamak experiments.

Fluid Dynamics Prize

Established in 1979 and supported by the AIP journal *Physics of Fluids*, the Fluid Dynamics Prize recognizes and encourages outstanding achievements in fluid dynamics research.

Fazle Hussain
University of Houston

Citation: *"For his careful and skillful experiments and interpretative concepts concerning important structures in turbulence and vortex dynamics, for his new turbulence measurement techniques, and for provoking his students and colleagues to think in fresh ways about turbulence."*

Hussain obtained his BS in mechanical engineering from the Bangladesh University of Engineering & Technology in 1963 and worked there as a lecturer. He moved to Stanford University as a Fulbright Scholar and obtained his PhD there in 1969. He was a Visiting Assistant Professor at Johns Hopkins University before moving to the University of Houston in 1971, where he is now the Cullen Distinguished Professor. Hussain's research has been in the areas of transition and turbulence phenomena and their control in jets and shear layers. He has also served on the editorial board of *Physics of Fluids* and the *Journal of Fluids Engineering*.

Otto LaPorte Award

The LaPorte Award was established in 1985 to recognize important advances in fluid dynamics.

David G. Crighton
University of Cambridge

Citation: *"For creative research of aerodynamically generated sound, nonlinear acoustics, flow-structure interaction and hydrodynamic instability, and for indelible contributions as a teacher and for service to the international fluid dynamics community."*

Crighton received his BA in Mathematics from St. John's College, University of Cambridge in 1964 and his PhD in Applied Mathematics from Imperial College in London in 1969. Following stints at Woolwich Polytechnic (now University of Greenwich) and Imperial College, London he became a professor of applied mathematics at the University of Leeds. In 1986 he joined the faculty at the University of Cambridge where he currently heads the department of Applied Mathematics and Theoretical Physics. Crighton has conducted research in aeroacoustics, hydroacoustics, nonlinear acoustics, and structural acoustics.

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Historical Factal

Photo courtesy of AIP Niels Bohr Library; T. Eakins's painting at Addison Gallery of Art, Phillips Academy, Andover, Massachussetts

Henry Augustus Rowland: *1848 -1901*

A principal founder and first president of the American Physical Society in 1899, Henry Augustus Rowland earned the recognition of his peers as "the highest known authority" in the U.S. on the subject of the laws and principles of electricity. He was born in Honesdale, Pennsylvania in November 1848, the son of a Protestant clergyman who was the latest in a long line of theologians. Henry's great-grandfather had used his pulpit to denounce foreign oppression with such zeal that he had to flee the city during the American Revolution, when a British fleet invaded Providence. Young Henry was expected to follow suit, attending Yale University and entering the ministry, but he rebelled against family expectations. He was an avid chemical and electrical experimenter and wished to study engineering. His family ultimately relented and he enrolled at Rensselaer Polytechnic Institute in the fall of 1865.

Rowland graduated with a degree in civil engineering in 1870, and worked as a railroad surveyor and as a teacher at the College of Wooster in Ohio before returning to Rensselaer in 1872 as an instructor of physics. His first major research was an investigation of the magnetic permeability of iron, steel and nickel, work which won the praise of Maxwell and established his reputation as a promising young experimental physicist in the U.S.

In 1875, Rowland accepted a chair in physics at the newly-established Johns Hopkins University, America's first true research institution, and spent a year in Europe inspecting various laboratories and purchasing experimental equipment. As a result of his efforts, by the late 1870s, the university's facility obtained one of the finest collections of research instruments in the world at that time.

Inspired by his study of Faraday's Electrical Researches, in 1868 Rowland devised an experiment to test whether the magnetic effect produced by electric current was the direct result of charge moving through space or of some interaction between the current and the conducting body. While his results did not prove or disprove either theory, the experiment was the first to conclusively demonstrate that the motion of charged bodies produced magnetic effects. In the late 1870s, he established an authoritative figure for the absolute value of the ohm, and redetermined the mechanical equivalent of heat in the early 1880s, demonstrating that the specific heat of water varied with temperature. He also suggested and supervised the experiments which led to the discovery of the Hall effect by one of his graduate students.

However, Rowland is best known for his invention and ruling of the concave spectral grating, instead of ruling his diffraction gratings on the traditional flat surface. Since such gratings were self-focusing, lenses — which absorbed infrared and ultraviolet radiation — were no longer necessary. And the optical properties of a concave grating greatly simplified the observation of spectra. The invention reduced the work of several days to a few hours, and Rowland sold more than 100 of them at cost to physicists worldwide. Rowland himself used the device to remap the solar spectrum, and his wavelength tables were ten times more accurate than their best predecessors, becoming the accepted standard for over a generation.

Rowland received a gold medal and grand prize for his gratings at the 1890 Paris Exposition. He was a foreign member of the Royal Society of London and the French Academy of Sciences, and was elected to the National Academy of Sciences, which awarded him its Rumford and Draper medals for his research accomplishments. Other professional honors included appointment as a delegate of the U.S. government to various international congresses on the determination of electrical units. Rowland was a lifelong avid proponent of basic research, even disparaging technological invention in favor of "pure science" in a celebrated 1883 address as vice president for the American Association for the Advancement of Science. Yet even he was ultimately forced to acknowledge the economic necessity of technological innovation. He married in 1890 and was diagnosed with diabetes soon afterward. Eager to assure the future financial security of his family, he worked on the development of a multiplex telegraph, which, while technically successful, did not succeed commercially before his death in 1901. His ashes were interred in the wall of his basement laboratory in accordance with his wishes.

A Century of Physics

1965-1975: Closing the Circle

by Hans Christian von Baeyer

Photo courtesy of AIP Niels Bohr Library

Arno Penzias and Robert Wilson

Even as the Vietnam War was tearing at the fabric of America, the Beatles conquered the world, and the first astronauts landed on the moon, two unrelated discoveries on opposite coasts of the country announced the opening of a new chapter in the history of physics. At the Bell Telephone Laboratories in New Jersey, Arno Penzias and Robert Wilson (right) were annoyed by a persistent hissing noise in their sensitive microwave receiver. Unable to suppress it no matter what they tried, they tracked it back to its surprising source: the cosmic background of microwave radiation that has been gradually cooling off since the Big Bang to a temperature of about three kelvins. This astonishing observation reinvigorated research on cosmology, with General Relativity as its firm theoretical backbone.

Four years later Jerome Friedman, Henry Kendall, and Richard Taylor, working at the Stanford Linear Accelerator Center in California, found the first experimental evidence for the existence of quarks, which had been proposed on theoretical grounds earlier in the decade. Protons and neutrons, it now appeared, are not elementary like photons and electrons, but composed of quarks. Here at last was reason for hope that a fundamental theory, as compelling as Quantum Electrodynamics, might one day be constructed for nuclear physics.

On the face of it, the discoveries of the cosmic background and of quarks seem to take place at opposite ends of the scale of distances. Indeed, the size of the observable universe is about forty-five powers of ten larger than that of a quark. Nevertheless, the two realms turn out to be closely related. The cosmic background radiation provides evidence of the universe the way it was about 10^{10} years ago, before it had expanded to its present size. A fraction of a second after the Big Bang, its particles were packed tighter than they are in an atom, so it was ruled by quantum mechanics. At one time, furthermore, the universe consisted not of atoms but of quarks. In this way cosmology brings the physics of the immensely large back to join the physics of the immeasurably small.

The scope of modern physics may be symbolized by a circle that extends from quarks, past atoms, molecules, and boulders, past planets, stars, and galaxies, out to the universe and, via the Big Bang, back to its elementary building blocks. Cosmology also relates how the universe has evolved in time. When this story is combined with stellar evolution and the geological history of the planet, with biological and cultural evolution, and finally with recorded history, a coherent narrative of truly epic proportions emerges. To be sure, the story is riddled with gaps and puzzles — including the mystery of the origin of life — but its broad outlines are firmly in place.

In the 1960s physicists first began to draft the opening chapters of this story. Future generations may well look back on this ambitious undertaking as the principal accomplishment of physics in the twentieth century.

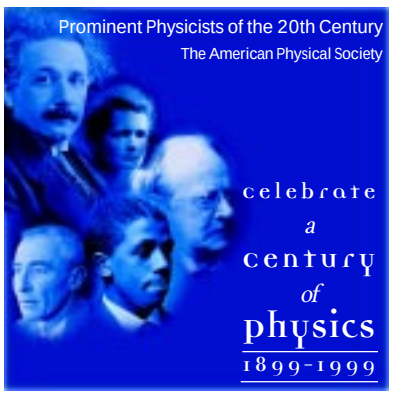
Editor's Note: A CENTURY OF PHYSICS, a dramatic illustrated timeline wallchart of over a hundred entries on eleven large posters is intended for high schools and colleges. Each poster covers about a decade and is introduced by a thumbnail essay to provide a glimpse of the historical and scientific context of the time. A Century of Physics will be on display at the Atlanta Centennial Meeting in March.

In the December issue, APS News will feature the ninth introductory essay: ***1975-1985: Images****.*

Prominent Physicists of the Century CD-ROM

In 1997, the APS convened a Task Force to develop a collection of portraits of physicists to be available at the time of the APS centenary. Members of the Task Force were Andrew Sessler, Gerald Holton, Stephen Brush and Spencer Weart.

The collection was initiated both to provide a pictorial history of distinguished physicists throughout the last century and to help to illustrate talks given by speakers included in the Centennial Speakers booklet.



The approximately 200 portraits of physicists selected for the collection have been compiled onto a CD-ROM. The collection is indexed alphabetically and includes birth and death dates, in addition to a short description of the subject's contribution to physics.

The collection will be mailed to all speakers in the Centennial Speakers booklet and will be available for purchase at the Centennial Celebration and Meeting in Atlanta.

OPINION

INSIDE THE BELTWAY

Under the Gun

by Michael S. Lubell, APS Director of Public Affairs

As the 106th Congress wrapped up its legislative business this fall, it found itself riding giant swells that made the waves in the Dow Jones average seem like gentle ripples on a summer pond. In July, even before Special Prosecutor Kenneth Starr had launched his Lewinsky missile, forecasters were predicting a stormy fall season. The warning flags went up more than half a year ago, when Congress and the President set sail on separate courses that promised a collision over budgets and taxes.

With a surplus in federal revenues virtually assured for the first time in decades, the White House fenced off the anticipated black ink by declaring that it should be dedicated to the Social Security System, which will begin to run deficits in about twenty years as the baby boomers retire.

It was a savvy political move calculated to blunt the GOP's inevitable call for cuts in federal taxes, a core Republican issue that resonates especially well in an election year. But, arguably, the White House declaration was also fiscally sound, because without the current surplus in Social Security revenues, the federal budget would still be more than $30 billion in the red this year.

The President found a willing ally in Senate Budget Committee Chairman Pete V. Domenici (R-NM), who had been pounding out the same message long before the White House had discovered it. When the House of Representatives finally passed a Budget Resolution that called for more than $80 billion in tax cuts, Domenici excoriated his Republican colleagues in the other chamber for acting irresponsibly.

Just as tax cuts are the GOP's bread and butter in an election year, social programs are the Democrat's sustenance. To pay for them this time around, President Clinton included in his budget request last February a call for a tobacco tax, which health experts said would help reduce teen smoking dramatically.

But the tobacco industry launched a $50 million ad campaign, slamming the White House plan as nothing more than a ruse for more federal spending, at the expense of poor and middle class smokers. It was an overstatement. Yet the kernel of truth it contained was sufficient for the Senate to kill the tax plan before Congress broke for the July 4th recess.

With the tobacco revenue stream choked off and with the balanced budget caps still in place, Republicans began to strip away the President's featured programs — education, child care, housing and the environment. About the only White House initiative that survived was increased funding for science.

So different were the House and Senate budget plans, however, that by the time the August vacation came, not one appropriations bill had made it through conference for final vote. There was an added complication: President Clinton had threatened to veto seven of the thirteen bills, if Republicans hewed to their fiscal plans. The stage was being set for a September showdown.

The outcome was uncertain: a mammoth catch-all appropriations bill, a government shutdown or a continuing resolution that would fund federal agencies at last year's level or the lower of the current House and Senate appropriations bills. While smart money was on a mammoth appropriations bill, the only sure bet was that members of Congress would leave town on October 9, as scheduled, to return home for a final month of campaigning prior to the November elections.

But when the Lewinsky missile landed on the Hill, all bets were off. Partisanship took over, as Republicans seized the opportunity to extend their Senate margin to a filibuster-proof majority and deny the Democrats any chance of reclaiming control of the House. Their strategy, according to high-ranking GOP leaders, was to humiliate the President so badly that Democrats would not show up at the polls in November.

The legislative calendar stalled, and suddenly a continuing resolution loomed large. About all the Democrats could do was denounce the Republicans for running a do-nothing Congress. But the charge fell on deaf ears — until the House put the salacious Starr language on the Web and released the secret grand jury tapes to the media. Those acts provoked a major public backlash, according to polls conducted by both parties. Abruptly, congressional Republicans were under the gun to complete the calendar, or risk that the "do-nothing" label would stick.

During the final two weeks of the session, appropriations bills began to move swiftly through conference. With Democrats stung by the President's transgressions and Republicans reeling from their X-rated releases, both parties sought common ground. Science provided them with one glorious opportunity.

As Democratic House Deputy Whip Rosa DeLauro (D-CT) said, when she promised to endorse the Ehler's (R-MI) science policy report, "Thank God we can agree on something!" In the final days of the session, research programs in DOD (6.1 and 6.2), DOE, NSF and NASA all received their major increases, with strong bipartisan support. And the Frist-Rockefeller bill continued to pile up cosponsors from both sides of the aisle.

About the only clouds on the horizon were concerns that the science community might now become complacent or cease speaking with a unified voice. Time will tell.

LETTERS

Non-PhD APS Members Need to Speak Up

For the past three years, the APS Committees on Membership and on Career and Professional Development have sent me a Junior Member survey. I have diligently filled it out and returned it, and yet every single year, I am frustrated with the survey report for the same reason: not enough (other) non-PhD degree replies to be "statistically significant" and so the data isn't even reported. Regardless of the reason, this only serves to isolate some APS members from their professional society.

Does it matter? Perhaps there are so few non-PhD members of APS that it is not worth changing the PhD-academia mentality of the APS (and thereby the Physics community in general). To me, the actual breakdown of current membership doesn't matter. We already know from countless pipeline surveys that there are alot more Bachelors and Masters level physicists in the world than PhD physicists. Undoubtedly, we all don't "do physics", at least not in the PhD-academic sense of the word. But doesn't the APS need to know what we are doing?

First step, report all the survey results with the appropriate statistical caveats. People are more likely to fill out a survey if they think it is going to be used and not discarded. After all, how many of us have worked on experiments and drawn conclusions from only a few data points!

Secondly, let's talk more with the non-PhDs to find out what is really going on. Who are we as a group? What are we doing with our educations? We didn't we continue on for a PhD? Talking to people who have gone through the Physics PhD pipeline isn't nearly as informative as those of us who "seeped out" if you want to fix the pipeline problem. Also, as physicists and potential physics majors question their career options, showing them a larger variety than getting a PhD and teaching/researching in academia is certainly more enticing.

Thirdly, let's involve industry and research laboratories. If non_PhDs are doing scientific work, this is probably where we are. Let's find out how the academic institutions can modify their curriculum to more match employers' wants and needs.

Finally, those of us with non-PhD level degrees must be at the forefront of this activity. Perhaps getting a list of people with various degrees who are willing to talk to students and academics about career options is crucial. For many years, I have done outreach activities to encourage girls to consider science as a career option. I think those of us with Master's/Bachelor's should also be willing to let people what we (and they) can do. We also need to be more involved with the APS itself. Have we ever had an APS officer who didn't have a PhD? Even the industry nominations always have a PhD.

I am told that there is a real concern in the APS about this issue and that actions are being taken. I have read several discussions on this topic throughout the years, and yet in practice, the situation hasn't changed. As a group, those of us with terminal Bachelors/Master's degrees (which sounds like a rather frightening disease) really need to speak up about what we do and how we promote science. In reality, once a person has "real world" experience, the actual degree matters less than one's accomplishments. And isn't that what is *really* important? Some of us were much better in a lab than we were in a classroom and we have valuable skills to offer both the physics and world communities.

But the real day of inclusion will be when I never have to hear the phrase "just a Master's degree" or "only a Master's degree". Even if said in a way clearly meant to be a compliment, the connotation is rather insulting. If those of us non-PhDs start being more vocal, maybe others who have remained silent will join in and feel more included (both in the APS and in the physics community). I think if we can show what a physics education (regardless of degree level) can do and be used for, the PhD-centric community, over time, can and will change its opinion. After all, we are all involved in APS to promote science and physics. We just have different ways of going about it.

Sandy Fletcher
Masters of Science in Physics

BELTWAY Becoming Too Partisan?

Michael Lubell's commentary ("Inside the Beltway", August/September) is taking on an objectionably partisan tone. "Conservatives" have their "ideology" and "adhere to their populist credo"; they are "anti-Washington ideologists." Republican leader John Kasich's (R-OH) ideas are "contentious." Nary a pejorative word is applied to any liberal.

Lubell is farthest afield, and out of his expertise, in his gratuitous comment on Social Security. He speaks of "the Social Security 'crisis'," and says, "Whether there is a crisis, of course, is still a matter of debate." Economists know that the Social Security system is actuarially unsound and is technically insolvent now. If we were to offer it for sale to a private insurer, no one would bid. We'd have to pay some company a vast sum (the unfunded liability) to take it. People who are denying this are pandering politicians, not scholars.

Our President is in disgrace, and congressional leaders, as Lubell says, are disposed favorably toward science. Shouldn't we restrain our natural tendency to bite the Republican hand that might feed us? Shouldn't Lubell's columns be placed on an inside page and labelled clearly "opinion"?

James E. Felten
Greenbelt, Maryland

Michael Lubell Responds:

I certainly didn't intend a partisan tone in my last "Inside the Beltway" column. I simply stuck to the facts.

First, on populism, there is no doubt that the Republicans have taken away the populist issue from the Democrats, who held it for most of the last century. That is not a criticism of

Continued on page 5

Physical Review Focus

PR Focus is a FREE APS electronic journal featuring highlights of selected *Physical Review Letters* accessible to all physicists. The editor is David Ehrenstein [see page 1, April 1998 *APS News*]. *PR Focus* is available at the web address: http://publish.aps.org/FOCUS/. *APS News* will print samplings from *PR Focus* over the next few issues to introduce the membership to this new journal. To receive one-paragraph introductions to *Focus* stories each week by e-mail, send the following message to majordomo@aps.org: subscribe focus [Leave the subject line blank].

A Molecule of Light

A micrometer-sized piece of semiconductor can trap photons inside it in such a way that they act like electrons in an atom. Now the 21 September PRL describes a way to link two of these "photonic atoms" together. The result of such a close relationship is a "photonic electronic states of a diatomic molecule like hydrogen. Photonic systems can be controlled and manipulated in ways that are not possible with regular atoms and molecules, so they have a wide range of applications—from probing the basic physics of molecular bonding, to building more efficient semiconductor lasers.

Light in a box. Photons confined within the photonic molecule are restricted to a set of discrete energies, like electrons in a real molecule.

For many years physicists have probed confined electrons in nanometer-sized semiconductor regions called "quantum dots." In contrast, the first photonic atom was fabricated just last year [Phys. Rev. Lett. 78, 378 (1997)] by a collaboration led by Alfred Forchel, of the University of Würzburg in Germany, and Thomas Reinecke, of the Naval Research Laboratory in Washington, DC. But photonic microcavity structures might soon become as important as their electronic counterparts because they are easier to understand and easier to manipulate. The theoretical description of connected photonic atoms is not confounded by many-particle effects, such as the complicated electron-electron interactions in coupled quantum dots.

To make a photonic molecule, the group constructed two blocks of gallium arsenide, approximately 3 × 3 × 1 μm in size, to act as light-confining resonators. The blocks were linked together with a narrow bridge that allowed them to interact. A tiny quantum well in the center of each block produced light in response to laser pulses. The size and shape of the whole structure tended to enhance specific frequencies (optical modes) of this light as it reflected within the structure—essentially the same effect that causes electrons confined in atoms and molecules to assume a set of discrete energy levels. A fraction of the light escaped, which allowed the team to measure the intensity of the photonic molecule's light over a range of wavelengths. They observed peaks in the spectrum that corresponded to the optical modes.

As they made the bridge between the two photonic atoms shorter, the lowest frequency mode split into two. Reinecke and his colleagues suspected that the splitting was due to the photonic atom states transforming into photonic molecule states, just as the energy levels of two hydrogen atoms split when they bind to become a molecule. In a hydrogen molecule, the two energy states are called "bonding" and "antibonding" orbitals, and they have distinct shapes. To test the analogy, the team carried out numerical calculations of the electric field distribution inside the photonic molecule and found patterns that were similar to the bonding and antibonding orbitals in a hydrogen molecule. The numerical calculations also agreed with their experimental determination of the electric field patterns in the cavity. These patterns could be deduced by measuring the intensity of light emitted at different angles.

This simple photonic molecule is just the first step toward fabricating even more complicated structures, atom by atom, in a way that is impossible to do with electronic building blocks, according to Manfred Bayer, a member of the Würzburg group. It might even be possible to weave together photonic molecules to form crystals with "photonic band gaps," that disallow access to photons of certain frequencies, he says. Eli Yablonovitch, of the University of California at Los Angeles is equally optimistic: "We are embarking on an era in which electromagnetic modes will be engineered to control things like the spontaneous emission of light and lasing."

This PR Focus article was written by Meher Antia, a freelance science writer. PR Focus vol. 2, story 14, posted September 28, 1998. Primary material: Optical Modes in Photonic Molecules, M. Bayer, et al. Phys. Rev. Lett. 81, 2582 (21 September 1998).

Letters, *continued from page 4*

Republicans. Indeed, populism served the Democrats extremely well, from the time of Andrew Jackson. Many Democrats, including House Minority Leader Dick Gephardt, have chastised Bill Clinton for abandoning it in favor of a pro-big-business agenda, as evidenced by the administration's China, NAFTA, and banking policies.

As regards John Kasich's budget plan, it was as contentious as any I have seen in years. Senate Budget Committee Chairman Pete Domenici slammed it, as did House Appropriations Committee Chairman Bob Livingston, both prominent Republicans. House Speaker Newt Gingrich tried to bring all sides together, but had little success. As of September's end, the Senate and House were still unable to agree on a Budget Resolution, which was due on April 15.

Finally, we come to the Social Security issue. Whether there is a crisis depends upon your frame of reference. Most economists predict that current formulas will put the system in the red as the baby boomers retire, about twenty or twenty-five years from now. That's a serious problem, but twenty years gives us some time to deal with it. Therefore, most analysts argue that the situation is not yet of crisis proportions, provided we make the necessary changes — privatization, means testing, or later age start. Ironically, if you want to read any partisanship into the column, you might possibly conclude that I was really knocking the Democrats, not the Republicans, for making the Social Security issue into a crisis to achieve a political and electoral end — although that, too, was not my intent.

From my vantage point, the column was well balanced. I am sorry that it wasn't from yours

Did you know...

...that Senior members pay one half the Regular dues rate? APS recognizes the value of members who have supported the Society for many years and may, due to reduced income, be unable to afford full membership dues. Seniors paid only $45, the Regular member rate of $90. In addition, Senior members for whom the $45 dues causes a hardship may request in writing a complete waiver of dues.

Senior members retain all membership privileges and continue to receive *Physics Today*, *APS News*, and other Society mailings. In addition, senior members qualify for reduced registration fees at APS meetings. For example, a Senior member will pay only $60 to attend the 1999 Centennial Meeting in Atlanta, which is $165 (early registration) less than regular member registration.

To qualify, an APS member must have at least 10 consecutive years of APS membership. In addition, the member must meet one of the following criteria:

- Reached the age of 70.
- Retired from gainful employment.
- Retired due to permanent disability.

If you quality for Senior membership and want to change from Regular or Fellow to Senior or Senior Fellow, please contact the membership department at (301) 209-3280 or membership@aps.org

IN BRIEF

Jennifer Ouellette, APS Newswriter wins Writing Award

In August, the Acoustical Society of America awarded its 1997 Science Writers Award to Jennifer Ouellette, newswriter for *APS News*, also a contributing editor for *The Industrial Physicist* (TIP) magazine. The award was bestowed for an article entitled, *Science and Art Converge in Concert Hall Acoustics*, published in the September 1997 issue of *TIP*. Ouellette joined the APS staff in the fall of 1989 and began writing news stories for the APS in 1991. She is easily spotted at APS general meetings, thanks to her trademark black leather jacket. While not a physicist by education or training, she now generally knows the answers to physics-related questions on the popular cable TV game show, "Win Ben Stein's Money".

Two APS Members Running for Congress

Rush Holt

Rush Holt is running as a democrat for the US House of Representatives in the 12th Congressional District in New Jersey and Vernon Ehlers is running for re-election as a republican in the 3rd Congressional District in Michigan. Before running for Congress, Holt was the Assistant Director of the Princeton Plasma Physics Laboratory, an arms control expert at the State Department, an APS Congressional Fellow and a professor at Swarthmore College. Holt was a recent chair of the APS Forum on Education. Vern Ehlers was a NATO post-doc and did nuclear physics research at LBL for several years before becoming a professor at Calvin College prior to coming to Congress. Ehlers is currently the vice-chair of the House Science Committee (see Back Page, this issue for a photo and more information).

APS Fellow Named to National Science Board

President Clinton nominated Anita K. Jones, Pamela A. Ferguson and 1996 Nobel Laureate (and APS Fellow) Robert C. Richardson to serve as members of the National Science Board. The National Science Board establishes the policies of the National Science Foundation. Board members serve six year terms.

Richardson, of Ithaca, New York, is currently a Professor of Physics at Cornell University. In 1996, he was awarded the Nobel Prize in Physics along with colleagues David Lee and Douglas Osheroff. Jones, of Charlottesville, Virginia, is currently a University Professor of Computer Science in the School of Engineering and Applied Science at the University of Virginia. Ferguson, of Grinnell, Iowa, is currently a Professor of Mathematics and formerly the President of Grinnell College in Iowa.

zero gravity

Computer Adages

1. Home is where you hang your @.
2. The E-mail of the species is more deadly than the mail.
3. A journey of a thousand sites begins with a single click.
4. You can't teach a new mouse old clicks.
5. Great groups from little icons grow.
6. Speak softly and carry a cellular phone.
7. C:\ is the root of all directories.
8. Don't put all your hypes in one home page.
9. Pentium wise; pen and paper foolish.
10. The modem is the message.
11. Too many clicks spoil the browse.
12. The geek shall inherit the earth.
13. A chat has nine lives.
14. Don't byte off more than you can view.
15. Fax is stranger than fiction.
16. What boots up must come down.
17. Windows will never cease.
18. In Gates we trust.
19. Virtual reality is its own reward.
20. Modulation in all things.
21. A user and his leisure time are soon parted.
22. There's no place like http://www.home.com.
23. Know what to expect before you connect.
24. Oh, what a tangled website we weave when first we practice.
25. Speed thrills.

Centennial Topical Symposia, *continued from page 1*

nucleus, center of the atom and all visible matter.

Breakthroughs of Women in Physics (CSWP) The stories of women physicists whose success has advanced both the progress of science and the demolition of barriers that hinder the full participation of women in physics.

Dynamics Since Poincaré (GSNP) Chaos in dynamics, and its ubiquitous manifestation in physical systems, has been thought to be one of the greatest discoveries of this century.

Einstein's Legacy: Probing Nature's Experiments in Gravitational Physics (GGR) Nature has constructed astronomical experiments which exhibit the full range of gravitational phenomena.

Electronic Structure and Semiconductors (DCMP) The central theme of this symposium is the physics of semiconductors, demonstrating the synergy between theoretical developments and technological applications.

Energy Landscapes in Physics, Chemistry, and Biology (DBP) The concept of the energy landscape is proving to be a useful way of thinking about the dynamics of a wide variety of systems, notably glasses and proteins.

Environmental and Medical Applications of Chemical Physics (DCP) This symposium will focus on the applications of chemical physics to issues of direct concern to society.

The History of Chemical Physics (DCP) The history of theoretical and experimental chemical physics, spanning processes in gas and condensed phases, will be reviewed.

The History of Magnetism (DMP, GMAG) The rich diversity of magnetic phenomena and magnetic materials provides a fascinating history of fundamental physics studies and the basis for a stream of technological applications.

History of Physics in the National Defense (FIAP, FPS) We will hear the story of radar and nuclear weapons, imaging and communication satellites, major national programs, national security policy and arms control, from those involved.

The Impact of Computing on Physics (DCOMP) Presentations will highlight how advances in computing have enabled advances in physics on the national scale, in materials, fluids, and biology.

The Impact of Immigration on U.S. Physics (FIP) There is no question that U.S. science has profited immensely from the immigration of physicists to our country. The symposium will explore the impact of immigration during the past century on physics in the U.S.

The Impact of the Laser on Contemporary Physics (DAMOP, DLS) This symposium will review some of the forty year history of the laser and describe some of its applications for physics and technology.

Industrial Research: Past, Present, and Future (FIAP) We will learn about the historical and future goals of the Research Divisions of Ford, GE, IBM, and Lucent from their leaders.

Milestones in Polymer Physics (DHPP) Distinguished speakers will review breakthroughs in the development of polymer physics, from its inception to the present.

The Natural Standards (GIMS, GPMFC) "Natural Standards" anchors the ensemble of the International System of Units (SI) base units to the unvarying constants of nature.

Neutrinos (DPF, DNP, DAP) Empirical knowledge about the properties and interactions of neutrinos has been increasing rapidly, crucially affecting our understanding of nuclear processes, high-energy physics, and the universe.

From Particles to Atoms and Galaxies: Physics in All Sizes and by All Peoples (COM) Members of the minority physics community will discuss their roles and contributions to atomic, high energy, astro- and condensed matter physics, as well as in public service.

Physics Education Research: How to be a Better Teacher (FEd) The current widespread activity in Physics Education Research will be described by leaders in the physics education community.

Physics in the 20th Century: The Revolution - Quantum Mechanics and Relativity (FHP) This symposium deals with the history of some of the fundamental developments in 20th-century physics.

Physics in the 20th Century: World War II, Accelerators, and the Rise of High-energy Physics (FHP) This symposium emphasizes the growth of high-energy physics, including accelerators and detectors along with the role of physicists in World War II and developments in theoretical physics since that war.

Plasma Physics in the 20th Century: From Fundamental Physics to Applications (DPP) The talks focus on the key physics issues, which have surfaced in the exploration of plasma dynamics in the natural universe, in basic laboratory experiments, and in applications.

Precision Measurements in Atomic Physics: A Window into Fundamental Interactions (DAMOP, GPMFC) The precision and tools available in atomic physics permit the study of low energy fundamental interactions at very low energies that test the foundations of physics.

Quantum Many-Body Phenomena (DCMP, DMP) A central issue in condensed-matter physics is the emergent behavior from interactions among electrons. Manifestations of these interactions have led to the discovery of families of materials displaying these phenomena.

Science Policy for the New Millennium (FPS) Subjects open for discussion include the size of the federal investment, program accountability, priority setting, enduring rationales for public investment in research, linkages between educational institutions and industry, and the balance in the R&D portfolio.

Science with Accelerators, Storage Rings, and Light Sources (DPB) This symposium will include some history, some high-energy physics, application of synchrotron radiation to high-Ts, and future uses for spallation neutrons and advanced light sources.

The Search for the Ultimate Structure of Matter (DPF) This symposium highlights the quest to understand the ultimate structure of matter, from the discovery of the Rutherford atom to the opportunities of the 21st century.

Spontaneous Pattern Formation in Fluids (DFD, GSNP) Nature abounds with intriguing patterns formed as a consequence of spontaneous instabilities. Here, we trace the legacy of those giants who gave structure to our early insight into nonlinear process and assess progress to date.

Statistical and Multi-disciplinary Physics (DCMP, DMP, GSNP) This symposium highlights the recent flourishing of statistical physics and some of the many ways in which condensed-matter physics and materials physics reach out to other areas in the sciences.

The Three-Body Problem in Atomic, Molecular, and Nuclear Physics (GFB) The talks will focus on the contributions made by researchers toward unraveling the complexities of three interacting particles, using the insights and tools of classical, semiclassical, and quantum mechanics.

20th Century Developments in Instrumentation and Measurements (GIMS, FHP) From pre-20th century instruments, there is a natural progression involving the era of electronics, the role of standardization filled by the National Bureau of Standards, and the impact of computers in laboratories.

Unsolved Problems in Astrophysics (DAP) Advances in astrophysical research in the last few decades have solved many fundamental problems. They have also provided a number of new and perplexing questions, four of which we will explore in this symposium.

APS Regional Sections Hold Fall Meetings

Five APS geographical sections held their annual fall meetings throughout the nation during the month of October, including the second meeting of the fledgling Four Corners Section. A brief description of highlights from each is below.

New York State Section The APS New York State Section held its 79th annual topical symposium 2-3 October at the Rensselaer Polytechnic Institute in Troy, New York. The theme of the meeting was advances and applications in magnetism, featuring lectures aimed at the general public by experts from academic and industrial institutions, as well as non-profit laboratories. Friday morning featured talks on magnetic memory, surface magnetism and cluster magnetism, followed that afternoon by lectures on magnetism and high-temperature superconductors, SQUIDs, extreme microscopy, and magnetic resonance imaging. Friday evening's banquet was followed by a public lecture by Ivar Giaever, recipient of the 1972 Nobel Prize in Physics, entitled, "How To Win a Nobel Prize." The final session on Saturday morning featured talks on optically based magnetic field sensors, animal magnetism, and permanent magnets.

Texas Section The APS Texas Section held a joint fall meeting with the Texas Section of the AAPT and Zone 13 of the Society of Physics Students, 15-17 October, at the University of Texas in El Paso. Invited plenary speakers included such noteworthy figures as Murray Gell Mann; Howard Georgi of Harvard University; Nathan Isgur, director of CEBAF/Jefferson Laboratory; Miguel Yacaman, director of Mexico's Instituto Nacional de Investigaciones Nucleares (ININ); John Anderson of the Jet Propulsion Laboratory; and Michael Martin Nieto of Los Alamos, who gave a banquet address on "The Discovery of Sqeezed States — in 1997." To encourage student participation, prizes were awarded for outstanding contributed papers presented by undergraduate and graduate students.

In addition, two special sessions were organized. One focused on physics in Mexico and featured talks by prominent Mexican physicists on such topics as pulsed laser deposition and in situ characterization of thin films; the application of nulear techniques of analysis using ININ's Tandem Accelerator; and transformations and structural aspects of quasicrystalline phases of alloys. The second featured talks by minority Texas-based researchers at the leading edge, sponsored by the APS Committee on Minorities.

Four Corners Section The APS Four Corners Section held its first fall meeting 16-17 October at Brigham Young University in Provo, Utah. The conference opened Friday afternoon with a session on "Physics in Utah," featuring talks on nanometer scale electronic measurements using scanning probe microscopy, and on EUV multilater mirrors for the IMAGE mission. Kip Thorne of CalTech, author of several books on astrophysics and cosmology — including *Black Holes and Time Warps: Einstein's Legacy* — gave a public lecture entitled "Gravitational Waves: A New Window on the Universe" following Friday evening's banquet.

Saturday morning began with a presentation of student papers, followed by a physics demonstration and the awarding of prizes for outstanding student papers, with a specific awards category for Native American or Hispanic students. The conference closed with a public session featuring other distinguished lectures from the region, speaking on the Hubble Space Telescope and the physics of nebulae; recent experiments in Bose-Einstein condensation; and, in keeping with the theme of two recent summer movie blockbusters, reducing the asteroid and comet hazard.

Ohio Section The APS Ohio Section held its annual fall meeting that same weekend at the University of Akron in Ohio. Organized around the theme, "Scanning Probe Microscopies: Recent Advances and Applications," the meeting was held in conjunction with the Ohio Chapter of the American Vacuum Society and the Ohio Materials Network. Friday afternoon's plenary session featured talks on the dynamics of two-dimensional reshaping on a metal surface, and on properties of nanoscale interfaces using scanning probe microscopy. They were followed by a poster session of student papers, after which three prizes were awarded for the best papers in separate categories for undergraduate and graduate students. The conference closed with a Saturday morning session featuring lectures on the use of SQUID microscopy for studying magnetotactic bacteria and on microscopy and spectroscopy beyond the diffraction limit.

New England Section The APS New England Section concluded the month's regional section activities with its fall meeting, held 23-24 October at the University of New Hampshire in Durham, New Hampshire. Focusing on advances in condensed matter and nuclear physics, as well as issues in undergraduate education, the conference was held jointly with the appropriate regional chapter of the Society of Physics Students and the Seacoast Physics Teachers. Friday afternoon's opening session focused on condensed matter physics, with talks on nanostructures and ultrafast dynamics of metal quantum dots. It was followed by a panel discussion on undergraduate education.

Daniel Kleppner, the Lester Wolfe Professor of Physics and Associate Director of Massachusetts Institute of Technology's Research Laboratory of Electronics, was the featured speaker at Friday evening's banquet, discussing Bose-Einstein condensation. The meeting closed with a Saturday morning session focusing on topics in nuclear physics, including measurements of fundamental physics with polarized neutrons; the use of spin to study strong interaction; parity violation and nucleon structure; and parity violation and fundamental electroweak physics.

Editor's Note: Coverage of the annual fall meeting of the APS Southeastern Section, to be held 12-14 November at Florida International University in Miami, will appear in the December 1998 issue of APS News.

Announcements

Matching Fund Grants for Students to Attend APS Centennial

Eligibility: All undergraduate and first-year graduate students enrolled in physics courses at any university or college in the U.S.

Nominating Letter: Physics departments should forward to the APS a brief statement of no more than 250 words concerning the rationale for selecting the student(s) it wishes to nominate. Nominating letters must include certification that at least $250 of matching support will be provided by the department to supplement the APS award, and a completed information sheet. Any questions or requests for information should be directed to Erika Ridgway, 301-209-3269; ridgway@aps.org.

Deadline: All letters must be received at the APS by **December 15, 1998**. Selected students and their departments will be notified in early January, 1999. All nominations must be mailed to:

Executive Office
The American Physical Society
ATTN: Matching Grants for Physics Students
One Physics Ellipse
College Park, MD 20740-3844

Special Note: Since the APS has limited funds to support the attendance of physics students at the APS Centennial Celebration, departments may elect to support the attendance of more students on their own, even if no travel grant from the APS is awarded. The APS asks that if a department does choose to fully support more students, that the APS be notified so that all students attending can be informed of the activities and events designed for them.

APS/AIP 1999-2000 CONGRESSIONAL SCIENCE FELLOWSHIP PROGRAM

The American Physical Society and the American Institute of Physics are currently accepting applications for their 1999-2000 Congressional Science Fellowship Programs. Fellows serve one year on the staff of a senator, representative or congressional committee. They are afforded an opportunity to learn the legislative process and explore science policy issues from the lawmaker's perspective. In turn, Fellows may lend scientific and technical expertise to public policy issues.

Qualifications include a PhD or equivalent in physics or a closely related field, a strong interest in science and technology policy, and, ideally, some experience in applying scientific knowledge toward the solution of societal problems. Fellows are required to be U.S. citizens and, for the AIP Fellowship, members of one or more of the AIP Member Societies at time of application.
Term of Appointment for both fellowships is one year, beginning in September of 1999, with participation in a two-week orientation in Washington, organized by the American Association for the Advancement of Science. Choice of congressional assignment is reserved to Fellows.

A Stipend of up to $46,000 is offered, in addition to allowances for relocation, in-service travel, and health insurance premiums.

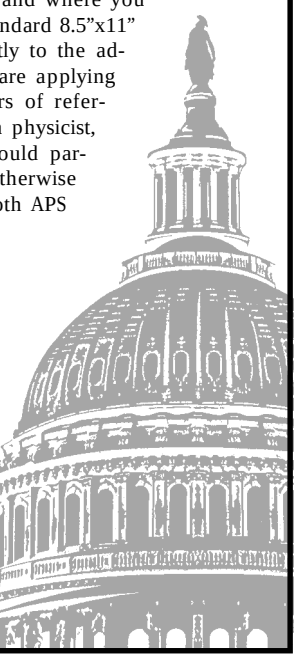
Applications should consist of a letter of intent, a 2-page resume, and three letters of reference, accompanied by a cover sheet indicating: name, address, phone, email, references, US citizenship, PHD status, society membership , and where you learned about the programs. All submissions should be on standard 8.5"x11" paper, single-sided and unstapled, and should be sent directly to the address below. Candidates should state in the letter why they are applying and briefly describe their public service experience. Letters of reference should discuss not just the candidate's competence as a physicist, but also the education, experience, and attributes which would particularly qualify the candidate to serve as a Fellow. Unless otherwise specified in the letter, the applicant will be considered for both APS and AIP fellowships.

All application materials MUST be postmarked by January 15, 1999.

APS/AIP Congressional Science Fellowship Programs
529 14th Street NW, Suite 1050
Washington, DC 20045

APS and AIP HomePages: www.aps.org and www.aip.org

Please note that other physics-related Congressional Science Fellowship opportunities are sponsored by AIP Member Societies. For information on the American Geophysical Union program, contact Daryl Tat/202-939-3222. For programs sponsored by the Optical Society of America, contact Liz Baldwin/202-416-1418.



CAUGHT IN THE WEB

Notable additions to the APS Web Server. The APS Web Server can be found at http://www.aps.org

Centennial
- Centennial Events updated-reunion information added
- Virtual Pressroom added

General
- Books for Sale—APS in association with Amazon.com
- Physics Internet Resources—String Theory Web Site added

centennial webpage
www.aps.org/centennial

Units
- DAMOP, DFD, DPB pages updated
- New York Section —election information
- Texas Section pages updated
- Topical Group on Magnetism pages updated

Meetings
- Centennial Meeting Announcment
- GEC sessions available in PDF
- Personal Schedule Builder now available for GEC and DNP Programs
- Online Registration for DPP and Centennial Meetings

Call for 1999 Awards and Nominations

Award for Outstanding Doctoral Thesis Research in Plasma Physics

Established in 1985 and endowed by General Atomic.

Purpose: To provide recognition to exceptional young scientists who have performed original doctoral thesis work of outstanding scientific quality and achievement in the area of plasma physics.

Nature: The annual award consists of $2,000, a certificate citing the accomplishments of the recipient, and an allowance of up to $500 for travel to attend the annual meeting of the Division of Plasma Physics at which the award will be presented.

Rules and Eligibility: Nominations will be accepted for any doctoral student (present or past) of a college or university in the United States or for a United States' student abroad. The work to be considered must have been performed as part of the requirements for a doctoral degree. Also, the nominee must not have passed his or her final doctoral examination or started regular employment more than 18 months before the nomination deadline for the selection cycle in which the nomination is to be considered. Each nominee will be considered in not more than two consecutive cycles.

Send name of proposed candidate and supporting information before **1 April 1999** to:

Amitava Bhattacharjee
Dept of Phys & Astron
Univ of Iowa
Iowa City IA 52242
Phone (319) 335-1686
Fax (319) 335-1753
Email amitava@physics.uiowa.edu

Nicholson Medal for Humanitarian Service

Established in 1994 by the Division of Plasma Physics and the Forum on Physics and Society by the friends of Dwight Nicholson.

Purpose: To recognize the humanitarian aspect of physics and physicists.

Nature: The honor consists of the Nicholson Medal and a certificate that includes the citation for which the recipient has been recognized.

Send name of proposed candidate and supporting information before **1 April 1999** to:

Barbara G Levi
1616 La Vista del Oceano
Santa Barbara CA 93109
Phone (805) 965-3483
Fax (805) 963-2574
Email bgl@worldnet.att.net

Excellence in Plasma Physics Research Award

Established in 1981 with support from Friends of the Division of Plasma Physics

Purpose: To recognize a particular recent outstanding achievement in plasma physics research.

Nature: The award consists of $5,000 to be divided equally in the case of multiple winners, and includes a certificate citing the contributions made by the recipient or recipients, to be presented at an award ceremony at the Division of Plasma Physics Annual Meeting Banquet.

Rules and Eligibility: Nominations are open to scientists of all nationalities regardless of the geographical site at which the work was done. It may be a given to a set of individuals as well as to individual scientists, as appropriate, to honor those who make essential contributions to the cited research achievement. Nominations are active for three years.

Send name of proposed candidate and supporting information by **1 April, 1999** to:

Charles F F Karney
Princeton Plasma Physics Laboratory
Princeton University
PO Box 451
Princeton NJ 08543-0451
Phone (609) 243-2607
Fax (609) 243-3438
Email karney@princeton.edu

James Clerk Maxwell Prize for Plasma Physics

Established in 1975 and funded by Maxwell Technologies, Inc.

Purpose: To recognize outstanding contributions to the field of plasma physics.

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

Rules and Eligibility: The prize shall be for outstanding contributions to the advancement and diffusion of the knowledge of properties of highly ionized gases of natural or laboratory origin. The prize shall ordinarily be awarded to one person but a prize may be shared when all the recipients have contributed to the same accomplishments. Nominations are active for three years.

Send name of proposed candidate and supporting information by **1 April, 1999** to:

Philip J Morrison
The University of Texas
Department of Physics
RLM 11.314, Mail Stop C1500
Austin, TX 78712
Phone (512) 471-1527
Fax (512) 471-6715
Email morrison@peaches.ph.utexas.edu

Call for Awards and Nomination Deadline: April 1, 1999

APS Mass Media Fellowship Program

Applications are now being accepted for the 1999 APS Mass Media Fellowships. In affiliation with the popular AAAS program, the APS is sponsoring two ten-week fellowships for physics students to work full-time over the summer as reporters, researchers, and production assistants in mass media organizations nationwide.

Purpose: The program is intended to improve public understanding and appreciation of science and technology, and to sharpen the ability of the fellows to communicate complex technical issues to non-specialists.

Eligibility: Priority will be given to graduate students in physics, or a closely related field, although applications will also be considered from outstanding undergraduates and postdoctoral researchers. Applicants should possess outstanding written and oral communication skills and a strong interest in learning about the media.

Term and Stipend: Following an intensive three-day orientation in early June 1999 at the AAAS in Washington, DC, winning candidates will work full-time through mid-August. Remuneration is $4,000, plus a travel allowance of approximately $1,000.

Mail application materials, which must be received by **January 15, 1999**, to:

APS Washington Office
ATTN: Mass Media Fellowship Program
529 14th Street NW, Suite 1050
Washington, DC 20045

Information on application requirements can be found at http://www.aps.org/public_affairs/Media.html

THE BACK PAGE

New Responsibilities in a New Era of Science Policy

by Vernon J. Ehlers, Member of Congress

Context always shapes history. Scientific and technological breakthroughs or other events that affect the scientific and engineering enterprise are no different. The Manhattan Project, for example, coming at the end of a long, bloody war and on the verge of a potentially equally bloody and protracted battle, was viewed at the time as a clear triumph of good over evil, of intellect over sheer force.

The course of further events modified society's recollections, or at least shaped the impressions of succeeding generations differently. In particular, the realization of the existence of long-term health effects from radiation exposure and the arms race that followed the war influenced the public's feelings about the appropriateness of the bombs' use and even the Manhattan Project's existence.

Vannevar Bush's 1945 report to President Truman, *Science: The Endless Frontier*, delivered just a few months before the bomb was dropped, had a less profound immediate impact on the nation. But its legacy, too, was shaped by the decades that followed. Implementation of Bush's call for public funding of research, for instance, received a tremendous boost during the post-war period due to the pressures of the arms and space races.

Political miscalculations made shortly after the release of the report, however, delayed implementation of a central tenet of it—the establishment of a single granting and policy body for science—so that by the time the National Science Foundation was established it had been preceded by formation of the National Institutes of Health and the Atomic Energy Commission (later the Department of Energy). For better or worse, the nation's management of science and its funding had been fragmented within the federal government.

Many of the nation's policies with respect to science were issued and shaped in the post-World War II era. But the Cold War context of urgency—of the need to maintain the scientific enterprise for the nation's very survival—has all but vanished today. Additionally, the increasing costs of scientific research in the face of declining federal funds, due to the growth of entitlements and interest on the national debt, have created a fiscally constrained atmosphere for science funding. Largely for these reasons, the Speaker of the House of Representatives, Newt Gingrich, asked the Chairman of the House Committee on Science, F. James Sensenbrenner, to charge me with developing a new national science policy that fits today's needs and circumstances.

Today, while we must remain ever vigilant and militarily strong, the need to maintain economic strength has taken on primary importance. We now recognize more clearly than ever that economic strength facilitates not only a strong defense, but promotes other societal needs, such as social and political stability, good health, and the preservation of freedom.

The growth of economies throughout the world since the industrial revolution began has been driven by continual technological innovation through the pursuit of scientific understanding and application of engineering solutions. America has been particularly successful in capturing the benefits of the scientific and engineering enterprise, but it will take continued substantial investment in this enterprise if we hope to stay ahead of our economic competitors in the rest of the world. Many of those challengers have learned well the lessons of our employment of the research and technology enterprise for economic gain.

A truly great nation requires more than simply economic power and the possession of military might, however. In a truly great nation, freedom triumphs. Diversity is not just tolerated, but celebrated. The arts flourish alongside the sciences. And strength is used not to conquer, but to assist. Economic stability brings more than a high standard of living in the purely material sense. It also promotes quality of life in the broadest sense.

Science, driven by the pursuit of knowledge, and technology, the outgrowth of ingenuity, will fuel our economy, foster advances in medical research, and ensure our ability to defend ourselves against ever more technologically-advanced foes. Science also offers us an additional benefit. It can provide every citizen—not only the scientists who are engaged in it—with information necessary to make informed decisions as voters, consumers and policymakers. For the scientific enterprise to endure, however, stronger ties between this enterprise and the American people must be forged. And our position as the world's most powerful nation brings opportunities as well as responsibilities that science and its pursuit can, and should, address.

As a nation, we have much to be proud of. But we ought always to be seeking to improve. Science and technology can play important roles in driving this improvement. These beliefs—that we can do better and that improvement can come, at least in part, through a strong science and technology program—are reflected in the vision that guided the Committee on Science during the national science policy study:

The United States of America must maintain and improve its pre-eminent position in science and technology in order to advance human understanding of the universe and all it contains, and to improve the lives, health, and freedom of all peoples.

After a year of gathering input for the project, including speeches to, and discussions with, thousands of scientists and other interested citizens, two roundtable discussions, seven hearings, and over 300 email submissions, we issued our report, entitled *Unlocking Our Future: Toward a New National Science Policy* (the report is available on the Web at: http://www.house.gov/science/science_policy_report.htm).

Because the continued health of the scientific enterprise is a central component in reaching the vision outlined above, the report lays out recommendations for keeping the enterprise sound and strengthening it further. The report contains no singular, sweeping plan for doing so. Instead, keeping the enterprise healthy will require numerous actions and multiple steps, and so we advocate in the report not a major overhaul of the enterprise but rather a fine-tuning and rejuvenation. It is also not something the Congress or even the federal government can do on its own; making these mid-course corrections will require the involvement of citizens and organizations—including the American Physical Society—from across the nation.

Our recommendations focus on improving three major areas. First, science—including understanding-driven research, targeted basic research, and mission-directed research—must be given the opportunity to thrive, as it is the precursor to new and better understanding, products and processes. The federal investment in science has yielded stunning payoffs. We have made major discoveries across all the scientific disciplines, and stand at the threshold of making new and equally exciting ones. Research sponsored by the federal government has spawned not only new products, but even entire industries. To build upon the strength of the research enterprise we must make federal research funding stable and substantial, maintain diversity in the federal research portfolio, and promote creative, groundbreaking research.

The role of the private sector is just as important in maintaining the overall scientific and engineering enterprise. The federal government's role in the application of research is naturally limited by the need to allow market forces to operate, but it is important that we ensure that the context in which technology-based industries operate is as conducive as possible to the advancement of science, technology, and economic growth.

Third, our system of science and mathematics education, from kindergarten to research universities, must be strengthened. Our effectiveness in realizing the vision we have identified will be largely determined by the intellectual capital of the nation. Education is critical to developing this resource. Not only must we ensure that we continue to produce world-class scientists and engineers, we must also provide every citizen with an adequate grounding in science and math if we are to give them an opportunity to succeed in the technology-based world of tomorrow—a lifelong learning proposition.

As with past events, whether the atomic bomb or Vannevar Bush's 1945 report, our recent report, *Unlocking Our Future: Toward a New National Science Policy*, will be judged based on not only future events we cannot predict, but also on actions taken in the immediate future, actions which, in contrast, we can and must effect. The scientific community has been given a rare opportunity to make an impact on national policy in a way not seen since the end of World War II.

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The response of this community to our report will be critical in determining the extent to which its recommendations can be implemented.

While the report strongly advocates federal funding for understanding-driven research, for example, support from the scientific community that focuses exclusively on this one recommendation will not be enough to accomplish it. Instead, scientists must become more thoroughly engaged in resolving some of the other, often more difficult, policy issues before the nation and the scientific enterprise. For example, the issue of research priorities within and among various disciplines must be addressed, ways to measure research performance must be identified, and hands-on reform of the educational system must be undertaken. Our report lays the groundwork for making some of these decisions and improvements, but it is only the first step. The scientific community as a whole must become more involved in promoting change if the scientific enterprise is to have the profound impact it is capable of exerting, and thus bring about improvements in the lives, health and freedoms of all peoples.

This involvement can take place on the national level, through interactions with federal policymakers, for example, or at the local level, through participation in city, county or state government. Speeches to local civic groups can help bridge the communication gaps that often exist between scientists and the rest of society. Invitations to students at nearby schools to tour or work in one's laboratory, or talks given to students in the classroom are ways to become more actively involved in education. I encourage each and every one of you to take at least one such step. In doing so, you will not only be helping to strengthen the scientific enterprise, but also the nation.

Vern Ehlers, a Fellow of the APS, was first elected to Congress in December 1993 after a distinguished career of teaching, scientific research, and community service. He is the first PhD research physicist to serve in the US Congress, and currently serves as Vice Chairman of the House Science Committee.

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