

CSWP Gazette

A Newsletter of the Committee on the Status of Women in Physics of The American Physical Society

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Culture of the Science and Technology World

*Commentary by Dr. Mary L. Good
Venture Capital Investors*

It has been fashionable since the days of C. P. Snow to talk about the cultural differences between the intellectuals in the scientific and technical community and those in the humanities and social sciences. In recent years there has been a great deal of discussion about the culture of the academic community and the rest of the world, especially the issues associated with the need for the academy to better communicate and collaborate with the industrial sector. To that mix has been added the question of the involvement of the government agencies with industry and academia and how they should best promote the country's interests through such interactions. One of the most often expressed reasons for the difficulties, inefficiencies and ineffectiveness of these relationships is that the "cultures" clash. It is obvious that these organizational structures have different goals and objectives and that the overall reward systems are different. However, having spent significant time in each of these structures I believe that the cultural differences are between the administrative and management directions and styles rather than "cultural" differences in the individual functions of the organizations. In particular, I am convinced that there is a real definable culture in the technical and science communities which is shared across the three activities and that the perceived (and real) conflicts are caused by the overlay of the needs and measurements of success by their respective organizations.

Cultures are defined by values - what behavior do you respect, what are the expectations for recognition, etc. The science and technology community respects and admires creativity, new knowledge, a well-reasoned explanation of observed phenomena, the nurturing of young followers, and the beauty of scientific discovery or new engineering construction. Scientists and engineers also maintain connections to their early mentors and almost always have close ties to their disciplinary colleagues across industry, academia and government. In fact, in many cases the origin of "culture" conflicts is between the technical staffs and their managers. The recent move by the research and development-intensive industries to better focus their R&D efforts and to have their technical staffs work directly with marketing, manufacturing and strategic management is more of a cultural shock than getting the industrial research staff to work directly with their academic colleagues. On the academic side, in most cases they now must work out industry cooperative arrangements with business managers rather than research vice presidents.

Similar issues are increasingly important in the government laboratories and their interactions with their constituents. Congressional and Administration oversight requires a focus on defined areas of government need - specific disease control,

leadership positions in defense technology, new energy solutions, measurement technology, etc. These focused areas are being redefined in the aftermath of the Cold War. The increased emphasis on accountability and evaluation of government activities is removing much of the flexibility long enjoyed by major government laboratories. The scientists and engineers in these institutions see threats in these changes to both creativity and the development of innovative science. Thus, the difficulties of working out CRADA's with industry, and collaborative work with universities, are not due to cultural differences between technical personnel, but between the goals and reward systems of their respective institutions.

The culture in the academic community is driven by the same values held by other technical personnel, but it is also molded by a reward system tied to peer recognition and the perception of "quality research" as defined by peer disciplinary groups. Thus, academic collaboration with industry and/or government can be impeded to the extent that non-academic colleagues are not considered "peers." Where a peer relationship exists, collaboration can be outstanding. An example is the work at ultra-low temperatures to create Bose-Einstein Condensate carried out by the University of Colorado and NIST scientists. In times past, similar collaborative studies have been very successful with Bell Laboratories and other industry fundamental research organizations such as the General Electric and DuPont central research groups. Today there is extensive collaboration between industry and academia in the health sciences, several areas of engineering, and in the creation of new start-up, technology-based companies.

The secret to an increased collaborative effort in science and technology will be for the technical communities in all three domains to talk to each other and to better understand their respective management concerns and needs. Going forward in an era where technology development is very rapid and where the lines between fundamental, applied and technology research are blurred at best, will require a cultural change in the scientific and technical community itself. This group can no longer be isolated from current economic trends and essential national technology issues. They must learn to retain their core values at the same time that they respond positively to society's needs either in the industry, in government or in education. Over the last half century, the technical community has argued for their support based on their contributions to national defense, health of the nation and economic posterity. The public is now more sophisticated and will require a rational explanation (in terms they can understand) in return for the resource support re-

Continues on pg. 2

The Editor for this issue is
Katherine Gebbie, NIST

Managing Editor
Tara McLoughlin

Production and Design
Alicia Chang

Members of the Committee

Neal Abraham
Depaw University

Beverly Berger
Oakland University

Peggy Cebe, Chair
Tufts University

Shu Chang
Xerox Webster
Research Center

Sally Dawson
Brookhaven National Laboratory

Elsa Garmire
Dartmouth University

Marjorie Olmstead
University of Washington

Linda Vahala
Old Dominion University

Barbara Whitten
Colorado College

APS Liaisons

Ramon E. Lopez
University of Maryland
The American Physical Society

Tara McLoughlin
The American Physical Society

AAPT Liaison

Patricia Allen
Appalachian State University

Publication Information

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Letter from the Editor

Dr. Katharine Gebbie, Director, Physics Laboratory, NIST



Photo courtesy of NIST

About one third of all graduating physics PhDs are going directly into industry; many others will turn to industry after a postdoc in academia or government. Industry is the dominant employer of physics bachelors. To provide a voice and focus for these industrial physicists, the American Physical Society and, specifically, the Committee on the Status of Women in Physics have introduced a number of

new activities. The Forum on Industrial and Applied Physics, established in 1995, is already the largest of any APS unit, with a membership of over 5000. In the same year, the American Institute of Physics introduced *The Industrial Physicist*, a quarterly magazine with a circulation of 50,000, dedicated to the development, advancement and recognition of industrial physicists and the applications of physics in industry. Just this past year, APS established a new Committee on Careers and Professional Development, which is offering short courses on topics of interest to industrial scientists.

Many of you have attended CSWP's industrial breakfasts held over the past few years in San Jose, St. Louis, and Los Angeles. Featuring talks by local women physicists in industry, they offer a special opportunity for these women to network among themselves and for students and postdocs to learn about alternative careers in industry. With a similar emphasis, the *APS News*' new series on successful female physicists began last February with a feature on Cherry Murray, director of the Physical Research Laboratory at Bell Laboratories/Lucent Technologies.

My own laboratory, the Physics Laboratory of the National Institute of Standards and Technology, supports U.S. industry by providing measurement services and research for electronic, optical, and radiation technologies. Our programs span the whole range from those that address the immediate demands of indus-

try for standards and measurement to the longer-term research that anticipates the future needs. Here we find that some of our most talented young women are opting for the more applied programs. They are no longer buying into the tenet that the intellectual challenge of research is inversely proportional to its usefulness—that the most creative minds must be free to pursue "unfettered research". Even the more mature scientists who are world leaders in the longer-term fundamental research are often among the most eager to see their efforts amplified by commercializing their ideas and discoveries.

This issue of the *CSWP Gazette* is focused on women in industry. In the lead article, Dr. Mary Good argues that the cultural differences are not so much between the technical staffs in industry, government and academia, as between the technical staffs and their managers in all sectors. She is well qualified to speak to this issue having had careers in all three sectors. In her academic career (1954–1980), she rose through the ranks of the Louisiana State University system to become Boyd Professor of Chemistry at the University of New Orleans and then Boyd Professor of Materials Science in the Division of Engineering Research at LSU in Baton Rouge. In her industrial career (1980–1993), she survived buyouts, mergers and acquisitions to become Senior Vice President for Technology for Allied Signal, a position she held for five years before embarking on her career in government (1993–1997) as President Clinton's Undersecretary for Technology in the Department of Commerce.

In another article, CSWP Chair Peggy Cebe reviews the common themes that emerged from two symposia she organized this year on educating physicists for careers in government and industrial laboratories. Former NIST intern Tahirih Lackey describes working as a summer undergraduate research fellow in a government lab. And the Archive on Contributions of 20th Century Women to Physicists, described in the article by Betty Anderson, includes a number of industrial women physicists.

I hope you find the *Gazette* both interesting and useful and that you will consider contributing your own views, enthusiasms, and concerns to future issues.

Culture of the Science and Technology World, cont'd from pg. 1

quired to do twenty-first century science and technology. Taxpayers want to be assured that government funding both for government facilities and external university research is being spent on their behalf and industry will require that their R&D funding is economically productive. Those of us who cherish our work in science and technology will have to adapt our culture to meet these expectations.

These comments should reassure science and technology students that there are wonderful opportunities for them to simultaneously extend our knowledge base and give our Nation a continuing leadership position in our global environment. It should also be obvious that the essential credentials and behavior for success in science and technology are quite similar in all three sectors. Good science and engineering are key ingredients but they must be supplemented by an understanding of priorities, needs, and expected outcomes. Scientists and engineers also must be prepared to present their work and their discoveries in ways that can be evaluated by the public and/or their business leaders. These requirements should, and will, create a climate for effective connections and interchanges within the entire technical community. The changes that are occurring may be per-

ceived by some as a diminution of the role and influence of science and technology. I believe that the opposite is true and that our contributions will be more important than at any time in the past. I personally would relish the opportunity to begin again with a fresh Ph.D. in chemistry and have an opportunity to be a player in this new game!

Report on the Online Archive of the Contributions of 20th Century Women to Physics

By Betty Anderson

Research Associate CWP Project (1996-1998)

Contributions of 20th Century Women to Physics (CWP) is a website that documents the important and original contributions of 20th century women to physics. This archive describes and documents important and original contributions women have made to the field, and gives biographical information about these women. The website can be found at <http://www.physics.ucla.edu/~cwp>

The website is being used by many people all over the world. Roughly 500 viewers per week visit the site and view the citations. A Reader Survey indicates that these viewers are primarily physicists, teachers, college and pre-college students, librarians, and historians. About 20% of the viewers answer our reader survey questions. They indicate that they have accessed the site to browse, prepare courses, conduct research for a publication or lecture, and sometimes because they are thinking about a career. Interest is also shown by web guides and search engines; the site is listed in a large number of different websites. In addition, digital databases such as the *Encyclopaedia Britannica Online* include hyperlinks to CWP for its data on many famous women such as Marie Curie, Irene Joliot-Curie, Dorothy Hodgkin, Kathleen Lonsdale, Lise Meitner, and Maria Goeppert-Mayer.

The web archive has been under construction for over two years, sponsored by the APS Committee on the Status of Women in Physics (CSWP) and Forum on History of Physics (FHP). Professor Nina Byers, UCLA, has served as coordinator of the project since its inception, working with many colleagues and with UCLA researchers and administrative assistants.

As can be seen on the site, over 60 Phase II citations are accessible for viewing. Only when the database for a given woman reaches Phase II is her citation made available for public viewing. The Phase II designation signifies that research has been conducted on each of these women by the staff at UCLA, and the results have been edited by a Field Editor who is or was active in the field of research in which the contributions were made. The Field Editor verifies the accuracy of the data and documentation regarding the science. For women no longer living, a great deal of historical research has been done and verified. Women who are still working today have been invited to provide information about their important discoveries, and provide references to the publications that first reported them. Many notable women have graciously supplied such information. Personnel and funding limitations, unfortunately, have required the limitation that only women who have made at least one important contribution before 1976 can be included.

In researching and completing the citations, the staff has compiled a collection of primary archival materials generally unavailable to most researchers. The citation for

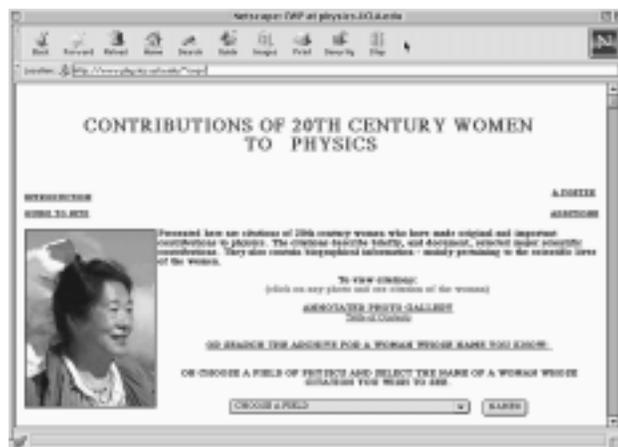
Hertha Ayrton, an English woman included because of her important work on the electric arc early in this century, is a case in point. CWP received reminiscences of her written by A.P. Trotter, former president of the Institute of Electrical Engineers in London. These are of great interest for the history of physics and for women's history. Extracts have been hyperlinked into her citation. This valuable document is only available at the Institute itself and on CWP.

Another important contributor to physics is Agnes Pockels, whose famous letter to Lord Rayleigh was published

in *Nature* in 1891 (this letter can be found hyperlinked to her citation). She is a remarkable addition to the website. Pockels never received a university education, primarily because Germany afforded women little opportunity to do so in the late 19th century, and because she had to remain at home to take care of her ailing family. In spite of this, she succeeded in conducting a number of important experiments in her kitchen on the properties of surfactants and surface tension of liquid solutions. Today she is credited with having initiated the field of surface physics.

The website is filled with a number of such remarkable stories and links to sources. It also includes pictures of most of the women. The primary sources that have been collected provide insight into the women's lives and careers as physicists, and also bring to light key anecdotal and scientific data unavailable in conventional reference books. Approximately 180 names have been researched, and in the near future perhaps 30 more citations will be posted.

To provide the needed historical context for each of the women's citations, the staff of the project is researching and writing historical essays pertinent to the women's lives. Because many of the women in this archive studied and worked in Germany, the first series of essays will discuss the changing conditions of women in that country between 1890 and 1933. In the first two decades of this period, German women struggled to gain admittance to the universities and called on the government to improve the quality of secondary education. Once German women began entering



**Visit the archive online at <http://www.physics.ucla.edu/~cwp>
It is filled with a number of photos, remarkable citations and links to sources.**

APS Outreach Programs for Minorities and Women

(a version of this article appeared in the APS News, February 1998)

At a Glance

The following is a list of outreach programs for Minorities and Women sponsored by the APS, as well as some websites of interest.

Women and Minority Speakers Lists

The lists are now available in hard copy and online (minority list: www.aps.org/educ/mip-csl.html women's list: www.aps.org/educ/wip-csl-front.html), and list the names and talk titles of women and minority physicists, indexed by field and state. These lists are mailed to all physics departments each fall. To add your name to the women's list, visit www.aps.org/educ/cslwip.html or see page 14; for the minority list, see www.aps.org/educ/cslmip.html.

Travel Grants for Minority and Women Speakers Programs

The APS provides small grants to physics departments to fund visits by minority and women colloquium speakers. Funding is still available for the 1998-1999 academic year. For information on the women's program, see www.aps.org/educ/women-intro.html or see pages 15-16, for the minority program visit <http://www.aps.org/educ/minority-intro.html>.

The Gazette

The Gazette is the official newsletter of the CSWP, featuring updates on CSWP activities and programs, book reviews, statistical reports, and articles on programs designed to increase the participation of women and girls in science. To subscribe, change your address, or volunteer to write an article, please contact Tara McLoughlin at 301-209-3231 or tara@aps.org.

Roster of Women and Minorities in Physics

The roster lists the names and qualifications of over 3500 women and minorities in physics. It serves as the mailing list for CSWP and COM publications, and is also widely used by prospective employers to identify women and minority physicists for job openings. To request a search online, please see www.aps.org/educ/reqform.html. To add your name to the roster, see pages 11-12.

Improving the Climate for Minority/Women in Physics Site Visits

Through this program, teams of minority/women physicists visit physics departments to assess the climate for minorities/women in the departments, and to make recommendations to improve the climate for minority/women undergraduates, graduate students and faculty. Online information is available at <http://www.aps.org/educ/cswp/sitevist.htm>.

WIPHYS (Women in Physics) Internet List

Over 700 subscribers from around the world network, exchange advice, and discuss issues of interest to women in physics on WIPHYS. The WIPHYS website (<http://www.aps.org/educ/cswp/wiphys.htm>) includes subscription information and a searchable archive.

The Edward A. Bouchet Award

A lectureship/award meant to enhance the visibility and awareness of outstanding minority physicists to peers and minority students. For information on eligibility and nomination, see www.aps.org/praw/bouchet/descrip.html.

Internet Archive of the Contributions of Women to Physics

This archive (www.physics.ucla.edu/~cwp/) documents citations of women who have made original and important contributions to physics this century. Visit this site to conduct historical research, add names of women physicists, or simply browse and find inspiration among these fascinating biographies.

Committee on Minorities Symposia

At the larger APS meetings, the Committee organizes invited sessions during which minority physicists give technical talks. At the 1998 April meeting, the committee organized a session on Collaborative Forefront Research Opportunities at Minority Institutions (www.aps.org/BAPSAPR98/tocM.html#SessM18)

CSWP Sessions

The Women's Committee also organizes sessions at meetings, usually on topics of interest to women in physics. 1998 sessions included talks on preparing for/surviving in a career in industrial/applied physics (see "Beyond the Ivory Tower" <http://www.aps.org/BAPSAPR98/tocD.html#SessD11> or page 5 of this issue.)

CSWP/COM Receptions

COM and CSWP regularly hold a joint networking reception at both the April and March APS meetings, during which the committees publicize their programs and projects. A reception is planned for the APS Centennial Celebration in Atlanta in March of 1999.

Corporate Sponsored Scholarships for Minority Undergraduate Students who major in Physics

Any African-American, Hispanic-American, or Native American US citizen who is majoring or planning to major in physics and who is a high school senior, college freshman or sophomore is eligible to apply. Applications for the 1999-2000 competition will be available in November 1998, and will be due 5 February 1999. Information and applications will be available in early November on the Education Department website [<http://www.aps.org/educ/index.html>], in physics departments, or from Arlene Modeste in the Education Department (modeste@aps.org).

CSWP/FIAP Women in Industrial/Applied Physics Networking Breakfasts

Co-sponsored by the CSWP and the Forum on International and Applied Physics, this event brings together women in industrial and applied physics to listen to a talk by a prominent women physicist, and to network over breakfast. The next breakfast is planned for the Centennial meeting in Atlanta in March of 1999.

For More Information

For further information on these programs, please contact:

Arlene Modeste

APS Staff Liaison to the
Committee on Minorities
301-209-3232
modeste@aps.org

Tara McLoughlin

APS Staff Liaison to the
Committee on the Status of
Women in Physics
301-209-3231
tara@aps.org

Or visit the APS Education and Outreach website at <http://www.aps.org/educ/index.html>

“Beyond the Ivory Tower” Sessions Give Real World Advice

By Peggy Cebe, Tufts University

(A version of this article will appear in a future issue of *Academe*, the magazine of the American Association of University Professors)

What skills will future physicists require for success in their careers? What do most physicists do when they finally leave the hallowed halls of the academy? These were some of the questions addressed recently at two sessions held at the American Physical Society national meetings in Los Angeles [1] and Columbus, Ohio [2]. The sessions, entitled “Beyond the Ivory Tower: Educating Physicists for Careers in Government and Industrial Laboratories”, were organized by the APS Committee on the Status of Women in Physics, and co-sponsored by the APS Forums on Industrial and Applied Physics and on Education. Eight physicists were invited speakers: Barbara Wilson (Jet Propulsion Laboratory), Mary Young (Hughes Research Laboratory), Barbara Jones (IBM), Cherry Murray (Lucent Technologies), Joanne Woestman (Ford Motor Co.), Beverly Hartline (Office of Science and Technology Policy), Katharine Gebbie (NIST), and Ann Von Lehmen (Bellcore).

Several common themes emerged from the symposia. At present, since there are very few entry level academic jobs available for new physics Ph. D.’s, most new graduates in physics will find employment in the industrial and government sectors. Both industry and government laboratories highly value students with physics degrees. These physics graduates generally possess excellent problem-solving skills, regardless of the students’ specific area of research training. Dr. Wilson advised graduate students to chose their research area carefully. For example, training in condensed matter physics might be considered more relevant to industrial employers, and therefore may lead to increased job opportunities. However, as Dr. Murray pointed out, most graduates will not be hired to work in the same field as their Ph. D. training, but will be expected to adapt to new interest areas, especially in fields of engineering. Dr. Jones described several upcoming challenges in magnetic storage that will require “new physics” for their solution. Applied research fields will continue to rely on the special knowledge and training of physics graduates for future innovations.

Most physicists receive little guidance during their student years in developing the different professional skills needed in their future careers. Academic or research advisors are frequently ill-prepared to provide advice to graduate students seeking industrial and government employment. The speakers advised that a few simple steps can make

students feel more comfortable moving “beyond the ivory tower”. Students should be encouraged by their academic advisors to seek out additional training in more applied fields. This could take the form of internships, joint research projects containing an engineering component, or even formal course work in applied disciplines. Besides these issues of technical training, Dr. Woestman emphasized that verbal communication, writing skills, and teamwork are all highly valued by industry. These skills can be honed through frequent oral presentations within the student’s research group, writing of papers and proposals, and working jointly on research projects.

Many industries are currently undergoing a period of rapid change. Dr. Young described an industrial landscape in aerospace dominated by buyouts, mergers, and a trend toward research for the shorter term. Dr. Von Lehmen described the fast pace of product development in the telecommunications industry leading to formation of start-ups and spin-offs. These changes require greater flexibility on the part of the research and technical staff, but also can lead to increased opportunities. According to Dr. Gebbie, NIST (as well as other labs) recognizes dual career tracks in which advancement can come either through laboratory/technical achievement or through technical management and policy making. Physics students who are inclined toward the business side may want to augment their physics education with additional training in business management or finance.

A final consideration for physics graduates is the issue of self-identification as physicists. Many alternative career paths are possible for those educated in physics, including technical writing and editing, technical policy making, research in other hard sciences, medicine and law, to name just a few. Broadening the definition of a physics career was recommended by Dr. Hartline, who encouraged including Bachelor’s and Master’s degree recipients among those recognized as physicists. She pointed out that people change careers an average of seven times during their working lives. An early degree in physics is excellent preparation for a wide variety of career opportunities “beyond the ivory tower”.

[1] Bulletin of the American Physical Society, *43*(1), 752 (1997).

[2] Bulletin of the American Physical Society, *43*(2), 1097 (1997).

Since there are very few entry level academic jobs available for new physics Ph.D.’s, most new graduates in physics will find employment in the industrial and government sectors.

Report on Online Archive, cont’d from pg. 3

the universities just prior to World War I, they fought to rise within the graduate and faculty ranks. After the Nazi ascension to power in 1933, the Jewish women scientists encountered discrimination not only because of their gender but because of their religion as well, and were forced to flee Germany. The changing role of science and industry in Germany during this period will also be discussed as it pertains to the women chosen for this archive. Future essays will discuss the educational and professional conditions women faced in Britain, France and the United States.

The CWP site provides resources for physicists, historians, college and high school students and librarians. It highlights the important scientific contributions women have made to physics and places this work within an historical context. The number of types of visitors to this site attests to the glaring gap that this site fills in the knowledge of women in science. We invite you to visit our website to gain knowledge and inspiration from the citations of these remarkable women.

Women Fellows of the APS announced

The following are the 1997 women Fellows of the APS, as well as their divisions and citations. The CSWP congratulates these women on their great achievements!

Brandan, Maria-Ester, IFUNAM

Nuclear Physics

For her contributions to the theoretical understanding of the interaction between heavy ions, deduced from analyses of their scattering in terms of refractive phenomena.

Drell, Persis S., Cornell University

Particles & Fields

For her many important contributions to elementary particle physics, including a systematic program to understand semileptonic decays of b quarks and measure the CKM matrix element V_{cb} .

Hellman, Frances, Univ. of Calif., San Diego

Materials Physics

For her studies on the interplay between magnetism and the surface phenomena inherent to vapor deposition growth.

L'Huillier, Anne, Lund University

DAMOP (Atomic, Molecular, Optical)

For pioneering the understanding and development of high-order harmonic generation by short laser pulses in atomic gases.

Ladanyi, Branka Maria, Colorado State University

Chemical Physics

For her insightful contributions to the molecular theory of fluids and its applications to solvation, optical response and dielectric properties.

Mandich, Mary L., Bell Laboratories

DAMOP (Atomic, Molecular, Optical)

For the development and application of unique molecular beam and spectroscopic tools for the study of the electronic properties and chemistry of clusters.

Pendriil, Ann-Marie Martensson, Chalmers Univ. of Technology

Forum on International Physics

For her contributions to the development and used of atomic many-body methods to explore relativistic effects and parity non-conservation in heavy atoms.

Suzor-Weiner, Annick, Universite Paris-Sud

DAMOP (Atomic, Molecular, Optical)

For her pioneering development of the theory of dissociative recombination, and for many other contributions to atomic and molecular physics which have stimulated significant theoretical and experimental studies.

Gwo-Ching Wang named AVS Fellow

Dr. Gwo-Ching Wang of Rensselaer Polytechnic Institute was named as a 1997 Fellow of the American Vacuum Society "For pioneering studies of surface structure, surface magnetism, and the relationship between them". Dr. Wang is also a fellow of the American Physical Society.

In Memoriam, Charles Palmer Bean, 1923-1996



Photo courtesy of the AIP Emilio Segre Visual Archives

Charles Palmer Bean, a member of Committee on the Status of Women in Physics from January 1983- December 1984, died unexpectedly in September 1996. He was 72. Charlie, as he was known to his friends, was an esteemed member of CSWP. He was the moving force in obtaining the endowment for the Maria Goeppert-Mayer Award from General Electric Foundation. His insights into the social factors behind the advancement and diffusion of the knowledge of physics was invaluable to CSWP.

Aware of the significance of Gordon Conferences in the physics community, Charlie drafted letters to the Conference organizers reminding them of the importance of including women as discussion leaders and invited speakers. Charlie's understanding of the importance of recognizing distinguished physicists by fellowship in the APS and participation in the Society's working committees resulted in a number of new nominations of women physicists to Fellowship in the Society and to service on APS committees.

Charlie had a distinguished career as an industrial physicist at General Electric. Taking early retirement in 1985 after 34 years with the company, he joined the faculty at Rensselaer Polytechnic Institute in Troy, NY, retiring in 1993. He was known as an ingenious and elegant experimentalist with a deep understanding of physics. His work in superconductivity and his elucidation of the mechanism of superparamagnetism - he coined the phrase - was admired by the physics community. He was elected to the National Academy of Science in 1976 and the American Academy of Arts and Sciences in 1977. He was the husband of Elizabeth Harriman Bean, who died in 1990. He is survived by three daughters, two sons, and his friend and companion Jenny Overeynder.

Nominate a Woman for APS Fellowship!

The Committee on the Status of Women in Physics encourages APS members to nominate a woman for fellowship in the APS. You can easily check and see if someone is already a fellow by searching on their name in the APS online member directory at www.aps.org/memb/enter-directory.html. Fellows are clearly marked "[Fellow]" after their name.

The APS Fellowship Program was created to recognize members who may have made advances in knowledge through original research and publication or made significant and innovative contributions in the application of physics to science and technology. They may also have made significant contributions to the teaching of physics or service and participation in the activities of the Society. Each year, no more than one-half of one percent of the then current membership of the Society are recognized by their peers for election to the status of Fellow in The American Physical Society.

All APS Members are eligible to nominate, and all APS members are eligible for nomination.

To Submit Nominations:

- Insure nominee is a member of the Society in good standing.
- Obtain signatures of two sponsors who are members of the Society in good standing.
- Submit signed Nomination Form, Curriculum Vitae, and Supporting Letters prior to unit deadline as a complete packet to:

Executive Officer
The American Physical Society
One Physics Ellipse
College Park, MD 20740-3844
ATTN: Fellowship Program

Although there is no required number of supporting letters for each nomination, typically 2 - 3 letters from individuals outside the nominee's institution who are familiar with the nominee's work are submitted.

Note: Nomination forms may be obtained by:

- writing the above address,
- sending an email message to: fellowship@aps.org,
- telephoning: (301) 209-3268 or faxing: (301) 209-0865,
- downloading electronic version of the nomination form from <http://www.aps.org/fellowship/form.html>

Supporting letters should be included with nomination forms to insure attachment to the correct nomination package.

Nomination Process:

1. Submit nomination to the APS prior to unit deadline.
2. Nominations reviewed at the Unit Fellowship Committee. **(By July 1)**
3. Recommendations reviewed by the APS Fellowship Committee. **(By September 1)**
4. Final approval given by full APS Council. **(By November 31)**
5. Notification of newly elected fellows as well as sponsors of nominees deferred or dropped.
6. General announcement of new fellows in March issue of the APS News.

Further Nomination Information

For further information regarding Fellowship Nominations, please email: fellowship@aps.org or telephone: (301) 209-3268.

Further information on the nomination process can be found online at <http://www.aps.org/fellowship/index.html>

1999 APS Fellowship Nomination Deadlines

APS General

APS General Nominations 06/01/99

Divisions

Astrophysics 05/01/99

Biological Physics 06/01/99

Chemical Physics 02/15/99

Computational Physics 02/15/99

DAMOP

(Atomic, Molecular, Optical) 02/15/99

DCMP (Condensed Matter) 01/30/99

Fluid Dynamics 02/15/99

High Polymer Physics 01/15/99

Laser Science 04/01/99

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Journeys of Women in Science and Engineering: No Universal Constants

Reviews

Each profile tells its story in a personal voice, speaking in first person of experiences lived and choices made.

By Susan A. Ambrose, Kristin L. Dunkle, Barbara B. Lazarus, Indira Nair, and Deborah A. Harkus, Temple University Press, Philadelphia, PA, 1997; ISBN 1-56639-527-5

Review by Nancy Forbes, Litton PRC Inc.

Journeys of Women in Science and Engineering, a recently published book in the growing genre of women in science, is subtitled “No Universal Constants”. This phrase seems to reflect the spirit of the book very well, in the sense that it consists of 88 individual profiles of various women scientists and engineers who, while sharing a common intellectual pursuit, differ in as many ways as one can imagine. If the stereotypical scientist was once a white male wearing a lab coat with a test tube in his hand, this book goes a long way to dispel that image. It depicts scientists as females of different races, socioeconomic backgrounds, and sexual orientations; some have disabilities, and others do not. They are married, single or divorced. The women work in labs, companies, government agencies, non-profit organizations, scientific institutions and universities. The 88 scientists profiled also represent a broad diversity of fields. Yet no one can question their identities as scientists or engineers. This is the common thread that binds these women together, engaged in the work that they love, in places where they definitely want to be.

A few of the profiles were written by the women scientists themselves; the majority were composed by the authors based on extensive interviews and email correspondence with their subjects. Each profile tells its story in a personal voice, speaking in first person of experiences lived and choices made. The biographies also cover what attracted each scientist to her field: her career decisions, successes and difficulties, and the significant people in her life. Outlined in each segment are also a typical day, home life, and advice for female students with similar interests.

This book fills in much of what is left unwritten in many of the scholarly treatises on women in science, explaining the reasons behind the great diversity of female scientists’ careers, and the way in which each participant seems to put her own personal stamp on her work. Though useful and informative, the scholarly tracts cannot speak to us in a personal voice about the myriad interwoven variables that compose a given woman’s scientists choices, such that the reader can say, “Yes, I felt that way, too”, and draw support from someone else’s experience. In this volume, each woman’s story is very much an individual one and could make up a book in itself.

Among those profiled are Mildred Dresselhaus, Gertrude Elion, Jocelyn Elders, Judy Franz, Shirley Ann Jackson, Sheila Widnall, and Rosalyn Yallow. Other names are perhaps not so well-known outside their fields, but their stories are equally impressive. The book also contains an insightful foreword by Lilli Hornig, and an introduction that artfully summarizes the history of women in science and engineering, with an up-to-date discussion of issues pertinent to our current age. *Journeys* also includes an extensive bibliography. I would recommend this rich and highly personalized book to anyone with an interest in women in science — and especially to young people, so they might be encouraged to enter a fascinating and rewarding field that embraces a broad diversity of people and ideas.

Nancy Forbes is a physicist at Litton PRC in Arlington VA. She does freelance science writing in her free time and is also currently the Mentoring Chair for the Washington DC Chapter of the Association for Women in Science (www.awis.org).

Have you moved? Changed jobs? Changed fields? Take the time now to update your name/address/qualifications on the Roster of Women in Physics (this database also serves as the Gazette mailing list). See pages 11-12.

Are you looking to reach more women and minority candidates for job openings in your department or institution? Consider a search of the **APS Roster of Women and Minorities in Physics** (see www.aps.org/educ/reqform.html).

Gut Symmetries

By Jeanette Winterson

Alfred A. Knopf (Distributed by Random House), New York, 1997; ISBN 0679454756

Review by Patricia Schwarz

I'll be honest and confess that British author Jeanette Winterson routinely makes me grateful for the existence of England. And since I'm Irish that's not trivial.

Her newest novel *Gut Symmetries* makes me grateful not only for England but also for physics and feminism and romance and even tugboats and Jewish mysticism. Winterson invokes all that and more, simmered together in an intoxicating diamond-laced brew of passion, betrayal, loss, redemption, and found love, enveloped in a shimmering, often sly and ironic, sensuality.

But what sets this novel apart and makes it worth reviewing here is *Gut Symmetries'* main character Alice—a theoretical physicist who runs off with the wife of her male physics mentor and lover Jove.

Jove, who nicknamed himself after the Roman god, is a sad character. His ego is the size of the space obelisk in 2001. His sense of accountability would appall the normal five year old. He carries an abundant supply of excuses for the inexcusable. So why would anyone want to read a novel about Jove? (After all, isn't fiction supposed to offer some escape from reality?)

The "why" of this novel is found in the spiritual intensity of Alice's internal relationship with physics. Alice loves physics so naturally and potently that even I had to double-check that the narration had not suddenly switched to a man!

Winterson, through Alice, lovingly lavishes a frankly erotic and possessive passion on the intellectual content of physics, while at the same time ruthlessly deconstructing and trying and convicting Jove, Alice's

former mentor and now her romantic rival, on every charge imaginable, even cannibalism.

But this is no saga of victimization. Winterson shows that Alice doesn't have to become Jove in order to inherit everything that Jove defines as belonging to him, including the power of physics and the love of Jove's wife Stella, a poet. Make no mistake, all Winterson leaves out is an actual billboard flashing WE CAN ALL TRANSCEND JOVE.

Winterson also makes it clear that in the "science wars", she is on the side that says that feminists can want to rule the entire Universe too. She's no humble communalist eager to purge herself from egotistical designs on a Theory of Everything. No, she goes as far as to tout string theory and shed emotion over the beauty of $E = M c^2$.

The symbolic arrangement of science, poetry, romance and religion feels deliberate, but is deftly balanced and playfully manipulated. Winterson fans know her as a writer magically addicted to allegories, aphorisms and epigrams. Physics has been her special fetish. Isaac Newton himself made a brief appearance in her last novel, *Art and Lies* (in a riotously farcical scene involving a woman in drag seducing a gay man in a bordello.)

A warning to those allergic to string theory: *Gut Symmetries* will make you itch! So take an antihistamine before reading. It's a joyful, transcendent novel starring a woman physicist and I'd suffer a full-body case of hives for that any day.

Patricia Schwarz has transcended Jove and is loving physics while writing her thesis and revolutionizing physics web design at Caltech.

Reviews

Winterson... lovingly lavishes a frankly erotic and possessive passion on the intellectual content of physics.

Interested in activities for industrial/applied physicists?

- Check out the Forum on Industrial and Applied Physics website at <http://www.aps.org/FIAP/index.html>
- Access the Industrial and Applied Speakers' list at www.aps.org/FIAP/speakers.html

Get exposure for yourself and your research while serving as a role model for women in physics! Add your name to the Women Speakers List at <http://www.aps.org/educ/cslwip.html> or...

see page
14
of this issue!

Summer SURFing: Notes from a NIST Intern

By Tahirih Lackey, Georgia Institute of Technology

I first heard about the Summer Undergraduate Research Fellowship (SURF) program at the National Institute of Standards and Technology during the spring semester of my junior year at Jackson State University. Our department has always encouraged students to intern during the summer to gain work experience. During one of our weekly meetings, my advisor informed me that NIST was looking for students majoring in physics. I sought advice from another student who had been to NIST the previous year, and her enthusiastic description of the internship convinced me to apply to the SURF program.

After I was accepted, I found out that I would be working under Dr. Charles Clark in the area of Bose-Einstein Condensation. As this area was entirely new to me, I contacted Dr. Clark before the internship to ask him for further information. He steered me toward some wonderful websites which gave me some great introductory information on the subject.

When I arrived in Gaithersburg in the summer of 1997, I met my advisor and spoke with him about my previous experience as well as the direction of the project. I got the sense that the internship would involve a lot of hard work, but would also afford me the opportunity to learn a lot and enjoy myself. My project involved modeling the behavior of Bose-Einstein Condensates when the traps holding them are shaken. At the beginning of the summer, I was not completely sure how I was supposed to model that behavior, but over the course of the summer I was able to learn.

I enjoyed many things about the SURF program. I was impressed because the program was well-organized, yet at the same time informal. The SURF directors, Marc Desrosiers and Paul Lett, were both very good at working with the students, and were easy to talk to if we had problems or suggestions. I was also impressed with the seminar series component of the SURF pro-

gram. Every week, scientists or other professionals would present a talk to the students on various topics of interest. Each of these seminars was hosted by two or three students. This gave us a chance to learn about contacting speakers and organizing seminars, and also made the seminars seem like something we were doing for ourselves. At the end of the summer, all of the students were required to give a presentation on our research. I found that giving this presentation was slightly stressful, but very rewarding. It was a good preparation for our future careers.

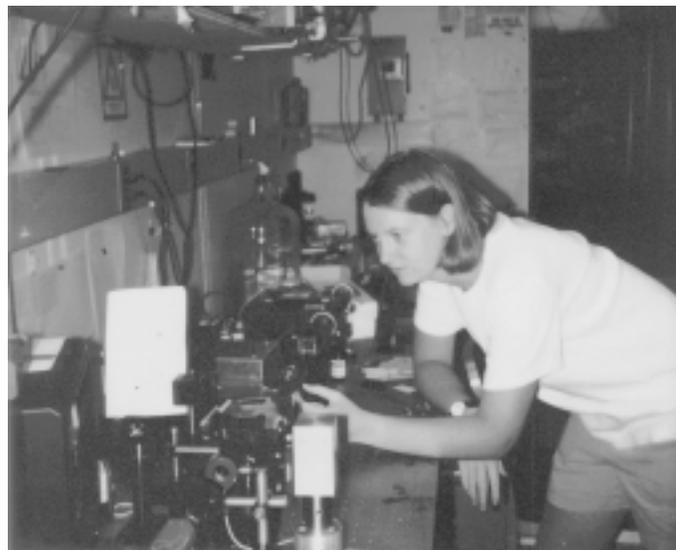
The most impressive element of the program was my advisor, Dr. Charles Clark. He was a tremendous help. The fact that he had me working with quantum mechanics before I even had a class in the subject still amazes me. He always made time to work me through things that I did not fully understand, and definitely pushed me to think and problem solve. He and two other BEC researchers, Mark Edwards and Robert Dodd, always went out of their way to make use of what I did know, and help me to learn what I did not know. Dr. Clark's influence played a key role in my decision to become a researcher after obtaining my graduate degree. He also influenced me to come back to NIST after I finished my senior year at Jackson State University and continue researching Bose-Einstein Condensation.

I presently attend the Georgia Institute of Technology in the area of Civil Environmental Engineering. Although I am no longer working in physics, I feel that the research skills that I developed at NIST will be a great asset to me in future years. I would definitely recommend the SURF program to anyone who is considering research as a future goal.

Further information on the SURF program at NIST is available online at <http://physics.nist.gov/ResOpp/surf/surf.html> or from Dr. Paul D. Lett (301) 975-6559 or paul.lett@nist.gov.

The research skills that I developed at NIST will be a great asset to me in future years.

Jennifer Sebbly from Creighton University in Nebraska aligns a phase-contrast imaging system that will be used for imaging the Bose-Einstein Condensates. This was Sebbly's second summer at NIST.



Do you have any interesting photos of yourself (or female colleagues) "doing physics"?

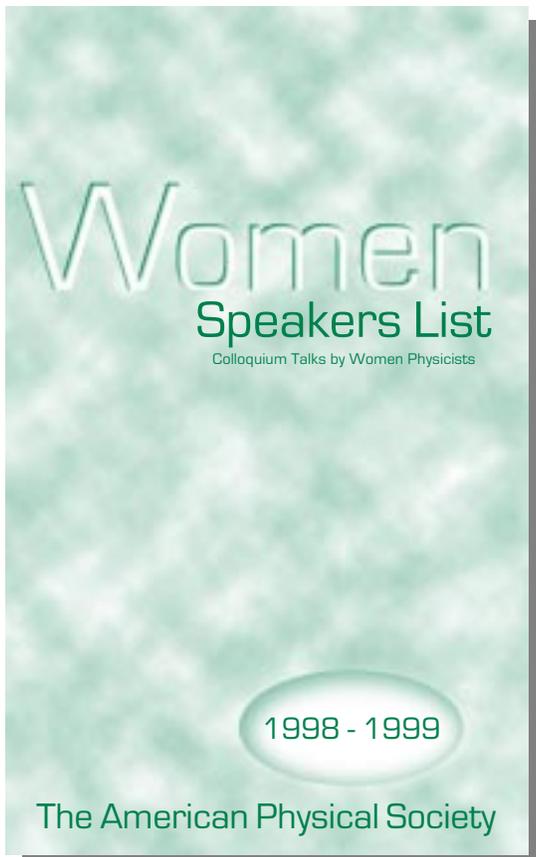
The CSWP is collecting "action shots" of women in physics for several projects.

Please email tara@aps.org for more information.



Photo courtesy of the Physics Department, University of Missouri

Suchi Guha working in the Physics Department at the University of Missouri.



The 1998-1999 Women Speakers List (WSL) of Women in Physics (pictured to the left) is published by The American Physical Society. This list, compiled by the Committee on the Status of Women in Physics, contains the names of over 200 women physicists who are willing to give colloquium or seminar talks. The WSL serves as a resource for middle school, high school, university and general audiences. Information on the speakers is listed by state and by field for easy reference. The APS Committee on Minorities maintains a similar list of minority speakers in physics. To receive your free copy of either list, please complete this form and return it to APS, or access the forms on-line (Women: www.aps.org/educ/wip-csl-front.html. Minority: www.aps.org/educ/mip-csl.html)

Name: _____

Institution: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Email: _____

Women WSL

Minority MSL

PLEASE RETURN THIS FORM TO:

The American Physical Society

One Physics Ellipse • College Park, MD 20740-3844

Women Speakers List (WSL)

Enrollment/Modification Form 1998-1999

Additions/Modifications may also be made on the Internet at www.aps.org/educ/cslwip.html
 An online copy of the WSL is available at www.aps.org/educ/wip-csl-front.html

The *Women Speakers List* is compiled by The American Physical Society Committee on the Status in Physics (CSWP). The list is updated continuously online and published each summer. Comments, questions and entries should be addressed to:

Women Speakers List · APS · One Physics Ellipse · College Park, MD 20740-3844 · 301-209-3231

To enroll or update your current entry, please fill out this form completely and return it to the address above. Please print clearly or type.

Title/ Name Dr. Prof. Mrs. Ms. _____ **Date** _____

Institution _____ **Telephone** _____

Address _____ **Fax** _____

_____ **Email** _____

City _____ **State** _____ **Zip Code** _____

If you have moved out of state, list previous state: _____

New Entry **Modification**

For which audiences are you willing to speak? (Please check all that apply)

Middle school
 High school
 General Audiences
 Colloquium

To register a new title, give the title as you want it to appear in the left column below. Then check the section(s) where it is to be inserted. To delete a title, indicate the title and check the appropriate box below. A limit of four total entries will be imposed. You may use additional pages if you are submitting more than four modifications. **PLEASE TYPE OR PRINT LEGIBLY PAYING PARTICULAR ATTENTION TO FORMULAS. WE REGRET THAT WE ARE UNABLE TO INCLUDE ILLEGIBLE ENTRIES.**

TALK TITLE	PHYSICS SUBFIELD (limit 4)
1. <input type="checkbox"/> Add this title <input type="checkbox"/> Delete this title	<input type="checkbox"/> Accelerators <input type="checkbox"/> Education (pedagogy etc.) <input type="checkbox"/> Interface/Device <input type="checkbox"/> Astrophysics <input type="checkbox"/> Environmental/Energy <input type="checkbox"/> Molec/Polymer <input type="checkbox"/> Atomic <input type="checkbox"/> Fluid <input type="checkbox"/> Nuclear/Particle <input type="checkbox"/> Biological/Medical <input type="checkbox"/> General <input type="checkbox"/> Optics/Optical <input type="checkbox"/> Chemical/Statistical <input type="checkbox"/> Geophysics <input type="checkbox"/> Plasma <input type="checkbox"/> Computational <input type="checkbox"/> History <input type="checkbox"/> Condensed Matter <input type="checkbox"/> Industrial
2. <input type="checkbox"/> Add this title <input type="checkbox"/> Delete this title	<input type="checkbox"/> Accelerators <input type="checkbox"/> Education (pedagogy etc.) <input type="checkbox"/> Interface/Device <input type="checkbox"/> Astrophysics <input type="checkbox"/> Environmental/Energy <input type="checkbox"/> Molec/Polymer <input type="checkbox"/> Atomic <input type="checkbox"/> Fluid <input type="checkbox"/> Nuclear/Particle <input type="checkbox"/> Biological/Medical <input type="checkbox"/> General <input type="checkbox"/> Optics/Optical <input type="checkbox"/> Chemical/Statistical <input type="checkbox"/> Geophysics <input type="checkbox"/> Plasma <input type="checkbox"/> Computational <input type="checkbox"/> History <input type="checkbox"/> Condensed Matter <input type="checkbox"/> Industrial
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4. <input type="checkbox"/> Add this title <input type="checkbox"/> Delete this title	<input type="checkbox"/> Accelerators <input type="checkbox"/> Education (pedagogy etc.) <input type="checkbox"/> Interface/Device <input type="checkbox"/> Astrophysics <input type="checkbox"/> Environmental/Energy <input type="checkbox"/> Molec/Polymer <input type="checkbox"/> Atomic <input type="checkbox"/> Fluid <input type="checkbox"/> Nuclear/Particle <input type="checkbox"/> Biological/Medical <input type="checkbox"/> General <input type="checkbox"/> Optics/Optical <input type="checkbox"/> Chemical/Statistical <input type="checkbox"/> Geophysics <input type="checkbox"/> Plasma <input type="checkbox"/> Computational <input type="checkbox"/> History <input type="checkbox"/> Condensed Matter <input type="checkbox"/> Industrial

1998-99 TRAVEL GRANTS FOR WOMEN SPEAKERS

◆ APPLICATION FORM ◆

This form is also available on the Internet at www.aps.org/educ/women-app.html

This form must be filled out and approval received from the APS in order to be eligible for up to \$500 travel reimbursement. Please note that submitting this application form does not guarantee reimbursement. You will be notified within two weeks of receipt of this application whether or not it has been approved.

DATE: _____

INSTITUTION: _____

ADDRESS: _____

APPLICATION PREPARED BY (VERY IMPORTANT):

NAME: _____ **TITLE:** _____

PHONE: _____ **FAX:** _____

EMAIL: _____

Please list information on the speakers below. If speakers, dates or titles of talks are tentative, please indicate.

DATE OF COLLOQUIUM: _____

SPEAKER'S NAME: _____

HOME INSTITUTION: _____

ADDRESS: _____

PHONE: _____ **FAX:** _____ **EMAIL:** _____

TITLE OF TALK: _____

DATE OF COLLOQUIUM: _____

SPEAKER'S NAME: _____

HOME INSTITUTION: _____

ADDRESS: _____

PHONE: _____ **FAX:** _____ **EMAIL:** _____

TITLE OF TALK: _____

Please return this form to: Tara McLoughlin, Travel Grants for Women Speakers Program
The American Physical Society
One Physics Ellipse
College Park, MD 20740-3844
Tel:(301)209-3231 • Fax:(301)209-0865 • Email: tara@aps.org

The American Physical Society

1998-1999 Travel Grants for Women Speakers Program

The APS Committee on the Status of Women in Physics (CSWP) is pleased to announce that the "Travel Grants for Women Speakers" Program is entering its seventh year. This program is designed to increase the recognition of women physicists. For an application, see page 15.

Purpose The program is intended to expand the opportunity for physics departments to invite women colloquium/seminar speakers who can serve as role models for women undergraduates, graduate students and faculty. The program also recognizes the scientific accomplishments and contributions of these women physicists.

Grant The program will reimburse U.S. colleges and universities for up to \$500 for travel expenses for one of two women colloquium/seminar speakers invited during the 1998-1999 academic year.

Qualifications All physics and/or science departments in the United States are encouraged to apply. Canadian and Mexican colleges and universities are also eligible, provided that the speakers they invite are currently employed by U.S. institutions. Invited women speakers should be physicists or in a closely related field, such as astronomy. Speakers should be currently in the U.S. The APS maintains the Women Speakers List which is available online (www.aps.org/educ/wip-csl-front.html) or from the APS. However, selection of the speaker need not be limited to this list. Neither of the two speakers may be a faculty member of the host institution.

Guidelines Reimbursement is for travel and lodging expenses only. Honoraria or extraneous expenses at the colloquium itself, such as refreshments, will not be reimbursed.

Application The Travel Grants for Women Speakers Application Form (see page 15 or apply online at www.aps.org/educ/women-app.html) should be submitted to APS identifying the institution, the names of the two speakers to be invited and the possible dates of their talks. Please note that funds for the program are limited. The Travel Grants for Women Speakers Application Form should be submitted as early as possible, even if speakers and dates are tentative, or if the speakers are scheduled for the spring semester. The application form will be reviewed by APS, and the institutions will be notified of approval or rejection of their application within two weeks. Institutions whose applications have been approved will receive a Travel and Expense Report Form to submit for reimbursement.

For Further Information: *Travels Grants for Women Speakers Program*
Attn: Tara McLoughlin
The American Physical Society • One Physics Ellipse • College Park, MD 20740-3844
Tel: (301) 209-3231 • Fax: (301) 209-0865 • Email: tara@aps.org

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