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CSWP Gazette

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

INSIDE



# Letter from the Chair

*Laurie McNeil, University of North Carolina at Chapel Hill*
*(mcneil@physics.unc.edu)*

Welcome to the Summer 1997 CSWP *Gazette*! As current chair of CSWP, I'd like to tell you about some of the committee's most recent activities.

It's conference time of year for many people, and CSWP is sponsoring events at many APS meetings. At the March meeting in Kansas City, CSWP hosted a joint reception with the Committee on Minorities on the evening of Sunday, March 16. This offered women and minority attendees a special opportunity to meet one another and to talk with members of CSWP and COM. CSWP also held invited session on March 19th entitled "The Two-Body Problem: Balancing a Physics Career with a Family." The panel members were Susan Coppersmith (U. Chicago), Jia Ling Lin (U. Wisconsin), Madelaine Msall (Bowdoin College), and Janet Tate (Oregon State U.). The session was a lively and well-attended one. The panelists' remarks and the comments and questions from the audience touched on topics such as having children while in graduate school or as a professor, spousal relocation, institutional responses to the "two-body" problem, and the different challenges faced in industry vs. academia.

At the April meeting, another joint reception with the Committee on Minorities was held on the evening of Friday, April 18. Immediately preceeding the reception, CSWP participated in an invited session co-sponsored by COM and DNP entitled "Impact on Nuclear Physics and the Public of Jefferson Laboratory Programs on Education and Outreach." Bev Hartline (TJNAF), 1995 CSWP Chair, spoke on "Exciting Precollege Students and Teachers about Science." This was followed by a talk by Warren Buck (TJNAF and Hampton Univ.) on "The Hampton Experiment."

CSWP also hosted an invited session the next day entitled: "Women in Physics: An International Perspective". We began with "Chien-Shung Wu: In Memoriam" by Noemie Benczer-Koller (Rutgers Univ.). This was followed by three presentations on the status of female physicists abroad: — "Women in Physics : A Mexican Perspective" (SMF President Carnen Cisneros, Institute de Física); "Women in Physics in Canada: A Physics Graduate and Faculty Survey" (Janis McKenna, Univ. of British Columbia); and "Physics on the Border: The 'Two-Body Problem' for Canadian Physicists" (Ann McMillan, Atmospheric Environment Service).

Judging by audience response at the panel discussions at the March and April meetings, the topics were timely and thought-provoking. I hope we can continue to provide sessions like these in the future. Please forward any suggestions for sessions for the 1998 March and April meetings to Peggy Cebe (peggy@cebe.phy.tufts.edu), the 1998 CSWP Chair. We are also planning to hold more sessions at regional and sectional meetings, mostly on an informal basis. If you would like to help organize such a session — perhaps a reception for women, a pickup lunch or dinner, or even a panel discussion — we'd love to hear from you.

A final version of the CSWP Site Visit program has been completed. During the NSF-funded program, a total of 16 universities were visited to assess the local climate for women in physics. Although no longer funded by NSF, CSWP plans to continue the program indefinitely with direct financial support from the institutions themselves. The University of Colorado at Boulder was the first site to participate, with a visit on March 31-April 1. If you are interested in arranging a site visit for your department or would like more information, contact me or Tara McLoughlin (tara@aps.org) at the APS.

As you can see from the article on p. 2, the CSWP is trying to exploit the potential of the World Wide Web more fully. This article describes a list of Internet sites of interest to women in science and technology. The lists are accessible from the CSWP homepage (http://www.aps.org/educ/cswpmiss.html). We encourage you to contact the APS with updates and additions to this valuable resource. Furthermore, look for a new feature in upcoming editions of the Gazette — highlights of individual Web sites.

The CSWP is presently engaged in a periodic review of its charge and its programs, so we would be delighted to receive any suggestions you may have regarding what we can do to monitor and improve the status of women in physics. I look forward to hearing from you, and to seeing you at future CSWP events.

***Publication Information***
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# How to Increase Your Chances of Getting on an APS Committee

*by Amy Halsted, APS*

The Committee on Committees (CoC) staffs most of the outreach committees, including the CSWP. A form and call for nominations appears in APS News in June, and another goes out by direct mail to members of Council, committee chairs, and officers of the units (divisions, sections, topical groups and forums). Nominations are sent to the CoC, which meets in late summer or early fall to select candidates and begin recruitment. Nominations remain active through two annual recruitment cycles.

Before you think about nominations, it would be wise to become familiar with the agendas of the committees that interest you, and those that would interest your colleagues. The present chair or other members of the committee are a good source of this information. The annual reports of the outreach committees, as well as, a listing of committee members can be found on the APS website.

There are nearly always many more nominations than slots open on committees. In 1995, for example, there were 38 nominations for three slots on CSWP; in 1996 there were 34 for the three slots. The CoC tries to select the most qualified nominees for each committee, while also giving consideration to issues of balance such as gender, minority status, age, field of physics, type of institution, and geographical region. It also considers the needs and wishes of the committee as communicated by its chair.

When the number of superbly qualified and strongly nominated individuals so exceeds the number of positions, it is important to provide the CoC with information pertinent to their consideration of your nomination. A concise CV (2-3 pages or less in length) that highlights professional accomplishments as well as any activities related to the mission of the committee is essential, as is a letter stating your particular qualifications and your willingness to serve.

The second part of a nomination is to have it supported, preferably by individuals known to the CoC and/or familiar with the committee in question. You might ask the committee's chair to consider including your name in any letter she sends to the CoC regarding new members. If you belong to a division, you might contact its chair, explain your interest, and ask if she would be willing to send a letter to CoC in support of your nomination. If a colleague has served the APS as a committee chair or officer, you could ask him or her to nominate you. These communications can be emailed, faxed or sent via regular mail.

These procedures aren't a guarantee of success, but they are guaranteed to improve your chances of getting appointed to an APS committee.

*For further information, please contact Amy Halsted at halsted@aps.org.*

# WISE Internet Resources

*by Donna Hurley, NIST (Boulder)*

The CSWP Homepage (http://www.aps.org/educ/cswpmiss.html) now contains links to two compilations of Internet resources for WISE (Women in Science and Engineering). With the hype surrounding the World Wide Web rapidly becoming reality, we hope you find these to be useful resources.

**http://www.neci.nj.nec.com/homepages/thio/cswp.html,** *compiled by Tineke Thio, NEC Research Institute*

**http://www.aps.org/educ/cswpmiss.html/cswp-science-eng.html,** *compiled by Donna Hurley, National Institute of Standards & Technology*

I compiled this list of Internet resources in early 1997. At the time, I was not aware of Tineke Thio's outstanding efforts along the same lines. Therefore, there is some redundancy between our lists (but it never hurts to repeat a good thing!).

I did not attempt to create a truly comprehensive list. Such a document is virtually impossible given the state of flux on the Internet, and would be unwieldy as well. It should be emphasized that the absence (or presence) of a site on the list should not be taken as disapproval (or recommendation) by the APS, the CSWP or myself. However, I did attempt to identify as many sites outside the US as possible. A good example is the South African WISE site, which contains many links to "otherWISE". The site also includes email addresses for WISE organizations all over the world.

In spite of its shortcomings, the list should help launch you on an exploration of WISE sites on the Web. Many of the pages are themselves compilations of site links, so the branching possiblities are virtually infinite. I have also included the WWWomen Homepage, which is a great search engine for women's Web resources of all kinds. If you're like me, you will soon discover how quickly time flies once you get started!

I am very pleased to learn that since its appearance in early March 1997, this site has become "live". What this means is that others have added their suggestions about additional, new, and improved links. This is a great way to insure up-to-the-minute, useful links. I encourage everyone to participate in turning "my" list into "our" list.

# Honors / Prizes / Awards

## 1997 Maria Goeppert-Mayer Award

*Margaret Mary Murnane,* University of Michigan

Dr. Murnane was cited "for her pioneering work in experimental ultrafast optical physics, including the development of sophisticated ultrafast techniques in both x-ray and visible regions of the spectrum. Her work has opened up the new field of high density, high temperature plasmas created by ultrashort laser pulses." The award was bestowed at the April 1997 meeting of the APS in Kansas City, MO.

The MGM award, sponsored by the General Electric Foundation, was established in 1986 to recognize and enhance outstanding achievements by a woman physicist in the early years of her career, and to provide opportunities for her to present these achievements to others through public lectures. The award provides a stipend of $2000 and a travel and living allowance of $3000 to support lectures by the recipient at four institutions of her choice. The award is given to a woman not later than ten years after the granting of the Ph.D. degree, or the equivalent career stage, for scientific achievements that demonstrate her potential as an outstanding physicist. The award is open to female U.S. citizens.

If you wish to nominate someone for the MGM Award, please contact MGM Award Committee Chair Anne Kernan (akernan@pacbell.net). **The deadline for nominations for the 1998 award is May 30th, 1997.**

## Ohio Women's Hall of Fame

*Bunny Clark,* The Ohio State Universtiy

Professor Clark, pioneering nuclear physicist (and former CSWP Chair) , was inducted into the Ohio Women's Hall of Fame in late 1995. The Ohio Women's Hall of Fame was established in 1978 by the Women's Division of the Ohio Bureau of Employment Services to provide a public recognition of the contributions Ohio women have made to the progress of the state and nation. "These inductees are important role models for all Ohioans, especially our state's young people," Ohio governor George V. Voinovich said. "It is an honor to recognize these outstanding women and their extraordinary achievements."

## Outstanding Woman of the Year Award

*Ellen Williams,* University of Maryland

Prof. Williams is an internationally recognized condensed matter physicist who received the 1996 Outstanding Woman of the Year Award from the President's Commission on Women's Issues at the University of Maryland at College Park. Williams was honored for the broad excellence and wide recognition she has brought to women in science at the University through both her research and outreach activities. Prof. Williams also received the 1996 **E.W. Mueller Award** by the director of the Laboratory for Surface Studies at the University of Wisconsin—Milwaukee. The award recognizes outstanding achievements in the field of surface science and engineering.

## Luise Meyer-Schutzmeister Memorial Award

*Mirang Yoon*

Ms. Yoon earned her B.S. in physics from Cornell in 1992, and is currently pursuing a Ph.D. at MIT. The $500 award, sponsored by the Association for Women in Science, recognizes an outstanding graduate woman in physics. For more information on the award, please contact AWIS at 202-326-8940 or http://www.awis.org/predoc.html

## Burton Award

*Joanna L. Batstone,* IMB

Dr. Batstone of the IBM Thomas J. Watson Research Center received the 1995 Burton Award for her contributions to elctron microscopy from the Microscopy Society of America. This award is given annually to nominees under age 35 years who have made important contributions to the field of microscopy, imaging and compositional analysis. Batstone received her Ph.D. in physics from the University of Bristol, UK, in 1985 and joined IBM in 1989. Since joining IBM, her work has included structural and electronic properties of defects in semiconductors. Most recently, she has been working in the computer sciences, specifically on user interface design for interactive applications such as electronic commerce.

*Dr. Joanna L. Batstone*

# How to Nominate a Woman for APS Fellowship

*by Ken Cole, APS*

**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, Biographical Information, Supporting Letters prior to unit deadline

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

Note: Nomination forms may be obtained online, by writing the above address, sending email request, telephoning: (301) 209-3268 or faxing: (301) 209-0865.

**Nomination Process**

- Nominations reviewed at the Unit level by the Unit Fellowship Committee. (By July 1)
- Recommendations reviewed by the APS Fellowship Committee. (By September 1)
- Final approval given by full APS Council. (By November 31)

Notification of newly elected fellows as well as sponsors of nominees deferred or dropped. General announcement of new fellows in March issue of the *APS News*.

**Nomination Categories**

*New:* Nominations that have been submitted for the first time and have not been reviewed at any level.

*Deferred:* Nominations that have been reviewed once and are held over for automatic consideration by the next year's unit fellowship committee. Update information from sponsors is recommended.

*Dropped:* Nominations that have been reviewed by two consecutive unit fellowship committees and have not been selected for fellowship. For further consideration, a completely new fellowship nomination packet must be submitted.

**Further Nomination Information**

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

## *1997 APS Fellowship Nomination Deadlines*

All APS members who are members of subunits are eligible to nominate, and all APS members are eligible for nomination. For more information on nominating, contact Ken Cole at 301-209-3268 or cole@aps.org.

The following are the deadlines for receipt of nominations for each of the APS units:

| | |
|---|---|
| Astrophysics | May 1 |
| Biological Physics | June 1 |
| Chemical Physics | Feb. 15 |
| Computational Physics | Feb. 15 |
| DAMOP | March 15 |
| DCMP | Jan. 30 |
| Fluid Dynamics | Feb. 15 |
| High Polymer Physics | Jan. 1 |
| Laser Science | April 15 |
| Materials Physics | Feb. 15 |
| Nuclear Physics | April 1 |
| Particles and Fields | April 1 |
| Physics of Beams | March 15 |
| Plasma Physics | March 15 |
| Committee on Applications | March 30 |
| Forum on Physics and Society | April 1 |
| Forum on the History of Physics | March 1 |
| Forum on International Physics | April 1 |
| Forum on Education | Dec. 1, 1996 |
| Few Body Systems Topical Group | April 1 |
| Fundamental Constants Topical Group | April 1 |
| Instrument and Measurement Science Topical Group | April 1 |
| Shock Compression Topical Group | April 1 |

# Operation SMART: Encouraging Girls in Science, Math and Relevant Technology

*by Katie Scott (YWCA)*

Last week they wired electrical circuits. This week, they are building a wind vane and using a compass to determine the direction of the wind. Next week, they will construct architectural prototypes. After they have their cookies and juice, that is. You see, girls at Boze Elementary School in Tacoma, Washington must have their snack before they take on the problems of the world.

And taking on the world they are, thanks to a program called Operation S.M.A.R.T. (Science, Math and Relevant Technology), an informal educational program developed a decade ago by Girls Incorporated (formerly Girls' Clubs of America). Girls Incorporated is a national organization devoted exclusively to helping girls deal with the distinct challenges and subtle messages they face in today's society.

Some of society's messages are not subtle, however. For example, the National Science Foundation reports that less than 17% of our working scientists are women while, according to the U.S. Department of Labor, approximately 99% of our nation's secretaries are women. And women are not just being shut out of the laboratory: if you have never experimented with an electrical circuit, there is no place for you in the electronics industry; if you have never used a wrench, you cannot be a mechanic. Without a solid background in science, math and technology, all sorts of doors close to women, which is one reason 40 percent[1] of women today work in jobs that pay below poverty-level wages.

Girls Incorporated created Operation S.M.A.R.T. to address these issues. They have created a place for girls to wire circuits and use wrenches without competing with boys, a place where girls are the leaders and rule makers. They have created more than 750 of these sites across the country, in schools and churches, gyms, YWCA's and Girls Incorporated centers. In 35 states, almost a quarter of a million girls between the ages of 6 and 18 are asking questions, making predictions, taking chances, and boosting their self esteem. They are learning that science, math and technology can be fun and rewarding subjects and are not just for boys.

"Operation S.M.A.R.T isn't a curriculum, it's a philosophy," explains Faedra Lazar Weiss, a research associate at the Girls Incorporated National Resource Center. That philosophy can be summed up, she adds, in three E's and an F: equity, exploration, empowerment, and fun. The idea is to let girls experience science, math, and technology the way boys always have: by experimenting, exploring, taking risks, and getting dirty.

In Tacoma, Washington, Operation S.M.A.R.T. is run out of the YWCA there. Instead of having girls come to the YWCA, volunteers go out to the schools in an effort to reach as many girls as possible. Lynn Dressel, a mechanical engineer and the volunteer S.M.A.R.T. club leader at Boze Elementary in Tacoma says "the girls are so excited about everything they make; they want to take it all home and show their parents." Generating that kind of enthusiasm is one of S.M.A.R.T.'s main objectives and is critical for girls to pursue science, math and technology careers.

The "Bozettes," as the girls in Tacoma have proudly dubbed themselves, waste no time diving into their project for the week. Ms. Dressel's voice is quickly drowned out by the sound of 12 fourth and fifth grade girls vigorously hammering nails into the wooden boards that will become their wind vanes. While hammering, one girl, Martissa, takes time to notice how the wood splits slightly along its grain, how the nail becomes warm due to friction (her word), and that by holding the hammer at the end rather than by the neck, she can exert more force. She is 11 years old.

Martissa's interest and ability illustrate the fact that girls and boys do equally well in math and science through elementary school. However, the 1993 Indiana study *High Hopes, Long Odds: A Major Report on Hoosier Teens and the American Dream* showed that when it is time to apply to college, 41 percent of boys plan to study math and science compared to 11 percent of girls. Research also shows that parents, teachers and other adults typically expect girls not to perform as well as boys in math, science and related subjects, regardless of their true potential or demonstrated abilities. Patterns like this make girls victims of lowered expectations. [2]

Operation S.M.A.R.T., however, does the opposite: it empowers girls by giving them the opportunity to participate in hands-on activites ranging from fixing bicycles to exploring fluid dynamics. These activities show girls that math, science and related technologies are a part of everyday life; that girls are capable of mastering these subjects; and that they need to continue doing so into high school and college to obtain fulfilling careers and financial independence.

"Girls need to receive consistent messages that their participation in science and math is essential, for themselves and for the future of our nation," says Shirley Malcom, head of the Directorate for Education and Human Resources of the American Association for the Advancement of Science. "Unless we worry about what goes on beyond the schoolhouse, the United States will never achieve its goal of being number one in science and technology by the year 2000."

Girls Incorporated has produced various Operation S.M.A.R.T. materials to help organizations put the program into action, including

*cont'd. on pg. 10*

"The idea is to let girls experience science, math, and technology the way boys always have: by experimenting, exploring, taking risks, and getting dirty. "

# Women Physicists Report from Beijing Conference

*by Yimin Zimmerer (Colorado Springs Chinese School), Shang-Fen Ren (Illinois State University) and Anne-Marie Schmoltner (NSF)*

"The husband is supposed to be higher in rank, salary — even taller in height, so it might be difficult for a woman with a Ph.D. to find a husband"

The United Nations Fourth World Conference on Women took place in Beijing September 4-15, 1995. The forum of non-governmental organizations was held at Huairou, about an hour's drive from Beijing, August 30 - September 8. Partially supported by the US Department of Energy (DOE) and the National Science Foundation (NSF), the Association for Women in Science (AWIS) sent a delegation to attend these conferences and hosted several activities.

*Scientists peruse AWIS materials at Beijing Conference*

Among the AWIS activities were two popular exhibits on women in science. Free brochures on women in science, mentoring, AWIS, and CSWP (including copies of the *Gazette*) were made available. Buttons stating "I SUPPORT WOMEN IN SCIENCE" in all six official UN languages, as well as bookmarks and magnets, were especially popular. One exhibit also featured a large display on women scientists at the DOE laboratories, as well as a video tape produced for the occasion.

Another important AWIS activity was a workshop entitled "Mentoring as a Tool for Girls' Advancement". The workshop went beyond the scope of its assigned title and covered mentoring for girls and women in science at all stages of their education and career. The workshop was very well attended, and included presentations from women in government, academe, and industry.

One of the panelists was Prof. Xide Xie, the president of the Chinese Women's Association of Science and Technology (CWAST). Prof. Xie is a physicist, a member of the Chinese Academy of Sciences, and a former president of Fudan University. She impressed the audience with her warmth and honesty, her excellent English, and her sincere concern for improving the situation for women in science in China.

At a workshop organized by CWAST, Prof. Xie presented statistical information on the Chinese educational system and women in scientific and technological occupations. The percentages of girls at the various levels of education illustrate the fact that women in China drop out at higher rates than men. Currently, the percentages of girls enrolled are: in primary school, 47%, in middle school (corresponding to junior high and high schools in the US), 43%, in colleges, 34%, and in universities, 25%. Of all the Ph.D.s awarded in China between 1982 and 1993, 9.4% or 107 went to women (China did not have any Ph. D. programs before 1981). Prof. Xie pointed out that both the achievements and the challenges must be seen in the context of China's total population of currently 1.2 billion. Currently about 122 million pupils are in primary school in China — almost half the total U.S. population!

According to the book "Chinese Women and the Development of Science and Technology," published by All-China Women's Federation, the percentages of women employed in science and technology in China show a similar trend — the higher the level of the positions, the fewer women. In 1992, the percentage of women in the rank of lecturer (which is equivalent to assistant professor in the US), associate professor, and full professor in colleges and universities in all of China were approximately 30%, 20%, and 11%, respectively. Prof. Xie reported that both in the Chinese Academy of Sciences and the Chinese Academy of Engineering, the percentage of women is currently about 5%, very similar to the percentage in the US Academy of Sciences. The situation, however, is much better in the medical sciences in China, where 40% of the senior professionals are women.

Prof. Xie stressed that girls should have the right to choose to go into the hard sciences and they should not be kept out because of prejudice and other barriers. She listed four main obstacles to women and girls interested in pursuing science:

- **Girls' preconceptions about the difficulty of math and science.**
  Often girls think "science is hard, math is terrible." They get no encouragement from their parents and they lose self-confidence.

- **Traditional roles for men and women in Chinese society.**
  The husband is supposed to be higher in rank, salary — even taller in height, so it might be difficult for a woman with a Ph.D. to find a husband.

# Update on the Aspen Focal Week on Women in Physics

*by Katherine Freese (Univ. of Michigan), Catherine Kallin (McMaster Univ.), Elizabeth Simmons (Boston University).*

In July 1994, we organized a Focal Week on Women in Physics at the Aspen Center for Physics. The program is described in an article in the previous issue of the CSWP *Gazette* (Vol. 15, No. 1, Pg. 6). A major goal of the Focal Week was to suggest how the Center could improve the participation of women in the Center's scientific activities. A list of specific recommendations was submitted to and approved by the Scientific Advisory Board of the Center in August 1994. This update briefly reviews the progress made in implementing these recommendations.

**Governance**

Between August 1994 and September 1996, a total of 7 additional women were elected to the Scientific Advisory Board, which is responsible for running the Center. This more than doubled the number of women Board members. The admissions, nominations, executive, and scientific program committees all had women members in 1994-5, 1995-6 and 1996-7. A committee for participant diversity (of which two of us are currently members) was established in 1996-7.

Three of the ten 1995 summer workshops and one of the four 1995 winter workshops had a woman among their organizers. Of the ten workshops held in summer 1996, three had at least one woman organizer. Four of the twelve workshops planned for summer 1997 have a woman among the organizers.

**Advertising and Admissions**

The scientific workshops are now more widely advertised — including a notice on the LANL electronic conference list with links to the Center's new WWW site (http://andy.bu.edu:80/aspen/). Over 100 women physicists have been added to the Center's mailing list. The application form is now readily available on-line.

Ten percent of the physicists participating in the 1995 summer program at the Center were women; in 1996 this rose to twelve percent. Both are higher percentages than for any year preceding the Focal Week, and the 1996 figure equals that of 1994. Many of the women attending in 1995 and 1996 were at Aspen for the first time.

**Family Issues**

Information on daycare is made available to applicants in the printed literature and on the Web site. A file on daycare is maintained at the Center to allow participants to share information and experiences.

An admissions policy on two-physicist couples has been established: Couples are able to identify themselves as such on the application form and to indicate whether they wish to be considered for admission independently or jointly. This is essential, since admission is competitive and the typical stay at the Center is 3 weeks or longer.

We are very pleased at the progress made since the Focal Week and anticipate that women's participation at the Aspen Center for Physics will continue to increase.

*Women Physicists, cont'd from previous page*

- **Family vs. career issues.**
  More kindergartens and day care centers are needed in order to assist women scientists with small children. Prof. Xie also advises, "Husband and wife should share the household chores in order to make the family happy."

- **Lack of women in higher administration**.
  More women are needed in key administrative positions in order to fight the "old boys' clubs" there and to combat discrimination against women at all levels.

At the Forum in Huairou, women scientists from other countries talked about their programs, mostly newly established, aimed at encouraging girls to study science (such as prizes), and mentoring programs to support students and faculty.

While Prof. Xie had China in mind, it became obvious from countless discussions with women scientists from all over the world that the obstacles are similar in all countries. In some countries, economic hardship and cultures that discourage men's participation in the household add to these problems. There are differences from country to country, however, in the degree to which these challenges have been overcome. The low percentage of women in physics in the United States shows that a lot needs to be done to encourage more girls and women to get a good scientific education and to pursue a career in science and related areas.

A very effective tool towards achieving this goal is mentoring. AWIS, with support from the Sloan Foundation and NSF, has been conducting mentoring programs through its 65 chapters nationwide. These programs are aimed at the undergraduate and graduate level, with the ultimate goal being to develop students' confidence, increase the number of women who attain degrees in science, and help them begin successful careers. (For more information, contact AWIS at 1200 New York Ave., Suite 650, Washington, DC 20005, (202) 326-8940, Fax (202) 3268960, e-mail awis@awis.org).

"More women are needed in key administrative positions in order to fight the "old boys' clubs" there and to combat discrimination against women at all levels."

*L: Shang-Fen Ren*
*R: Xide Xie*

# Women Changing Science: Voices from a Field in Transition

## Reviews

*by Mary Morse*
*Insight Books, Plenum Press, New York, 1995*
*reviewed by Donna Hurley (National Institute of Standards & Technology)*

In the introduction to *Women Changing Science: Voices from a Field in Transition*, Mary Morse asks, "Now that women have begun filling the ranks of science, will its focus, or even science itself, change?" The rest of her book seeks to answer this challenging question. Although no single book could respond conclusively, Morse skillfully explores cultural aspects of science that are of particular concern to female scientists.

"Do women do science differently? If so, how do men react?"

The book is divided into two sections. In the first section, Morse covers a great deal of ground as she discusses the current status of women in science. The first chapter tackles the subject from a sociological perspective, explaining different feminist theories of viewing science and female contributions to it. This is unfamiliar territory to many practicing scientists, and as such is a thought-provoking introduction to the book's topics. Morse then delves into the education of scientists, focusing on factors (such as negative peer pressure and the lack of female role models) that affect the retention rate of girls and women in science. In Chapter 3, behavioral elements related to "doing science" are considered: competition, cooperation, intimidation, and intuition. Morse explores how these elements fare with respect to women. In other words, do women do science differently? If so, how do men react? The first section concludes by examining the day-to-day culture of working in science, especially the demand or desire to work more than a 40-hour week. Morse considers how the face of science can be changed to accommodate those who want to "have a life" and also be considered successful scientists.

The second part of the book is devoted to interviews with (female) scientists. This section comprises nearly half of the book; it is space well utilized, given the variety of personalities Morse portrays. The interviews are grouped into three sections. The first section recounts the opinions and life stories of several women who are relatively young. By maintaining anonymity, the chapter becomes a fearless free-for-all that offers a revealing look at what's on the minds of women in technical fields today. The second section deals with women in scientific policy-making positions. The interviews concentrate on such issues as the role of ethics in science, and whether women feel differently than male scientists about this topic. Finally, additional interviews with established scientists explore the future of science and ways in which science should or could change.

The book concludes by recommending changes that will improve the climate of science for women. As the report on the CSWP Site Visits concluded, such changes generally benefit not only women, but the entire physics community. Suggestions are made for innovations throughout the educational system, from kindergarten to graduate school. Improvements to the scientific workplace (both in and out of academia) are also proposed. Morse ends on a positive note, confident of positive changes to come.

Clearly, this is a lot to cover in a single book. (As an aside, note that Morse points out that words like "clearly" are part of the intimidation culture of science). However, Morse admirably manages to cover most topics in sufficient detail. Her lively exposition is sure to stimulate new ideas as well as lively discussions with male scientists — it did in my house! One of the book's greatest strengths lies in Morse's gift for transcribing interviews in language that is readable yet natural. Interviewees' thoughts and feelings are brought to life throughout the book by her liberal use of personal remarks to reinforce her statements. The book contains a diversity of voices, culled from queries to Internet discussion groups such as WISENET and SYSTERS and from follow-up personal interviews. In spite of the variety of viewpoints expressed in the interviews, several themes emerge that move the interviews beyond anecdotal experience. For instance, challenging the status quo of working long hours provokes strong reactions in many. Since this issue is faced by many young scientists, I was glad to see it discussed. However, Morse appears to have strong feelings on this topic, and it perhaps should have been emphasized less. I would also have liked to see more interviews with industrial and applied scientists — Morse herself points out the need to explore careers outside academia.

Many of the opinions and issues expressed in *Women Changing Science: Voices from a Field in Transition* will come as no surprise to those currently working on the "front lines" of physics. This book is nonetheless welcome reading to practicing scientists; it articulates the concerns with which we may be grappling, and reassures us that others share our thoughts. The book also provides a feminist or sociological context for the changes occurring in science, giving us the opportunity to step back and examine the work we love from a different perspective. Others who would benefit from reading this book are students and educators in the social sciences who seek an understanding of current issues in, and the culture of, the physical and natural sciences. For instance, it would make a valuable addition to the reading list of courses in women's studies, science and society, or gender and science.

# Pythagoras' Trousers: God, Physics and the Gender Wars

*by Margaret Wertheim*
*Times Books, Random House, New York, 1995.*
*reviewed by Suzanne Amador (Haverford College)*

## Reviews

As a rule, I generally avoid books with the words "God" and "physics" in the same title. In her book, *Pythagoras' Trousers: God, Physics and the Gender Wars*, Margaret Wertheim threatens to push an even more exhaustive list of hot buttons. However, one of her aims is to examine this very plethora of books implying mystical links between theology and physics: Leon Lederman's *The God Particle*, Paul Davies' *The Mind of God and God and the New Physics*, and Robert Jastrow's *God and the Astronomers*, to name a few. Ms. Wertheim, a free-lance science writer with bachelor's degrees in physics and math, asks how physics got associated with religion in the first place. In doing so, she seeks to answer the seemingly disparate question of why women physicists have been nearly as uncommon as women priests—a seemingly superficial analogy which she develops in surprising ways.

Scientists interested in the history of science will appreciate this different take on familiar territory, since the main body of the book involves a history of pre-twentieth century physics with an emphasis on its complex relationship with the Christian church. Unlike many modern writers on the history and philosophy of science, Ms. Wertheim displays considerable affection for her subject. The book opens with an account of her youthful discovery of what scientists have experienced throughout history: the uncanny sense that mathematical science provides a deep, direct connection with the universe. This understanding has often been taken literally as a sort of religious experience. Not surprisingly, then, many scientists have had a hard time keeping separate their religious beliefs and their investigations into the natural world.

This way of thinking about the physical sciences dates back to mystical cults such as the one headed by Pythagoras, in which mathematics was hailed as the Creator's plan. In their dualistic world view, the Pythagoreans associated mathematics with masculinity, and corruptible nature with femininity, introducing a social context for interpreting the universe which continued to permeate natural philosophy for centuries. The theorizing of the Pythagoreans has a surprisingly contemporary sound, with their emphasis on the necessity for theories to satisfy religiously-motivated aesthetic standards of harmony, symmetry and beauty.

This interplay between mysticism and physical science did not stop with the ancient Greeks. The Christian church essentially controlled the development of Western physics in centuries past. Physics arose in an environment where the major universities were entirely church funded and managed; scientists themselves were almost exclusively celibate, and often clerics, equally devoted to their religious and scientific pursuits. (Not merely a quaint artifact of the middle ages, celibacy was officially required of Oxbridge dons until the late nineteenth century.) This social context had definite scientific consequences, too, since new theories had to conform to prevailing religious biases, not only empirical tests. In addition to enduring the biases and prohibitions present throughout society, women were completely excluded from the monastic universities, practically the only setting in which the pursuit of science was possible. The celibacy of most scientists even prevented women from profiting indirectly from the education and professional activities of their male relatives. This climate of misogyny which arose as a result in early academic establishments resulted in a correspondingly open and pervasive misogyny expressed quite explicitly in scientific writings; this naturally led to even less support for women's participation.

For centuries, the Christian church enthusiastically supported the rationalist views of Galileo, Newton and other developers of classical mechanics. (Even Galileo's collision with the Catholic church represented only a temporary falling-out). The happy meshing of scientific and religious goals eventually culminated in physicists and astronomers being deemed an almost literal priesthood. This identification had scientific consequences: religious beliefs placed constraints on what was allowable in planetary orbits, cosmology, and views on the underlying unity of nature. Some of the resulting stories are familiar. For example, Copernicus' cosmology had more to do with his aesthetic preferences than achieving better agreement with observational data. Other cases related here are more surprising, such as the revelation that Faraday's experimental efforts to relate electrical and magnetic forces were motivated by the theories of the Slavic physicist-monk Boscovitch that gravitational and atomic-scale forces were manifestations of one unified force.

One of the book's merits is the balance struck between an acknowledgment that the physical sciences "work"— in the sense that mechanics undeniably gives accurate predictions — and yet the pathway taken by individual physicists is often highly culturally determined. Wertheim feels no need to diminish the achievements of such pioneering figures as Kepler and Newton when she explains how they were able to reconcile religious devotion with their discoveries. What, then, finally spoiled this congenial partnership? During the eighteenth and nineteenth centuries, this program was undermined both by philosophers, who denied that a basis for theology lay in a study of the natural sciences, as well as scientists, who no longer saw the need for the hand of a Creator in their work. However, scientists wished to retain their moral imprimatur. This was achieved by explaining science as salvation in itself, capable of creating a heaven on earth through human technology. The rupture between religion and science accelerated in the late nineteenth century with the acceptance of gradualist theories of evolution and a cosmology increasingly at odds with literal Biblical interpretation.

This work mainly aspires to be a history of physics, and as a result it often gives short shrift to the physics itself. The explanations of physical phenomena are often too tele-

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**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 roster also serves as the Gazette mailing list).**
**See page 13.**

***Pythagoras' Trousers, cont'd. from previous page***

graphic for nonscientists, and occasional inaccuracies mar the discussion. The narrow focus of the book excludes a historical survey of other natural sciences, which sometimes skews her presentation even of the history.

Throughout the book, readers will find many inspiring profiles of women physicists and astronomers who struggled to do science against all odds, including such early pioneers as eighteenth-century physicist Laura Bassi. There are even reassuring tales of a few courageous male scientists who helped these women against tremendous institutional opposition, Liebnitz, Felix Klein and David Hilbert being among the most prominent examples. Her even-handed treatment of great male scientists lends special poignancy to her descriptions of the immense hardships endured by great women scientists like Lise Meitner and Emmy Noether.

"Many physicists are in fact distressed by post-modernist critiques of science which accuse science of trying to fill the role of religion."

Wertheim's discussion of the history of science provides an illuminating context for understanding the forces which shaped and limited women's participation in physics, as well as influencing the way women were viewed within the scientific establishment. However, she goes beyond this to assert that modern physics carries a built-in prejudice against women as a direct consequence of this history. She specifically locates this bias in particle physics, especially unified field theory and high energy accelerator physics, which are deemed the chief heirs of this tradition. While women are certainly under-represented in these fields, her arguments failed to convince me that the philosophical underpinnings of the fields themselves are the cause. The unusual, "macho" sociology of high energy physics seems adequate to explain its gender imbalances, and this seems to owe more to the big science aspects of accelerator physics than earlier history.

Like many unified theories of cultural phenomena, Wertheim's thesis works best for selected examples. She does confront and explain some seeming contradictions, such as the relative success of women in astronomy. (Since observatories could be privately maintained, rather than under clerical control, their doors were historically open to a few women with money and connections. Because this system also allowed noncelibate men to participate, it led to a trickle-down of opportunities to their female relatives. Even so, persevering women astronomers still were limited by a total absence of professional employment.) However, her particular historical take on the subject fails to explain, for example, why the representation of women in physics varies so widely by nationality even in the West (from only 3% of physics faculty in the US to 23% in France in 1991[1]), or how the dramatic evolution of physics research culture in the early twentieth century and the post-World War II era affected women's role. The broad array of cultural forces which have shaped women's participation in science have been more convincingly documented elsewhere[2].

Wertheim also fails to make a case that the association of religion with physics is prevalent in the physics community, rather than a public relations ploy used to "sell" physics. How widespread is such language, and how seriously do the scientists quoted in her book take their pronouncements? In their recent book on career trends in the sciences, Tobias, Chubin and Aylesworth report that scientists exhibited a wide variety of responses when asked on a questionnaire whether they felt "called" to science, "much like others are called to the priesthood"[3]; many rejected the metaphor outright. Many physicists are in fact distressed by post-modernist critiques of science which accuse science of trying to fill the role of religion.

This book would have benefited from the inclusion of either interviews with physicists, or at least more extensive documentation of their thinking. Such materials would have revealed a variety of opinions within the field about what is fundamental about physics — an issue of crucial importance as the physics community increasingly turns from high energy accelerator experiments to the study of complex systems and interdisciplinary science, such as materials science and biological physics.

These questions do indeed bear directly on the deeper philosophical meaning of physics and science as a whole. Our community needs to confront these issues internally, and discuss them honestly with a wider audience. It ineffectual to have one part of the community combating relativist theories of science, creationism, and pseudoscience, while the other promotes particle physics and astrophysics as yielding insights into the "Mind of God." In the present funding environment, the way physics is portrayed to the outside world could help determine the fate of the field itself. Books such as this one can serve as useful reminders that we need to work at living up to the high expectations physics has created for itself.

1 Mildred S. Dresselhaus, Judy R. Franz, and Bunny C. Clark, "Interventions to Increase the Participation of Women in Physics," Science 263, 1392 (1994).

2 See, *e.g.*, Margaret W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940.* (John Hopkins University Press, Baltimore, 1982).

3 Sheila Tobias, Darryl E. Chubin, and Kevin Aylesworth, *Rethinking Science as a Career* (Research Corporation, Tucson, 1995), pp. 45, 131.

***Operation SMART, cont'd from pg. 5***

"Spinnerets and Know How," an implementation guide, and "The Power Project," an activities guide. The organization also offers training and technical assistance conducted by experienced professional staff from its affiliates.

To learn more about Girls Incorporated programs in your area, to volunteer, to find out how to bring Operation S.M.A.R.T. to your children, contact the Girls Incorporated National Headquarters, 30 East 33rd Street, New York, NY, 10016, call them at 212-689-3700 or visit their website at http://www.girlsinc.org.

1 Joline Godfrey, *No More Frogs to Kiss* (Harper Collins, New York, 1995), p. xviii.

2 M.C. Linn & J.S. Hyde, "Gender, Mathematics and Science," *Educational Researcher* 18, 17 (1989).

# Physics Awareness for U.K. Girls

*by Suzanne Wakelin (Optivision, Inc.)*

The numbers of females studying physics and continuing a career in the physical sciences in the United Kingdom has been consistently low. This article describes a *Physics Awareness Workshop for Girls* that was held at Heriot-Watt University with support in part from the Institute of Physics (IoP). It is hoped that knowledge of the efforts being made will encourage more people to see this is an important priority in the teaching of physics.

**Motivation**

At present, it is difficult to convince young people of either gender that studying science, particularly physics, is attractive. Reasons for this may be due to the general social climate in Britain, the low standing of scientists in the minds of the general public, or just a common misconception that science is too difficult and not interesting or relevant to everyday life. A large impact can be made by an enthusiastic teacher so that any interest aroused in childhood continues through to adulthood. Unfortunately, this kind of stimulation is not automatic, and effort has to be made at all stages of development. It is interesting to imagine how different the socio-economic and political climate would be if more people with power over large institutions had a scientific background rather than arts or classics. It is also worrying that the economic future of Britain in terms of technology development and exploitation relies on the judgement of many people who have limited perception of the issues involved. Given this situation, concerted effort must be made to give people of all ages and backgrounds a chance to experience science as exciting and stimulating.

In order to convey general interest in science, it is necessary to approach the problem from many different directions. It is possible to pinpoint specific areas in which particular effort should be made. It is generally accepted that the numbers of females entering a scientific career are insufficient. Before even the question of career direction is considered, many girls feel that they are not interested in or are not capable of understanding how things work. Clearly, these feelings of inadequacy do not inspire girls to choose to study science when given options on what subjects to continue. Furthermore, at an age when the actions of other people have a strong influence on choices made, the small number of girls studying physics discourages other girls from continuing their physics studies. When the majority of my female colleagues moved on in their careers and it became apparent that there were not as many young women taking their places, I realized that it was necessary to make an effort to encourage more girls to study physics.

**The Physics Awareness Workshop**

The main emphasis of the one-day workshop that we organized was to show young women the breadth of opportunities that are open to them with a physics background. We hoped to demonstrate to the attendees that there are many females who have enjoyed studying physics, and to give them an opportunity to meet women who have used their physics training to enter a diverse range of careers.

Initially, over 300 girls from schools throughout Scotland showed an interest in the event. It was estimated that 120 would be just manageable, so an application form was prepared for the girls to complete. The teachers were also asked to indicate which girls could benefit most from the workshop. We selected 85 girls from 20 schools.

The morning session consisted of invited talks, while the afternoon sessions were practical demonstrations and experiments and tours of the department and university. We recruited departmental student and staff members to act as helpers/demonstrators. Most of the undergraduates asked to help were female; the postgraduate and academic staff were male. This gave the impression of the balanced environment that we are trying to promote. Unfortunately we were unable to balance it completely by having females in some of the senior positions.

Informal experiments and demonstrations were devised for the laboratory sessions to allow the attendees to investigate the areas that interested them. We felt it was important to show that physics encompasses more areas than can be shown in the high-school laboratory. Each attendee received an IoP *Physics at Work* folder containing general information leaflets as well as support material specific to the workshop. Itineraries and maps of the university were also provided, along with background information about the invited guests.

The invited talks were presented in two sessions. Each talk was approximately 20 minutes long, with a half-hour refreshment break after the first three. Seven invited speakers covered a diverse range of subjects including medical physics, working in defense, science publishing, and astronomy. At the end of the invited talks, the attendees, teachers, guests, and helpers ate lunch together. This provided an informal and sociable atmosphere for interaction.

The afternoon session commenced by splitting the attendees into groups of four to six and allocating a student helper to act as group leader. These helpers were prearranged to stay with their group for the afternoon and to act as guides. The two, hour-long afternoon sessions were used for tours and experimental work.

Tours were arranged to give the attendees an idea of the activities carried out in a university physics department. Included were visits to research laboratories to show the operation of high power lasers and novel blue laser diodes, and to undergraduate practical laboratories and other department facilities. The attendees were shown around the university grounds and told about university life from a student's point of view.

Simple experiments and demonstrations were devised to show aspects of physics not commonly taught in high-school physics. Emphasis was placed on exploration rather than formal experiments. Most of the demonstrations were held in a large undergraduate laboratory. A dark area was used for optics demonstrations to show geometric and wave optics. Other demonstrations included soap bubbles, radioactivity of common household objects, a pickled gherkin

*cont'd. on next page*

"At present, it is difficult to convince young people of either gender that studying science, particularly physics, is attractive."

# ANNOUNCEMENTS

• The NSF **Visiting Professorships for Women** (VPW) program gives experienced female scientists and engineers the opportunity to conduct advanced research at academic institutions of their choice, where they have access to the top scientists in their fields and the most advanced research facilities. The award provides funding for travel to the host institution, basic research expenses, and salary for a period of six to 15 months. As an option, a portion of time may be spent in a foreign country to carry out international collaborative research projects.

Contact:

Visiting Professorships for Women
National Science Foundation
4201 Wilson Blvd.
Arlington, VA 22230
Web info: http://www.nsf.gov/cgi-bin/getpub?nsf95113

Eligibility: U.S. citizens, nationals or permanent residents; Ph.D. in a field of research supported by NSF; currently employed in a U.S. academic institution, industry, or non-profit laboratory and planning to return to that place of employment (employees of Federal agencies are **not** eligible); not have a salaried position, or the promise of one, with the proposed host institution, nor be receiving funds as a principal investigator or co-principal investigator from a federal research grant distributed through that institution.

**Stipend:** Varies
**Tenure:** Six to 15 months
**Number:** Approximately 25 awards
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• The **vision for excellence in science education** is clarified in the landmark National Science Education Standards (ISBN 0-309-05326-9, $19.95) which was released in December 1996 by the National Academy Press. To order, call 800-624-6242 (DC area 202-334-3313) or fax 202-334-2451 or see Web at http://www.nas.edu

• **The Forum on Education** maintains an interactive Summer Jobs Database on the Web. Students and potential employers should see http://www.att.com/APS/SJB.html for more information.

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discharge lamp(!), properties of gases and liquid nitrogen cooling. All experiments were supervised, some by student/staff helpers and others by invited female guests who had brought the demonstrations with them. In addition, other displays and devices were available, including a plasma ball, laser lissajous figures, liquid crystal thermometers and many more.

**Discussion and Conclusions**

The feedback about the morning sessions was extremely positive. Many comments were made about the good and diverse range of speakers. The format (timing, order of speakers, etc.) had been arranged to allow for the attention span of the participants. This had apparently been judged correctly, and the morning session was successful in its aims to give an idea of the range of opportunities available, and to show that successful female physicists with interesting and stimulating careers do exist.

During preparation, provision was made for plenty of refreshments. This was obviously popular and worth the effort, as it can contribute largely to the enjoyment of the day as a whole. A large proportion of the budget was used for refreshments and was seen to be a necessary part of the day.

The afternoon sessions were clearly enjoyable for the attendees and helpers alike. The laboratory session was completely unregimented, allowing the attendees to investigate the parts they found interesting. This appeared to be a good decision. Apart from the logistics of organizing 50 people in a laboratory to do several short experiments in an hour, the lack of formal experiments seemed to encourage more interest.

The tours were very popular. Most of the participants and their teachers were interested to find out what the university was like and were impressed with the facilities. The research lab visits seemed a good choice, with just two labs available. They gave an idea of a few of the research activities going on without becoming a dull trek around all the laboratories.

The general feedback has been extremely positive from all areas of involvement. Many of the teachers and girls came to me during the day to say how much they were enjoying themselves. I have since received several letters of thanks from the attendees and guests, saying how positive they felt about the effect of the workshop on their perceptions about physics. It was particularly interesting to bring together an unusual range of guests, all being female and most in their twenties. This gave a positive impression of a physicist, significantly different from that image with which they are usually associated.

**Acknowledgements**

The funding for this event was provided by the Institute of Physics and Heriot-Watt University Physics Department. Sponsorship was also provided by Barrs, Tunnocks and Highlander Snacks in the form of refreshments.

I would like to acknowledge and thank all the people who contributed their time and enthusiasm in supporting the *Physics Awareness Workshop*.

## Erratum

Barbara McClintock's name was misspelled twice in Sheila Tobias's editorial in the Summer 1995 issue of the Gazette. The CSWP regrets this error.

# The American Physical Society - ROSTER ENROLLMENT FORM

The Roster is the basis for statistical reports on women and minority physicists; mailing lists corresponding to announcements, and publications of the APS Committee on the Status of Women in Physics (CSWP) and Committee on Minorities (COM); and confidential searches. The Rosters will not be made available to commercial or political organizations as a mailing list, and all information provided will be kept strictly confidential. Although the Roster is employed to serve women and minority physicists, enrollment is open to anyone interested in issues affecting these groups. Please give a copy of this form to others who might be interested in joining the Roster, or in receiving the newsletters.

**Please complete all entries on BOTH SIDES OF THE FORM and indicate changes if this is an update of a previous entry. After completing this form, please return to:**

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| 8 ____ | 8 ____ | Electronics |
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| 14 ___ | 14 ___ | Mechanics |
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# *Colloquium/Seminar Speakers List (CSSL) of Women in Physics Enrollment/Modification Form ◆ 1997-1998*

***(updates can also be made via www via http://aps.org/educ/cslapp.html)***

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

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

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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 your modifications (not entries) number more that four. **PLEASE TYPE OR PRINT LEGIBLY PAYING PARTICULAR ATTENTION TO FORMULAS. WE ARE UNABLE TO INCLUDE ILLEGIBLE ENTRIES.**

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|---|---|---|---|---|---|
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| 2. | ❒ Add this title | ❒ Delete this title | ❒ Accelerators<br>❒ Astrophysics<br>❒ Atomic<br>❒ Biological/Medical<br>❒ Chemical/Statistical<br>❒ Computational | ❒ Condensed Matter<br>❒ Education (pedagogy, etc.)<br>❒ Environmental/Energy<br>❒ Fluid Plasma<br>❒ General<br>❒ Geophysics | ❒ History<br>❒ Interface/Device<br>❒ Molec/Polymer<br>❒ Nuclear/Particle<br>❒ Optics/Optical |
| 3. | ❒ Add this title | ❒ Delete this title | ❒ Accelerators<br>❒ Astrophysics<br>❒ Atomic<br>❒ Biological/Medical<br>❒ Chemical/Statistical<br>❒ Computational | ❒ Condensed Matter<br>❒ Education (pedagogy, etc.)<br>❒ Environmental/Energy<br>❒ Fluid Plasma<br>❒ General<br>❒ Geophysics | ❒ History<br>❒ Interface/Device<br>❒ Molec/Polymer<br>❒ Nuclear/Particle<br>❒ Optics/Optical |
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# PLEASE RESPOND
# !!!WE NEED YOUR HELP!!!

In order to keep publication and mailing costs down, the Committee on the Status of Women in Physics is considering an electronic format for the *Gazette* newsletter. Those with an electronic subscription would receive an email version of the *Gazette* along with the URL of a graphic- and picture- enhanced version of the newsletter.

Please take a moment to answer the questions below, and return the survey to us via mail, fax, email or webpage.

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- Fax to Tara McLoughlin (301-209-0865)
- Email to tara@aps.org (please put "Gazette Survey" in the subject line)
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