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CSWP Gazette

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

INSIDE

Guest Editorial: *Catherine Fiore, MIT*

Catherine Fiore

Today is an exciting time to be a woman professional, especially in science and technology. Led by Shirley Jackson at Rensselaer Polytechnic Institute, women have assumed the presidencies of a number of prestigious technological and Ivy League universities including MIT, Harvard and Princeton. The Democratic Party has a woman seriously contending for the presidential nomination, and she has a serious chance of winning the presidency. Women are becoming CEOs at ever more Fortune 500 companies. The glass ceiling no longer appears so solid.

At the same time, while the percentage of women in physics has been steadily rising at all levels, the numbers are still far less than we would like to see. Many technical fields such as medicine, biology, and chemistry have achieved numbers near or above parity in the female population. Physics still is far behind with 22% of bachelor's degrees and 18% of doctoral degrees earned by women. (*Women in Physics & Astronomy 2005*, American Institute of Physics)

By sponsoring the first ever Gender Equity Conference for physics department chairs and national lab directors, CSWP (with funding from DOE and NSF) has taken a bold step to increase the percentage of women in physics at all educational and employment levels. This conference brought people who are in positions to make positive changes and are highly motivated to make them together with scientists who had researched the problem and could give them positive tools for change.

The conference was extremely exciting, sustaining a high level of energy over nearly 2 days of presentations. A large number of recommendations and suggestions for the attendees to take back to their home institutions were generated. I left the conference convinced that bringing the percentage of women in our field to parity is within our grasp, and that it can be achieved in my lifetime. This is truly an exciting time to be a woman in physics.

Gender Equity: Strengthening the Physics Enterprise in Universities and National Laboratories

By Catherine Fiore, MIT

Seeking to address the shortfall of women at all levels of the physics community, APS sponsored a conference for physics department chairs from 50 major research-oriented universities and program managers from more than a dozen national laboratories on May 6-8. The conference was held at the American Center for Physics with support from DOE and NSF.

A series of presentations, panels and breakout sessions addressed a wide range of issues concerning factors that inhibit women from pursuing degrees and careers in physics. Speakers and panelists were drawn from social scientists who have done research in gender bias and family/career issues, as well as from the ranks of academic and national laboratory leaders, and representatives of funding agencies. The agenda and many of the presentations can be found at http://aps.org/programs/women/workshops/gender-equity.cfm

Session 1: Defining the Issues

The conference began Sunday evening with co-chairs Arthur Bienenstock, Stanford University, APS president-elect, and Nora Berrah, Western Michigan University, outlining the meeting objective: to give

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physics department chairs and national laboratory directors a set of tools that they could take back to their institutions that after implementation would lead to the doubling of the number of women in physics in the US in 15 years. Tony Chan, Assistant Director, NSF Directorate for Mathematical and Physical Sciences and Patricia Dehmer, Associate Director of Science for Basic Energy Sciences and Acting Deputy for Programs, DOE Office of Science, made introductory remarks welcoming the attendees, asking what obstacles and biases remain for women in physics. Pat Dehmer pointed out that 40 years ago, many professional programs had quotas on the number of women who could enroll. Once those quotas were lifted, law and medicine soon achieved gender parity. While biology and chemistry are at or near gender parity, physics, math and engineering are still lagging.

Alice Agogino, University of California at Berkeley, a member of the NAS Committee on Maximizing the Potential of Women in Science and Engineering, summarized the work of this committee in producing the NAS report, "Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering." Following the now famous remarks made by former Harvard president Lawrence Summers, this committee explored the role of nature versus nurture in producing successful women in these fields. They found little difference in math SATs due to gender (e.g., in Iceland girls outperform boys). No impact on productivity could be attributed to marital or parental status, or to responsibilities for elder care. The overarching conclusion was that women in science and engineering are held back from achieving their full potential, not by a lack of drive or talent but by unintentional biases and by institutional structures that serve to hinder their advancement.

Arthur Bienenstock explained why it is a matter of national importance that the number or women in science and technology be expanded. His argument on why "the nation needs more women physicists" points out that 50% of the productivity increase that has occurred in the last half century can be attributed to advances in science and technology. The number of Americans employed in science and technology has grown steadily, from 11% in 1962 to 15% in 1995. Historically, these workers have largely come from the white male population. Demographic projections show a steady decline in the fractional representation of this group over the next half century. Meeting the need for continued growth of the science and technology sector makes it crucial to use women and under-represented minorities in this workforce.

Statistics collected by AIP show the steady growth in the percentage of bachelor degrees in physics earned by women: from 5% in 1966 to 22% in 2001. In the same time span, women earning chemistry bachelor's degrees increased from 18% to 49%. In 2001, girls accounted for 46% of students in high school physics classes. This suggests that young women now entering colleges and universities provide a larger pool of potential physics and engineering majors than is currently being utilized. The nation's needs could be met by making physics more attractive to all students.

Session 2: Equity and Bias

Virginia Valian of Hunter College described the Gender Equity Project at Hunter which is examining why the advancement of women in some professions has been so slow. She defined schemas as the shorthand we use for efficient storage of images in our brains and explained how the ability to quickly retrieve these mental images contributes to our survival. However, schemas also provide the basis for unintentional bias. We might store a picture of a physicist in our mind that is male and socially inept, focused and indifferent. When we look at hiring a physicist, we select the qualities that reflect our inner picture and discount those that are different. This results in the accumulation of small advantages for the male. Search committees must be vigilant about this kind of bias. One example is the difference between how letters of recommendation are often written for male versus female applicants: letters for males contain longer, more standard adjectives while letters for women use grindstone adjectives such as "perseverance".

Mary Ann Mason, Dean of the Graduate Division at UC Berkeley, heads the "Do Babies Matter Project." She has studied the disproportionate effect that motherhood has on the professional career. Using statistics from the UC system, she showed that 14 years post graduation, 53% of women who had children early in their careers had achieved tenure while 77% of men reached tenure. Of women with no children or who had their children late, 65% had reached tenure after 14 years. Her conclusion is that the extraordinary demands of achieving the top ranks of academia are incompatible with meeting needs of young children, a responsibility that disproportionately falls upon women.

Session 3: Challenges and Opportunities

Robert Drago of Penn State University spoke on "Bias Against Caregiving in the Academic Workplace: Evidence and Implications." Many workers perceive that there is workplace bias against care-givers, and thus end up using techniques of "bias avoidance" to evade the consequences. He gave examples of productive bias avoidance (staying single, delaying children) and unproductive bias avoidance (not taking reduced work load, returning to work too soon after child birth.) Bias avoidance affects more women than men, but there are steps which can reduce it. Supportive supervisors decrease bias avoidance, most particularly by instituting family friendly work-life practices. Paid leave, reduced hours, child/elder-care supports, flexible hours especially designed for the constituency (faculty, staff, students) also help. He encouraged people to be honest and open about their care-giving needs in order to change the culture, especially for men to make use of "The Daddy Pulpit."

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Where are the female physicists?

By Robert Ehrlich, George Mason University

The existence and reasons behind gender and racial under-representation among scientists has been a long-standing concern of both scientists and policymakers in the U.S. and elsewhere. Projections show, however, that women may become the majority of science PhD recipients in the United States as soon as 2008. Nevertheless, the under-representation of women in some sciences, most especially physics is far greater than other sciences, and it is unlikely to be reversed in the foreseeable future. With the aid of two recent studies on academic women in physics, we find several correlations that account for variations in percentages in numbers of women faculty and graduate students in physics and astronomy departments at U.S. Universities. Here we look specifically at how the percentages of women physics faculty tend to correlate with department size, gender distribution of graduate students, geographic location, and departmental selectivity in admissions.

Introduction

Recently, considerable attention has been given to the matter of gender bias in science, including its causes and consequences.[1] Even with the continuing existence of such bias, it is worth noting, however, that women science PhD's are not a rarity. In fact, projections from the data show that women might be in the majority of science doctorates by the year 2008. Already by 2003 women received 45.8% of science PhD's — a 9.8% rise since 1991 — according to the National Science Foundation.[2] Since the percentage of women BS degrees in science rose 4.1% from 1994 to 2001,[3] a corresponding rise at the PhD level (given an average seven year delay between receipt of BS and PhD degrees), could put women in the majority of science PhD recipients by the year 2008 or 2009 at the latest. Admittedly, women science faculty at universities will still be greatly outnumbered by their male peers, given that on the average science faculty received their doctorates many years ago, when women science PhD's were indeed a rarity, but that situation also will change over time.

But what is true for science generally is untrue for certain fields of science, notably physics, where in 2003 women still earned only 18% of all PhD's in the U.S. — albeit a record high (up from a meager 4% in 1972).[4] On the other hand, given a rise of only 3.3% per decade in the percentage of physics PhD's going to women, it probably will be many decades if ever before the gender gap begins to close in physics. Given this reality, it is worth trying to understand better which universities are especially successful in attracting female physicists (faculty and graduate students), and what factors are responsible for their success. Two recent studies in particular are especially helpful: (1) "Women in Physics and Astronomy, 2005,"[4] prepared by the American Institute of Physics (AIP), and (2) an ongoing online survey conducted by the Committee on the Status of Women in Physics (CSWP),[5] a committee of the American Physical Society. The latter survey has elicited 145 responses from departments of physics or physics and astronomy that grant physics PhD's, as of July 24, 2007. Both studies relied on self-reported data supplied by individual physics and astronomy departments at PhD-granting institutions. The AIP study makes it clear that the U.S. is not alone in having few women in physics, and that most countries award less than 20% of their physics PhD's to women. With regard to physics degrees at the baccalaureate level, some readers may be surprised to learn the identity of the nation having the largest percentage (39%) of physics degrees awarded to women.[6] The AIP study also identifies ten U.S. schools which have a particularly healthy output of female physics PhD's (over 25% during the years 1999-2003), and suggests that it might be worthwhile to learn what these schools are doing right.

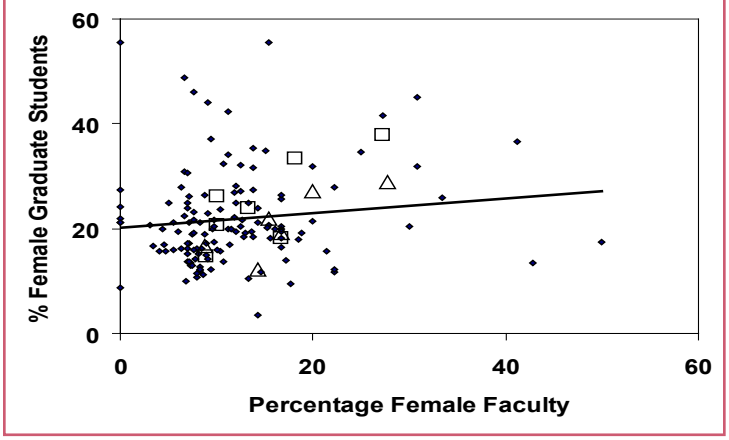

Figure 1. Dependence of the percentage of physics graduate students who are female on the percentage of faculty who are female. The meaning of the data points shown by squares and diamonds is discussed in the text.

Analysis of Data

In the CSWP survey respondents provide both written paragraphs describing what makes their departments "female-friendly," and quantitative data on graduate students and faculty. Using the quantitative data we have looked for factors that may account for high percentages of female graduate students and faculty in physics in those schools and others. Our results are illustrated in Figures 1, 2 and 3. As the trend line of Figure 1 shows, a correlation can be found between schools having higher than average percentages of female physics faculty and female physics graduate students. Although the correlation is weak (small slope of the best fit trend line), it is statistically significant at a level of $p = 0.0009$. It seems unlikely that females would apply to graduate schools based on their knowledge of how many women faculty they had, and most of them probably decide on a graduate school

Female Physicists, continued from page 3

using the same criteria as their male peers. However, some women might be attracted to schools that had a "female-friendly" atmosphere based on a visit there, word of mouth, or their having attended the school as an undergraduate.

Two specific groups of departments have been flagged in Figure 1: (1) those who were highlighted in the AIP survey as giving more than 25% of PhD's to women during 1999-2003 (seven schools shown with open squares), and (2) those six departments (shown with open triangles) having a female chair based on her first name, according to a 2007 AIP directory.[7] Most of these 13 departments with one or two exceptions would seem to have unremarkable percentages of female faculty and graduate students, which suggests that (a) the schools identified in the AIP report as having a high output of female physics PhD's during 1999-2003 may simply represent a statistical fluctuation for many of them, and (b) the presence or absence of a female department chair is also not highly correlated with large percentages of female faculty or graduate students.

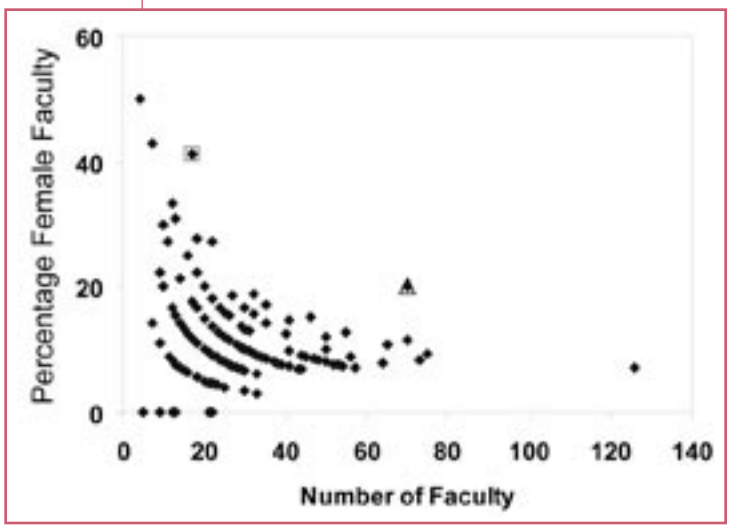

Figure 2. Dependence of the percentage of women physics faculty on the department size.

In order to learn what factors in fact influence the percentages of females among the physics faculty and graduate student population, we have looked at the departments of Figure 1 which show "above average female representation," i.e., have more than 10% females among the faculty and also more than 20% among the graduate students, and those that show "below average female representation," i.e., have less than 10% females among the faculty and also less than 20% among the graduate students. These departments show an interesting geographic correlation: only one of the 29 "above average" schools are in the south (not counting the border state of Virginia or the Western state of New Mexico), while as many as 12 out of 39 "below average" schools are in the south.

To find other correlations we have investigated the relationship between the number of tenured and tenure-track faculty in a department and the percentage of faculty who are female. Although, we would expect that larger physics and astronomy departments tend to have more women faculty in absolute numbers, it is less clear what to expect concerning the percentages. In fact, as Figure 2 shows, larger departments tend to have lower percentages of female faculty. Given that the number of females must be integral, the data points of Figure 2 all lie on a set of hyperbolas indicating those departments having 1, 2, 3, … tenured or tenure-track faculty. My own institution (flagged with an open square) happens to have the largest percentage of tenured or tenure-track faculty of all 145 physics and astronomy departments surveyed (as of July 24, 2007) who have 10 or more faculty members, although it does not have the largest number, an honor belonging to the University of Michigan, Applied Physics Department (flagged with an open triangle), which has 14 female tenured and tenure-track faculty out of a faculty of 70. The factors accounting for the high percentage of women faculty at George Mason University are not unlike some other schools in the CSWP survey.[8] The reason that larger departments tend to have lower percentages of female faculty is due to simple demographics — they tend to have a larger percentage of senior faculty, who received their PhD's many years ago, when female physics doctorates were a rarity, and when discrimination against women was not forbidden by law, i.e., before passage of the civil rights act.[9]

One final correlation we have investigated is between the "selectiveness" of a graduate program and its percentage of women graduate students. Selectiveness is shorthand here for schools that accept a low percentage of applicants to their physics and astronomy PhD programs. Since the physics Graduate Record Exam (GRE) plays a significant factor in evaluating graduate applicants,[10] and since it has been found that females score more poorly on this exam by on the average 150 points,[11] one might expect that female graduate students are scarcer at more selective institutions — at least to the extent that they rely on GRE scores as a significant factor in admission decisions. Surprisingly, however, the trend — albeit a weak one — is in the reverse direction, as can be seen in Figure 3, with more selective institutions having on the average higher percentages of female graduate students. Thus, suppose we arbitrarily define "more selective" institutions as those admitting fewer than 20% of applicants, and we also define "many" female graduate students, as more than 25% women. Figure 3 shows that among more selective schools 36% have many female graduate students, while among other schools only 21% have many females. One can imagine many possible explanations for this surprising correlation, including (a) greater percentages of females than males applying to more selective schools, (b) greater recognition by selective schools that the physics GRE has limited utility in predicting success in graduate school,[12] and (c) greater possibilities of scholarships for talented female PhD students. (We put little credence in the idea that the

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better programs are unfairly accepting more women than are justified from GRE test scores, just for the sake of making their statistics look good.)

If the correlation between program selectivity and percentage of women graduate students is genuine,[13] it is a piece of good news, since females and males have comparable dropout rates in physics graduate programs.[14] It means that future women physics PhD's will on the average come from more selective schools than their male peers, and will be at a competitive advantage in the hiring process. Additionally, such a correlation undermines the misguided belief that women tend to be ill-suited to be in the forefront of physics.

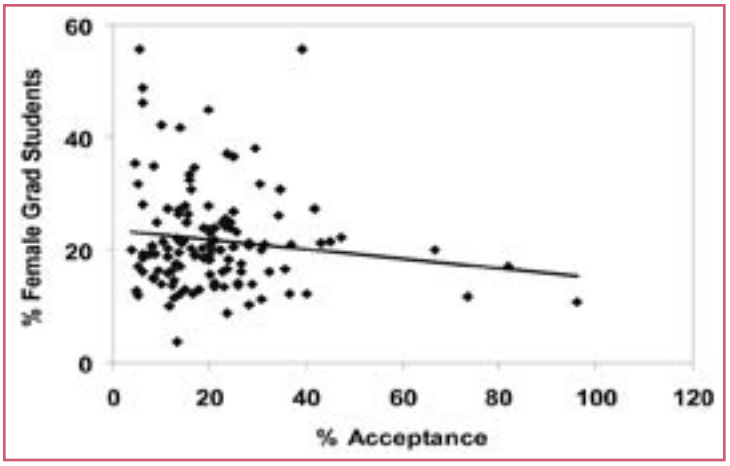

Figure 3. Dependence of the percentage of graduate physics students who are female on the selectivity of the program.

References

1. *Maxine Singer, et al., Beyond Bias and Barriers, Science 314, 893 (2006).*
2. *Chapter 2, "Science Indicators, 2006," National Science Foundation, Arlington, VA.*
3. *See ref 2. Note that "science" as defined by the National Science Foundation includes social science as well as natural science, however, the percentages of women in the social sciences are actually lower than those in science generally at the bachelor's level.*
4. *R. Ivie and K.N. Ray, "Women in Physics and Astronomy, 2005," AIP publication Number R-43002, Statistical Research Center, The American Institute of Physics, College Park, MD, February, 2005.*
5. *"Survey by the Committee on the Status of Women in Physics," See: http://cswp.womeninphysics.org/results.php. For each institution, the questionnaire asked the following: How many tenure-track or tenured faculty -- male/female? How many graduate students -- male/female? Is there a family leave policy for graduate students? If so, describe. Is there family health insurance available for graduate students? Is it included in the stipend? In a paragraph, please describe why someone applying to graduate school who is interested in a female-friendly department should choose your institution.*
6. *Turkey.*
7. *"2007 Graduate Programs in Physics, Astronomy and Related Fields," American Institute of Physics, Melville, NY 2006.*
8. *The main three factors include a welcoming attitude by both male and female faculty to women in senior positions of leadership, an existing critical mass of highly successful female faculty, and an understanding policy regarding maternity and paternity*
9. *E. Mielczarek, letter to the editor, Science 27, October 2006 314: 592.*
10. *This claim can be verified based on the large number of schools that either require or strongly recommend that graduate applicants take the physics GRE in the 2007 A.I.P Directory of graduate programs. An informal sampling of 10 department chairs indicates that in all but one case, "some" or "major" weight is given to the GRE score in admissions decisions – this despite the fact that a majority of the chairs polled were aware of the research claiming that the GRE score is not a good predictor of later success in graduate school or in research. The chairs were evenly split on whether the score is useful for all applicants or only those who seem marginal or come from schools with an unknown reputation*
11. *APS News, The American Physical Society, July 1996.*
12. *A quick informal survey of the web sites of a number of physics departments shows that many do require or strongly recommend the physics GRE exam for applicants. However, they also usually say that there is no minimum score required on the GRE, and that top grades and strong recommendations outweigh GRE scores. In a thoughtful essay, Howard Georgi, former chair of the Harvard University Physics Department, offers a number of reasons why this may be the case in the newsletter: "STATUS, A Report on Women in Astronomy," January 2000. Moreover, as reported in ref 6, a study of Harvard graduate students in physics found that "while there was a slight correlation between GRE scores and graduate course grades, there was no correlation with other measures of success in graduate school, including oral exam scores, and overall completion time for the Ph.D. degree." Georgi further notes that the GRE was most useful in judging applicants from small colleges where the University had little or no experience with previous students.*
13. *It may not be because it depends largely on four schools having acceptance rates greater than 60%, and it might depend on confounding variables, such as the percentage of foreign applicants.*

Are you looking for a graduate school that is "female friendly"?

Check out the results of an informal survey and read what departments say about themselves at:

www.aps.org/programs/women/female-friendly/index.cfm

Gender Equity, continued from page 2

A series of panel discussions began with "Challenges to Institutions: Recruitment and Hiring, Retention and Promotion." Participants on the panel included Ana Mari Cauce, Moderator, University of Washington, Patricia Falcone, Sandia National Laboratories, Myron Campbell, University of Michigan, Millie Dresselhaus, MIT, and Mary Ann Mason, University of California at Berkeley.

Myron Campbell opened the discussion by listing a number of lessons learned in successfully recruiting women candidates. Search committee members should be given specific training in reading letters of recommendation so that unintentional gender bias in the letters can be discounted. Character and/or field assassination can crop up in discussion of candidates: male traits are viewed positively while female traits are seen as detracting from the value of the applicant. He recommended following up on rejected offers by finding out the reasons for the rejection and finding lessons to be learned.

Patricia Falcone touted the successful and productive careers enjoyed women physicists in the national labs. Mildred Dresselhaus spoke of her long career, beginning with her PhD in 1958, and the growth in the number of women in physics over her lifetime. She suggested that job descriptions be as broadly-worded as possible to widen the pool of applicants. For retention and promotion of successful candidates, she recommended mentoring and networking, establishing and communicating effective policies and establishing best practices for personal support.

Recommendations generated from the morning session were the subject of a panel moderated by Karan Watson of Texas A&M. Patricia Rankin of the University of Colorado outlined lessons learned from the NSF-funded LEAP program (Leadership Education for Advancement and Promotion.) Action must come both from the top down and from the bottom up. Workshops for women to improve their negotiating, networking and communication skills are crucial, but so is commitment to institutional improvement by senior management. Sue Rosser of Georgia Institute of Technology described the NSF ADVANCE program, dedicated to increasing the participation and Advancement of Women in Academic Science and Engineering Careers.

Laurie McNeil, physics department chair at the University of North Carolina, discussed the implications of marriage on recruitment of women faculty. She suggested some creative techniques for dealing with employment for the trailing spouse, such as pooling jobs with other area colleges and universities. Natalie Roe of Lawrence Berkeley Laboratory presented lessons learned from the perspective of the national labs: using broadly-scoped job descriptions in recruitment is important, as is having formal mentoring programs for junior employees and transparency surrounding the promotion process.

Session 5: Training the Next Generation

Chaired by Meg Urry of Yale University, this panel identified elements which promote a healthy climate for women students at all levels of their studies. Barbara Whitten of Colorado College has done extensive research on climate issues in physics departments. She stressed the need to do better recruitment of undergraduate women physics majors. She charged physics department chairs to pay particular attention to the quality of their introductory courses. Suggestions for improving the community spirit in the department included establishing study lounges for majors and hiring majors to tutor for the introductory courses.

Howard Georgi of Harvard University found a problem in his department when he began breaking down the results of student satisfaction surveys by gender: all of the very dissatisfied respondents were female while all of the very satisfied students were male. He began meeting with the female students, and believes that this is crucial to maintaining a good climate in the department

Meg Urry (recently named the first woman chair of the Yale Department of Physics),stepped in for Mark Kastner of MIT. The MIT physics department has a strong community among women students, with a dedicated lounge area and an alumni-funded social program. There is also mentoring of the undergraduate women by female graduate students. MIT has an 8 week maternity accommodation for women graduate students with pay, funded by an insurance pool so that it is not charged to the department.

Noting that historically black colleges and universities have a high success rate for graduating women physics students, Keiven Stassun of Vanderbilt University presented details of the BRIDGE program which he established. This is a joint program with Fiske University that allows masters students in physics and astronomy at Fiske to move into the doctoral program at Vanderbilt. Of the 18 students currently enrolled in the program, half are women.

Session 6: Challenges and Opportunities at Funding Agencies

Patricia Dehmer, Associate Director of Science for Basic Energy Sciences and Acting Deputy for Programs, DOE Office of Science, discussed why funding agencies want to solve the problem of under-representation of women and minorities in physics. Apart from the government commitment to anti-discrimination, there is concern about the projected shortfall of technical workers at a time when key science and technology research must be ramped up.

Judith Sunley, Executive Officer, NSF Directorate for Mathematics and Physical Sciences demonstrated the commitment of NSF to addressing this problem through such programs as the ADVANCE grants, Research Opportunities for Women, Visiting Professorships for Women, et al.

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Blewett Scholarship Awarded to Archana Dubey

By Katherine McAlpine, APS Science Writing Intern

India to Albany, Albany to Austin, Austin to Orlando! While the life of Archana Dubey has taken her across the world and around the US, the frequent changes in scenery have impeded her academic career. Her current institution, the University of Central Florida, has offered as much support as possible for her research endeavors, but she wants to do more. The Hildred M. Blewett Scholarship, recently awarded to her through APS, will help her cut a wider path through the thickets of theoretical physics.

The scholarship, a grant of up to $45,000, was created from money left to APS by Hildred M. Blewett with the purpose of advancing the research careers of women in physics. Specifically, it is intended to jumpstart the work of women whose research has been interrupted for reasons concerned with family.

While all of the candidates clearly had excellent research credentials and plans, Dubey stood out in her perseverance through three career interruptions, the baby, and two moves for her husband's job changes, said Peter Sheldon, a member of the committee that selected Dubey for the Blewett Scholarship. She had great support from the institution where she is trying to get some research going, and it seemed clear that the scholarship would help her to establish herself there. Born in Rajasthan, India, Dubey completed most of her doctoral work at Bhavnagar University. Towards the end, she married and moved to Albany, NY. "While I was able to finish my PhD work remotely, continuation of further work became cumbersome if not impossible," she said.

In Albany, she first met Tara Prasad Das, who introduced her to theoretical investigations of electronic structures. She landed a post-doctoral position at Rensselaer Polytechnic Institute in Troy, NY; however, she put her research on hold to focus on her first child. In the meantime, she and her husband moved to Austin, Texas. Here, she made new contacts by taking classes and collaborating with professors. She again engaged in research activities with Texas State University during her fifteen-month stay in Austin.

Dubey has now lived in Orlando for six years. She worked in various capacities for the Department of Physics of the University of Central Florida, leading to a lectureship. Talat Rahman, chair of the physics department at the University of Central Florida, became a mentor to her.

Dubey has focused her research activities on theoretical physics over the last two and half years. This discipline gives her the freedom to do research at any time from any location, and she possesses the diligence to put this freedom to good use. She expects to enhance her research repertoire with projects funded through the Blewett Scholarship. Her interest lies in understanding the atomic and electronic structures of hemoglobin molecules. Found in red blood cells, hemoglobin binds oxygen and carries it to other cells through the circulatory system. Her work may have medical value in the future. This very basic understanding of these essential elements of life has the potential to be the basis of future developments of diagnostic techniques as well as cure diseases related to blood, Dubey explained.

Current theory says that the electrons in oxyhemoglobin should be in a singlet state with their spins anti-aligned. However, experiments involving bulk amounts of oxyhemoglobin demonstrate a response to magnetic fields which would not occur if the electron spins cancelled. Dubey believes the first excited state of oxyhemoglobin is a spin-aligned triplet state. She also believes that relatively little energy is required for an electron to be promoted to the first excited state. This way, statistical fluctuations in energy among oxyhemoglobin molecules at room temperature would allow for some of them to have electrons in the triplet state, accounting for the observed response to magnetic fields.

She will investigate this hypothesis through first principles calculation of the energy of ground and first excited states. She will test the ground state calculations against experimental data taken through Mössbauer spectroscopy to confirm that her methods are sound. Then, she will calculate the energy required to promote an electron from the ground to first excited state. Through Boltzmann statistics, she will determine if this energy is small enough to produce significant amounts of triplet-state oxyhemoglobin at room temperature. Finally, she will examine the features of the triplet state through muon spin resonance, comparing with experimental research.

In the course of this work, she looks forward to hiring a graduate student, attending national and international conferences, and making new contacts in the interdisciplinary field of theoretical biophysics. It will be her first time hiring graduate students, and her standards reflect those that she set for herself. "I would like a student to have determination, drive, integrity, and desire," Dubey articulated. "I believe if there is passion for something, it happens without effort."

Receiving the award with a sense of accomplishment, Dubey is also very grateful to those who helped her along the way. "I want to take this opportunity to thank APS for providing me the opportunity to establish my credentials, Professor Das and Professor Rahman's unconditional support and mentorship for my growth, and my daughter, Shikha, who usually gets the short end of every deal for being my best partner and counselor in the times of need," she said.

By aiding in the advancement of her career at such a critical time, the Blewett scholarship will help Dubey fulfill her dream of conducting physics research for years to come.

This article appeared also in the August 2007 issue of the APS News. Information on the Blewett Scholarship and how to apply can be found at www.aps.org/programs/women/scholarships/blewett/index.cfm

Archana Dubey

M. Hildred Blewett Scholarship for Women Physicists

This scholarship has been established to enable women to return to physics research careers after having had to interrupt those careers for family reasons. The scholarship consists of an award of up to $45,000. The applicant must currently be a legal resident or resident alien of the US or Canada. She must currently be in Canada or the US and must have an affiliation with a research-active educational institution or national lab. She must have completed work toward a PhD.

Applications are due by June 2, 2008. Selection will be made by a sub-committee of the APS Committee on the Status of Women in Physics. Announcement of the award is expected to be made by July 1, 2008.

Details and on-line application can be found at www.aps.org/programs/women/index.cfm (click on Scholarships). Contact Sue Otwell at APS, blewett@aps.org.

2008 Katherine Weimer Award

By Catherine Fiore, MIT

The Katherine Weimer Award is presented once every three years to a woman plasma scientist of outstanding achievement for work done during the first ten years following receipt of her doctoral degree. This award honors the life and work of Dr. Katherine Weimer. She was a pioneering, research physicist at the Princeton Plasma Physics Laboratory (PPPL) at Princeton University. She made many important contributions to research advancements in magnetohydrodynamic equilibrium and stability theory for magnetically confined plasmas.

Previous award winners include Professor Yu Lin of Auburn University (2002) and Dr. Elena Belova of PPPL (2005).

Call for Nominations for the third Katherine Weimer Award

The nomination deadline is Tuesday, April 1, 2008.

In 2002, the Division of Plasma Physics announced the establishment of a new award, the Katherine E. Weimer Award. Its purpose is to recognize and encourage outstanding achievement in plasma science research by a woman physicist in the early years of her career. The award consists of $2,000 and funds for travel to the annual meeting where the award is to be presented, as well as a certificate citing the contributions made by the recipient. The recipient will be invited to give a talk at the Division's annual meeting. The award is presented every three years.

The award is named after Dr. Katherine Weimer (1919-2000), a pioneering woman physicist at the Princeton Plasma Physics Laboratory. Dr. Weimer made many important contributions to understanding magnetohydrodynamic equilibrium and stability theory for magnetically confined plasmas.

The award is open to any female plasma scientist. The nominee's Ph.D. must have been received within the ten-year period prior to the nomination deadline, April 1, 2008. Nominations are active for one selection cycle (three years). The nomination guidelines are similar to the standard APS guidelines.

Anyone (not a member of the committee making the selection) may submit one nomination or seconding letter for each award.

A nomination should include:

- A letter of not more than 1,000 words evaluating the nominee's qualifications in the light of the particular features listed above of the award and identifying the specific work to be recognized. THERE IS NO NOMINATION FORM for this award, so this letter is considered the nomination application.
- Up to 30 word award citation.
- A brief biographical sketch (optional).
- A list of the five most important publications.
- At least two, but no more than four, seconding letters and up to five url addresses of posted papers.
- Five copies of the complete nomination package should be mailed to Catherine Fiore (see address below) chair of the selection committee. The name of each prize selection committee chair is available on the DPP website [http://apsdpp.org/appoint_committees.html].
- A nomination is reviewed for one cycle.

Nominations for the 2008 award should be sent to the chair:

Dr. Catherine Fiore, Chair
Massachusetts Institute of Technology
NW21-203
77 Massachusetts Avenue
Cambridge, MA 02139
Fax: 617-252-1808

Committee members:

Catherine Fiore, Chair, MIT, fiore@psfc.mit.edu

Joel Fajans, Past-Chair, U.C. Berkeley, joel@physics.berkeley.edu

Elena Belova, 2005 Winner, PPPL, ebelova@pppl.gov

TBA

TBA

There is no provision for online submission; however, electronic submissions may be emailed to fiore@psfc.mit.edu.

Have you moved? Changed jobs? Changed fields?

Take a moment to update your name/address/qualifications on the Roster of Women in Physics.

This database also serves as the Gazette mailing list. See pages 13–14.

ASK THE PHYSICS MENTOR

"Help! I have an important interview very soon with Big Employer for my dream job – and I just discovered that I am pregnant! I haven't told anyone yet and I am wondering what and when I should tell a future employer. Do I announce this at the first interview (I won't be visibly pregnant then)? Wait until they make me an offer and then tell them? I want to do the right thing, but I certainly don't want to negatively affect my chances of getting this job."

Answer: This is an interesting question. In fact, it was raised at the recent Gender Equity Conference during the discussion on the impact of small children on one's career. The speaker who was asked this question responded immediately that the pregnancy should not be mentioned until an offer has been tendered. Many physics department chairs countered that they would want to know much earlier in the process.

As we know, prospective employers cannot ask about your marital or parental status in the course of the interview nor use that information in employment decisions. However, human nature is such that some employers may have difficulty with their internal vision of what a physicist is, and expectant mothers rarely fit that vision. Thus, it is very tempting not to mention the pregnancy initially. If the interviewing process will be done in several stages, you do not have to bring it up in the first round.

That said, ask yourself if you really want to work somewhere that is family unfriendly. If an employer will make your life miserable as you are trying to meet the needs of your children, then perhaps it's not the right job for you. You can use the pregnancy as a starting point for discussion on family policies and accommodations that the employer offers. You will want to know about these things anyway as you decide whether or not to accept the job.

One thing that you should do is to have a well laid out plan for how you are going to manage the pregnancy, maternity leave, and subsequent child care. If you bring up the pregnancy during the interview, inform the interviewer of your plan and explore with him or her how you will be able to meet the needs of the employer.

Keep in mind that the option of hiding the pregnancy during an interview will only be available for a short time. If you don't get a job offer right away, you will have to deal with these issues up front with prospective employers. In the long run, a good employer will appreciate your honesty.

Do you have a question for the Physics Mentor? Send it to women@aps.org. A member of the Committee on the Status of Women in Physics will offer suggestions in the next issue of the Gazette. *No name or other identifying feature will be attached to your question.*

Childcare Grants for Parents to Attend APS Meetings

Sherry Yennello, Texas A&M University, past CSWP chair

Attending APS meetings is critical to career advancement, in terms of getting one's work recognized, learning about the work of others, networking, and participating in professional service. When a physicist is the primary caregiver, childcare responsibilities present an additional hurdle to attending APS meetings.

In order to assist parents to fully participate in professional meetings, the APS is initiating a childcare grant program for the March and April APS meetings. Any parent wishing to take advantage of such assistance must submit a childcare application form, which will be available on the meeting website. The amount of support requested must be justified up to the maximum available of $200 per parent. The meeting website will also provide an informal bulletin board for those interested in sharing childcare. The conference hotel will be asked to provide a list of childcare providers in the area, which could be accessed by meeting attendees. The APS will not vet or endorse any specific provider and will assume no liability.

There will also be a small unsupervised play area in the convention center for parents/caregivers and children to relax (bring your own toys!).

All applications received by the 15 January deadline will be reviewed by a subcommittee of the CSWP. In the event that the number of requests for grants exceeds the funding available, preference will be given to applicants in the early stages of their careers.

Correction: Women Fellows of the APS

Fiftteen (not thirteen) women were named to fellowship in the APS in 2006. Our apologies to Sultant Nahar of the Ohio State University and Ina Sarcevic of the University of Arizona whose names were inadvertently omitted from the list in the last Gazette. We regret the error and are happy to print their names and citations below:

Sultana Nurun Nahar
For seminal contributions to studies of photoionization and recombination of multicharged atomic systems fundamental to atomic physics and plasma physics and pioneering calculations of remarkable complexity on astrophysically significant processes. Atomic, Molecular, & Optical Physics (DAMOP)

Ina Sarcevic
For outstanding contributions to physics of ultrahigh-energy neutrinos and cosmic rays. Particles and Fields (DPF).

Gender Equity, continued from page 6

Judy Franz, APS Executive Officer, led off a second panel discussion by noting that over her 40 year career, the percentage of women in physics has increased on average by 0.4% per year. If that rate of rise continues, it will take until 2027 for women to achieve the level of 27% of physicists. APS established the CSWP in 1972 in order to address this problem. She described several programs sponsored by CSWP such as departmental site visits. She asked the attendees to go back to their home institutions and to make change happen.

Joining her on the panel were: Alice Hogan, Program Officer, NSF Social, Behavioral, and Economic Sciences Directorate, outlined challenges to the physics community; Sharon Wyatt, Attorney-Advisor, DOE Office of Civil Rights & Diversity described Title IX enforcement requirements and audits for recipients of federal funds; and Patricia Hyer, Office of the Provost, Virginia Tech, presented a list of family friendly policies employed at her university and suggested ways that the attendees could promote institutional changes.

The final panel discussion, *Issues and Findings Relevant to Funding Agencies* was moderated by Arthur Bienenstock. Eric Rohlfing, Director, DOE Chemical Sciences, Geosciences, and Biosciences, said that he was leading an effort to hire more women program managers. Joseph Dehmer, Director, NSF Division of Physics, reiterated the national need for a more diverse physics community, and outlined several areas where grant policies could be made more family friendly. W. Lance Haworth, Acting Division Director, NSF Division of Materials Research, discussed changes in how diversity data were being solicited and used by NSF. G. Wayne Van Citters, Director, NSF Division of Astronomical Sciences, looked for ways to improve the grant application process especially by eliminating gender and racial bias from the process. He recommended involving graduate students in writing grant applications and bringing post-docs to grant reviews.

In closing, Sherry Yennello presented a summary of recommendations generated during the meeting. This was followed by a request from the meeting chairs that the attendees select two of the recommendations, take them home, and to begin implementing them in their home departments. The committee's report will be available in the fall and will be posted on the website.

The American Physical Society 2007-2008 Travel Grants for Women Speakers Program

Limited funding is available for the 2007–2008 academic year! Apply online at www.aps.org/programs/women/speakers/travel-grants.cfm

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 2007–2008 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 at www.aps.org/programs/women/speakers/enroll.cfm. 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 (www.aps.org/programs/women/speakers/travel-grants-app.cfm) 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.

See following page for application form.

Women Speakers List

Need a speaker? Consider consulting the American Physical Society Women Speakers List (WSL), an online list of over 300 women physicists who are willing to give colloquium or seminar talks to various audiences. This list serves as a wonderful resource for colleges, universities, and general audiences. It has been especially useful for Colloquium chairs and for those taking advantage of the Travel Grant Program for Women Speakers. To make the WSL easy to use, we have made the online version searchable by state, field of physics, or speakers' last names.

If you'd like to search the list to find a woman speaker, go to: www.aps.org/programs/women/speakers/index.cfm.

Women physicists who would like to be listed on the Women Speakers List or those who would like to modify their existing entries can do so at: www.aps.org/programs/women/speakers/enroll.cfm or see page 15.

APS has a companion program for minority speakers. Information on the Minority Speakers List and the Travel Grant Program for Minority Speakers can be found at: www.aps.org/programs/minorities/speakers/index.cfm.

2007-2008 Travel Grants For Women Speakers

♦ Application Form ♦

This form is also available on the Internet at www.aps.org/programs/women/speakers/travel-grants-app.cfm

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: _____

DEPARTMENT: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

APPLICATION PREPARED BY (Required):

NAME: _____ **TITLE:** _____

PHONE: _____ **FAX:** _____

EMAIL: _____

Please list information on the speakers below and indicate if speakers' dates or talk titles are tentative.

DATE OF COLLOQUIUM: _____

SPEAKER'S NAME: _____

HOME INSTITUTION: _____

HOME DEPARTMENT: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

PHONE: _____ **FAX:** _____

EMAIL: _____

TITLE OF TALK: _____

DATE OF COLLOQUIUM: _____

SPEAKER'S NAME: _____

HOME INSTITUTION: _____

HOME DEPARTMENT: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

PHONE: _____ **FAX:** _____

EMAIL: _____

TITLE OF TALK: _____

Please return this form to:

Pahola Elder, Travel Grants for Women Speakers Program
The American Physical Society
One Physics Ellipse
College Park, MD 20740-3844
Tel: (301)209-3232 • Fax: (301)209-0865 • Email: travelgrant@aps.org

Roster of Women and Minorities in Physics Enrollment Form

The Roster is the basis for statistical reports on women and minority physicists; mailing lists corresponding to announcements, publications of the APS Committee on the Status of Women in Physics (CSWP); and confidential searches. The Roster 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 newsletter.

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:

The Roster of Women and Minorities in Physics ◆ American Physical Society ◆ One Physics Ellipse ◆ College Park, MD 20740-3844

Please indicate whether you are interested in receiving:

❒ **The *Gazette,* CSWP (women's) newsletter**

❒ **Employment Announcements *(women and/or minorities only)***

Is this a modification of an existing entry?

❒ **yes** ❒ **no** ❒ **not sure**

NAME: _____
(last) (first) (middle)

Previous last name (if applicable): _____ Date of Birth _____/_____/_____

GENDER:
❒ Female
❒ Male

Ethnic Identification

❒ Black
❒ Hispanic
❒ Native American
❒ Asian or Pacific Islander
❒ Caucasian (Non-Hispanic)
❒ Other (please specify) _____

Mailing Label Information (Foreign addresses: Use only the first three lines, abbreviating as necessary.)

In this section, please print information exactly as it is to appear on your mailing label. Where boxes are provided, print one character within each box, abbreviating where necessary.

NAME AND TITLE

ADDRESS Line 1:

ADDRESS Line 2:

ADDRESS Line 3:

CITY/STATE/ZIP

Daytime Phone #: – – Fax: – –

E-mail Address: _____

Educational Background

Degrees	Year Received (or expected)	Name of Institution
BA or BS	_____	_____
MA or MS	_____	_____
Ph.D.	_____	_____
Other _____	_____	_____

Thesis Title (Highest Degree) (Abbreviate to 56 characters total)

_____

PLEASE REMEMBER TO COMPLETE SIDE II OF THIS FORM

Current Employment Information (28 Characters per line)

Employer: _____

Department/Division: _____

Position/Title: _____

Professional Activity Information

CURRENT WORK STATUS (Check One)

1 ____ Faculty, Non-Tenured
2 ____ Faculty, Tenured
3 ____ Inactive/Unemployed
4 ____ Long-term/Permanent Employee
5 ____ Post Doc./Research Assoc.
6 ____ Retired
7 ____ Self-Employed
8 ____ Student Full Time
9 ____ Student Part Time
10 ___ Teaching/Precollege
11 ___ Other (please explain)

_____
_____

TYPE OF WORKPLACE FOR CURRENT OR LAST WORK

1 ____ College - 2 year
2 ____ College - 4 year
3 ____ Consultant
4 ____ Government
5 ____ Industry
6 ____ National Lab
7 ____ Non-Profit Institution
8 ____ Secondary School
9 ____ University
10 ___ NA
11 ___ Other (Please explain)

_____
_____

TYPE OF WORK ACTIVITY

Please check up to four of the activities in which you engage most frequently.

1 ____ Administration/Management
2 ____ Applied Research
3 ____ Basic Research
4 ____ Committees/Professional Org.
5 ____ Computer Programming
6 ____ Development and/or Design
7 ____ Engineering
8 ____ Manufacturing
9 ____ Proposal Preparation
10 ___ Teaching - Secondary School
11 ___ Teaching - Undergraduate
12 ___ Teaching - Graduate
13 ___ Technical
14 ___ Technical Sales
15 ___ Writing/Editing
16 ___ Other (please specify)

_____
_____

DEGREE TYPE (Highest)

1 ____ Theoretical
2 ____ Experimental
3 ____ Both
4 ____ Other (please explain)

_____
_____

FIELD OF PHYSICS

(check up to 4 in each column)

Current Interest	Highest Degree	
1 ____	1 ____	Accelerator Physics
2 ____	2 ____	Acoustics
3 ____	3 ____	Astronomy & Astrophysics
4 ____	4 ____	Atomic & Molecular Physics
5 ____	5 ____	Biophysics
6 ____	6 ____	Chemical Physics
7 ____	7 ____	Computational Physics
8 ____	8 ____	Computer Science
9 ____	9 ____	Condensed Matter Physics
10 ___	10 ___	Education
11 ___	11 ___	Electromagnetism
12 ___	12 ___	Electronics
13 ___	13 ___	Elementary Particles & Fields
14 ___	14 ___	General Physics
15 ___	15 ___	Geology
16 ___	16 ___	Geophysics
17 ___	17 ___	High Polymer Physics
18 ___	18 ___	Low Temperature Physics
19 ___	19 ___	Materials Science
20 ___	20 ___	Mathematical
21 ___	21 ___	Mechanics
22 ___	22 ___	Medical Physics
23 ___	23 ___	Non-Physics
24 ___	24 ___	Nuclear Physics
25 ___	25 ___	Optics
26 ___	26 ___	Physics of Fluids
27 ___	27 ___	Plasma Physics
28 ___	28 ___	Quantum Electronics
29 ___	29 ___	Solid State Physics
30 ___	30 ___	Space Physics
31 ___	31 ___	Superconductivity
32 ___	32 ___	Surface Science
33 ___	33 ___	Thermal Physics
99 ___	99 ___	Other (please specify)

_____

APS Membership Information

Are you an APS member?:

❒ No Check here if you wish to receive an application - ❒

❒ Yes Please provide your APS membership number, if available, from the top left of an APS mailing label:

___ ___ ___ — ___ ___ ___ ___ ___ ___

Office Use Only

Date of entry: _____

Roster #: _____

Initials: _____

Thank you for your participation. The information you have provided will be kept strictly confidential and will be made available only to CSWP and COM members and APS staff liaisons. Please return this form to the address on the reverse side.

Women Speakers List (WSL)
Enrollment/Modification Form 2007–2008

Additions/Modifications may also be made on the Internet at www.aps.org/programs/women/speakers/enroll.cfm
An online copy of the WSL is also available.

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

Women Speakers List • APS • One Physics Ellipse • College Park, MD 20740-3844 • (301) 209-3232

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.	❒ Add this title	❒ Delete this title	❒ Accelerators ❒ Astrophysics ❒ Atomic/Molecular ❒ Biological/Medical ❒ Chemical ❒ Computational ❒ Condensed Matter ❒ Diversity	❒ Education ❒ Fluid Dynamics ❒ General ❒ Geophysics/ Environmental/Energy ❒ History ❒ Interface/Device ❒ Materials	❒ Nuclear ❒ Optics/Optical ❒ Particle ❒ Physics & Society ❒ Plasma ❒ Polymer ❒ Statisical/Nonlinear ❒ Other
2.	❒ Add this title	❒ Delete this title	❒ Accelerators ❒ Astrophysics ❒ Atomic/Molecular ❒ Biological/Medical ❒ Chemical ❒ Computational ❒ Condensed Matter ❒ Diversity	❒ Education ❒ Fluid Dynamics ❒ General ❒ Geophysics/ Environmental/Energy ❒ History ❒ Interface/Device ❒ Materials	❒ Nuclear ❒ Optics/Optical ❒ Particle ❒ Physics & Society ❒ Plasma ❒ Polymer ❒ Statisical/Nonlinear ❒ Other
3.	❒ Add this title	❒ Delete this title	❒ Accelerators ❒ Astrophysics ❒ Atomic/Molecular ❒ Biological/Medical ❒ Chemical ❒ Computational ❒ Condensed Matter ❒ Diversity	❒ Education ❒ Fluid Dynamics ❒ General ❒ Geophysics/ Environmental/Energy ❒ History ❒ Interface/Device ❒ Materials	❒ Nuclear ❒ Optics/Optical ❒ Particle ❒ Physics & Society ❒ Plasma ❒ Polymer ❒ Statisical/Nonlinear ❒ Other
4.	❒ Add this title	❒ Delete this title	❒ Accelerators ❒ Astrophysics ❒ Atomic/Molecular ❒ Biological/Medical ❒ Chemical ❒ Computational ❒ Condensed Matter ❒ Diversity	❒ Education ❒ Fluid Dynamics ❒ General ❒ Geophysics/ Environmental/Energy ❒ History ❒ Interface/Device ❒ Materials	❒ Nuclear ❒ Optics/Optical ❒ Particle ❒ Physics & Society ❒ Plasma ❒ Polymer ❒ Statisical/Nonlinear ❒ Other

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