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CSWP Gazette

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

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Letter from the Editor:

A Peculiar But Pretty Good Career in Physics

Miriam Forman, State University of New York at Stony Brook

Miriam Forman

Women in physics today, as ever, manage their work in physics alongside the rest of their lives as individuals, often as part of a couple and as parents. Our men, now taking more responsibility for quality family life, face these issues, too. The CSWP Gazette tries to help us cope by sharing information and ideas. As I read the contributions to this issue, it struck me that although we can identify and try to ameliorate persistent common challenges (such as simple prejudice, mentoring deficiencies, employment location for a dual-career couple, and re-entry into physics if a lapse occurs) every woman has different experiences. Each of us has to be creative in forging a life of our own while doing physics, and there are many ways to do it. You might like to read how it worked out for me.

Other girls may long for diamonds and fur coats, but I just wanted to do physics, figuring out new stuff about cosmic rays and space plasmas. I enjoyed it and had an internal need to do so. I wanted to explain certain phenomena, or at the least, to be one of the first to know and understand their explanations. My first "career interruption" occurred shortly after I passed the Ph.D. prelims at the University of Chicago and was starting research in cosmic rays with one of the most eminent physicists in that field. John Simpson was making some of the first instruments for spacecraft, to make measurements outside the Earth's atmosphere and magnetic field. He set me to work on ground-based neutron data of the type that had been made

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Workshop on Survival Skills for Women Physicists Returns to the March Meeting

Dongqi Li, Argonne National Laboratory

Many people recognize that a successful career in physics, as in most other fields, requires more than hard work and good technical skills. How to best negotiate for resources and teaching load? How to strategically plan one's career? How to balance work and family? In March 2002, the Committee on the Status of Women in Physics hosted a very successful workshop on "Survival Skills for Successful Women Physicists" prior to the APS meeting in Indianapolis. By popular demand, a similar workshop will be offered on Sunday afternoon, March 21 at the 2004 March Meeting in Montreal. This workshop will be aimed at early- to mid-career women physicists who seek advice and training to improve their skills in navigating through the waters of today's research world to advance to the top. These include faculty members in universities, researchers in industry and government labs, and aspiring postdocs and graduate students.

The half-day workshop will feature a panel of highly successful women physicists and an interactive session led by an experienced training professional. It will cover both new subjects such as negotiation skills, and familiar topics, such as establishing a scientific identity, and balancing career and family. To ensure sufficient interaction, seats are limited. Both men and women are invited to participate. Following the workshop, CSWP, the Committee on Minorities (COM), and the Committee on Careers and Professional Development (CCPD) will host a joint reception.

You do not need to register for the March Meeting itself to attend this workshop, however pre-registration for the workshop is strongly recommended. Details on the program, cost, and how to register are available on the APS Meetings website at http://www.aps.org/meet MAR04/special. html or on the CSWP's website at http://www.aps.org/educ/cswp/skills/. For more information, contact Dongqi Li at Argonne National Laboratory (dongqi@anl.gov).

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A Peculiar But Pretty Good Career in Physics, continued

already for 20 years. I didn't even think of asking to work on the space stuff. Meanwhile, I fell in love with a nice young chemist post-doc who had given me crucial moral support through the Ph.D. prelims. We married, and moved to his home in South Africa for three years. I was also happy that his mother was a working scientist. In South Africa, I was employed on several enjoyable applied physics projects in an engineering research lab, which gave me access to computing facilities, and the best scientific library in the country. I also connected to a (then) small struggling cosmic-ray research group at a university about 150 miles away from where we worked. My happy connection with them lasts to this day, when they are very important players in cosmic ray science. My first publication appeared in print while I was in Africa, and two more papers I wrote there were published. Although I had thought at first that Africa was not a good career move, the experience of doing my own thing away from constant intense competition was good for me. I discovered that I really could do physics myself. I also had a wonderful time.

We wanted to live in the US, and returned three years later when my husband got a temporary job at Harvard. We figured that Cambridge would also be good for me. The first thing I did was to spend our own money to go to and give a paper at the International Cosmic Ray Conference, which was in Calgary, Canada that summer. All the great people in the field were there. Because I was there too, my Chicago professor steered me to a sort of post doc position at MIT, in the very congenial group which had built the first American plasma detector flown in space and was just starting to get the first steady stream of data on the (rather unsteady!) solar wind. Although I didn't register for a Ph.D. at MIT because we would be in Cambridge only a year, I was in the right place at the right time with the right background to develop certain very useful insights and techniques that are still used. The professors, post-docs and students in the space plasma group at MIT that year taught me by their example how to be a decent working physicist.

Next, my husband moved to Brookhaven National Laboratory, on Long Island. Again, this choice aligned with my needs, so I might finish my Ph.D. nearby at Stony Brook and maybe later find work in the Long Island area. Stony Brook let me (slowly) write a thesis based on work I had started at MIT and continued with several kind scientific colleagues elsewhere. By then I had two children, and where to get a job became a real problem, as my husband was happily settled at Brookhaven. This was a difficult time for me, as my contemporary colleagues in space science were all getting tenure track positions, and I did not want to move. Another colleague alerted me that NASA money for theory and data analysis was available then for projects I wanted to do. Stony Brook let me be a Principal Investigator (PI) and gave me a place in return for the overhead, although they had very little interest in my work. It was a blessing to work part-time close to home for years as my kids grew up. I never stopped physics, though; I was PI on small grants, wrote papers, attended all the important conferences in my field and kept up with a network of collaborator friends around the country and the world whom I visited. I served in section and division offices in the American Geophysical Union and the American Physical Society; colleagues nominated and elected me a Fellow of the APS. My mother, understanding my love of physics and how I would benefit, came with us to care for the kids for the year we worked in Germany. She says it was a very good experience for her too. I was fortunate to have healthy, good children who are natural achievers. I think all the family knew I would go nuts if I weren't busy doing the physics I loved.

The lack of local recognition and appreciation did get to me though. In 1985 I started a daily commute 2 hours each way to New York City to work in an executive position at the APS. I missed doing as much research as before, but I really enjoyed helping physicists in all areas around the country and around the world communicate and do their work. At APS I met for the first time many wonderful women physicists in fields outside my own. Then, when both my boys were in college, I accepted a call from another colleague and went to NASA headquarters in Washington, DC for six years to manage the grants programs that had supported me at Stony Brook. In Washington, I also worked with Beverly Hartline one year in the Office of Science and Technology Policy, then located next door to the West Wing in the Executive Office of the President.

Now I am again supported on my own grants at Stony Brook. I have had a very good life in physics. Both my children are married and doing well on their own. I am working on a new project with smart colleagues in England, Germany, Hungary and New Zealand who are half my age. Science and society have evolved, but it is still true that every career, especially that of a woman in physics, is defined by a series of chance events and outside forces, and the choices and compromises we must make. With the crucial help of colleagues and loved ones we may turn what looks like obstacles, into satisfying opportunity.

I hope you find this story entertaining and useful. The important points are:

1. Get a good fundamental education.
2. Marry the right person. It would be great if his mother is a scientist.
3. Try to never leave your field entirely- keep a hand in a few hours a week; read the literature on time and consistently; talk to or e-mail ideas with your colleagues; participate in the important meetings, even if you have to pay the way yourself. You should "stay alive" in your colleagues' minds, even if you can't write stupendous papers for a while.
4. Be creative in your employment. Don't berate yourself if you haven't got what you imagine is a "regular" job. Hardly anybody does.

As we go to press, Science magazine's online service for young scientists for January 2004 has a section on parenthood. These articles remind me of what I wrote! http://nextwave.sciencemag.org/cgi/content/full/2004/01/08/7

Best wishes!!

Editor's Note: It is a pleasure to thank Adrian Harris Forman for helping me find the balanced voice to write this story.

CSWP and FIAP Co-Sponsor Networking Breakfast at March Meeting

Sue Otwell, APS Staff

Francois Legoues

On Tuesday, March 23, CSWP and the Forum on Industrial and Applied Physics will co-sponsor the popular Networking Breakfast for Women in Physics from 7:00-9:00 am in the Queen Elizabeth Hotel in Montreal, Canada. Please join us for a full breakfast and an inspiring talk! The speaker will be Dr. Françoise LeGoues of IBM. She is currently Director of Innovation in the Applications Management Services business unit, where she built a team of senior IT architects to help grow the AMS business through technical leadership. Her role also includes bringing innovation to the organization and she has initiated and funded the AMS/Research institute, which funds research projects that have potential impact on the AMS business. She is an IBM Distinguished Engineer, and a member of the IBM Academy.

Her talk is titled "From studying defects in SiGe, to managing those who get rid of them in software: physics leads to anything!" ("Des défauts dans les matériaux électroniques au management de ceux qui les supriment dans le logiciel: la physique mène à tout!"). There will be time for questions and for networking with colleagues. Cost is $20 US. Pre-registration is not required but is strongly recommended (you need not be registered for the APS meeting to attend this event). There is no charge for physics students, thanks to the generosity of the Forum on Industrial and Applied Physics! Details can be found at http://www.aps.org/educ/cswp breakreg.html

Overview of Coming Events

Montreal, Canada
Sunday, March 21, 1:30-5:45pm
Workshop on Survival Skills for Women Physicists
Location: Queen Elizabeth Hotel
A workshop aimed at early to mid-career women physicists. Panel discussion followed by an interactive session with a professional trainer. Pre-registration is strongly encouraged. Cost: $40 US .
See http://www.aps.org/educ/cswp/index.html for details.

Tuesday, March 23, 2004 – 7:00 – 9:00am
CSWP/FIAP Networking Breakfast for Women in Physics
Location: Queen Elizabeth Hotel
Speaker: Françoise LeGoues, IBM Distinguished Engineer, Director, Innovation and Technology AMS Business Services, "From studying defects in SiGe, to managing those who get rid of them in software: physics leads to anything!" Pre-registration strongly recommended. Cost: $20 US. See http:/www.aps.org/educ/cswp/index.html for details.

Wednesday, March 24, 8:00-11:00am
Palais de Congres
Session N7. "History of Monolayers and Multilayers: Agnes Pockel and Katherine Blodgett". Co-sponsored with the Forum on the History of Physics.

Wednesday, March 24, 11:15a.m.
Palais de Congres
Session P7. "Physics Careers Outside the University."
Sponsored by the Forum on Graduate Student Affairs.

Wednesday, March 24, 2:30p.m.
Palais de Congres
Session P7. "Keeping Women/Girls in Science"
Co-sponsored with the Forum on Education, the Forum on Graduate Student Affairs, and the Institute of Physics (UK)
Followed by a reception, 5:30p.m.-7:00p.m.
(Palais de Congres)

Looking Ahead to the APS Meeting in Denver, Colorado, May 1-4, 2004
As we go to press, here are some events to watch for!

Saturday, May 1, 10:45 am
"Physics Careers Outside the University".
Joint Session co-sponsored with the Forum on Education and the Forum on Graduate Student Affairs.

Saturday, May 1, 1-2:30 pm
CSWP Networking Luncheon
Continue the discussion over lunch and network with colleagues! Pre-registration strongly encouraged. See http://www.aps.org/educ/cswp/index.html for details and cost as they become available.

Saturday May 1, 2:30 p.m.
"Keeping Women and Girls in Science"
Joint session co-sponsored with the Forum on Education.

Getting Back Into Research: Some Thoughts and Advice on Career Breaks in Physics

Elizabeth Freeland, School of the Art Institute of Chicago, Illinois.

There are many people who believe that taking time off or reducing work hours should not end a career.

Early in my college career, I knew I wanted to be a professor. But I left the mainstream physics career path as soon as I got my Ph.D. The reasons for my leaving are complex enough to be an article by themselves. Family was part of it and certainly family kept me from returning as soon as I had hoped. Three years after leaving school, I had moved twice, and luckily obtained a part-time position teaching physics at a professional college for artists. That was The Difficult Part. I was sure I would do well, and I have. I also knew that I needed to get back into research if I was going to have any chance at advancement.

Reentry into research has turned out to be The Really Difficult Part. Although I offer no complete solutions here, and haven't fully completed the process myself, it has been quite an experience. Through it, I have learned a lot about the process, made a number of observations, and discussed the issue with many people.

This article is a review of what I have learned about taking time off and re-entering a full-time physics career path. I want to provide current and tested information to others who are considering a career-break. Additionally, a list of resources on reentry is posted at http://home.earthlink.net/~papagena Career Breaks.html with suggestions for individuals and institutions interested in making this path a possibility. A link to my site is also provided from the CSWP website under "Networking, Careers, and Mentoring" at http://www.aps.org/educ/cswp/women-links.html

When I first began to look for a summer research opportunity I contacted the readers of CSWP's Women in Physics listserve, WIPHYS, for help. I did so again in the spring of 2003 asking for responses to a number of career-break issues. In addition I've asked for advice and ideas from just about every scientist I've met. I owe thanks to all of these people. I have spoken in person to several NSF program directors and emailed several others. I have had leads from graduate students, professors, research scientists, department chairs, and deans. I've spoken mainly with physicists but to check for related opportunities, I've also spoken with some computer scientists and engineers. While I will never be sure I have exhausted every possibility, I feel confident that I have searched thoroughly.

What I found

My original reason for gathering this information was to help myself re-enter the career path of a full-time physicist. After a several years of looking for information I have found:

•There are far more people out there willing to help than I expected. I've received a great amount of encouragement to return to physics full-time.

•There are far fewer resources and programs focused on re-entry out there than I expected.

•It has been done before.

•There is no template for returning to physics.

There are many people who believe that taking time off or reducing work hours should not end a career. To those people I would say, "Help formulate a process!" Integrate practices and options within the career track and within grant requirements, that promote a coherent and reasonable career path that could include time off. Educate yourself about what is available so you can inform and advise students and younger scientists. Help them balance their families with careers. Lobby for change within your own institution.

Consider that while many people consider a career break because of a spouse's career or to care for young children, others may want time off to care for family members, do military service, or do volunteer work such as the Peace Corps. Should these people also be penalized by time limits, grant restrictions, and 'history'? I'm not suggesting that scientists with career breaks be given extra consideration. I am suggesting that, given a reasonable explanation for their time off, they should be given consideration equal to their scientific experience.

Think about it: a four-year break in a career that could span over forty years would be less than 10% of the total. Should 90% of a person's working life be lost because they needed a few years off? For more information on the effects of career breaks on women, see the article "How Babies Alter Careers for Academics" (*The Chronicle of Higher Education,* December 5, 2003).

Advice for physicists considering a career break

Think hard before taking time off! If you decide to take a career break, consider the following suggestions:

•Plan your break, so that upon your return to full-time science, you are eligible for the few programs available. For U.S. citizens there are basically three fellowships which have accommodations for career breaks: NSF's ADVANCE fellowship, the American Association of University Women's American Fellowships, and the Sloan Research Fellowship. While you may be eligible for other grants or positions, your time off will most likely be a liability

•Strongly consider doing a post-doc if you have not already done so. There are two reasons for this. First, the NSF's ADVANCE fellowships currently require that you have previously been employed as a scientist and graduate school does not count. Second, it will be easier to develop a research idea for grant applications if you've done a post-doc lately. On the other hand, many programs will not consider you if you received your PhD more that five (5) years ago. I suggest doing the post-doc first because it gives

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Some Thoughts and Advice on Career Breaks in Physics, continued

you a stronger research background, and research is the coin of the realm.

•Stay in contact with colleagues and the physics community as much as possible. Keep subscriptions and memberships current. Attend seminars at local universities or research facilities if possible. You may even be able to give a seminar on your own past research.

•If you are taking time off to care for children, save money for daycare later. You may want to attend a conference, or seminar at a local university. You might volunteer in a lab, be a guest lecturer, or give a seminar. Many people believe that you should be paid for such work, but don't count on it. It is your investment in yourself and your future. You may want to teach a class part-time or just have a day or afternoon off each week to keep current on the literature in your field. Eventually, you will need time to hunt for a job or apply for a grant; again, you'll need daycare.

•Be aware that part-time employment will not qualify you for any summer research grants at any of the institutions I've come across. High school teachers will have an easier time getting such a position – no joke. Part-time employment may bring useful experience and contacts, though.

Thoughts and Suggestions on Improving the Career Track

I have to ask myself how many scientists would like to take time off or temporarily work a reduced schedule, but don't because they see no way back. How many, like myself, risk their career, plunging ahead with what they want or need thinking "surely there is a reasonable way back". Only later do they find that for all the goodwill of other working physicists, there is very little in the way of practical, usable advice. The information available about how to return from a career break is chaotic at best.

The disorganization makes it very hard to efficiently plan time off. With a few good re-entry programs and education about them, people could pause their careers and then return quickly without wasting time due to lack of information and guidance.

Recently I received a thirty-two-page publication from Britain's Institute of Physics entitled *Career Break Brief for Physicists.* I wonder if a similar document could be created for U.S. physicists. Since women seem to be most affected by career break issues, would better and more easily obtainable information help keep women from dropping out of physics?

Another barrier to career breaks is a common grant restriction that the Ph.D. have been obtained "within five years". This language could be changed to accommodate scientists with career breaks. I particularly like the wording used by the Sloan Foundation and quote it here:

"(The applicant) may be no more than six years from completion of the most recent Ph.D. or equivalent as of the year of their nomination, unless special circumstances such as military service, a change of field, or child rearing are involved or unless they have held a faculty appointment for less than two years. The letter of nomination should clearly explain such special circumstances."

Finally, it is possible to make the full-time career path more flexible so that people would not feel the need to leave it in the first place. Most of these ideas concern making life with children more manageable and most readers of the Gazette are probably familiar with them.

To my knowledge, there is no physics career path that includes extended time off for any reason. People do take time off and return, but each in their own way. An effort to bring some order to this state of affairs would allow young physicists to make informed career decisions, and allow promising scientist who many need a few years off, a legitimate and efficient career path.

Elizabeth Freeland received her PhD in physics in 1996. Recently, she has been raising two small children while teaching physics at the School of the Art Institute of Chicago.

Suggested Resources on Re-entry

Information about other grants suitable for persons with career breaks can be sent to Elizabeth Freeland at papagena@earthlink.net. A link to this information is also posted on the CSWP website at http://www.aps.org/educ/cswp/women-links.html under "Networking, Careers, and Mentoring".

The Chronicle of Higher Education

http://chronicle.com/

Archived articles concerning all aspects of academe, including women and families and such topics as reduced schedules, and staying vs. leaving. Articles can be accessed and searched online with a subscription. Six month and month-to-month subscriptions are available.

Forward to Professorship in Science, Engineering, and Mathematics

http://student.seas.gwu.edu/~forward/advance/

An NSF funded workshop sponsored by the George Washington & Gallaudet Universities**.** Intended for women and minorities who may be considering, or are currently in, a tenure track position in science, engineering or mathematics.

American Association of University Women: American Fellowships

http://www.aauw.org/fga/fellowships_grants/american.cfm

Three fellowships open to scientist and non-scientist: one for postdoctoral research, one for dissertation writing, and

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Career Re-entry Grants and Information, continued

one that is short-term for research publication. Time off and part-time work are generally not a problem.

NSF ADVANCE Program
http://nsf.gov/home/crssprgm/advance/
Three types of awards in this program are targeted to women. The Fellows Award is targeted towards individuals who have had disruptions to their careers. There are conditions of eligibility, such as previous employment, which exclude certain circumstances. NOTE: NSF advises that some changes may be made for the year 2004.

Alfred P. Sloan Foundation:
Sloan Research Fellowships
http://www.sloan.org/programs/scitech_fellowships.shtml
Applicants with career breaks due to special circumstances such as military service, a change of field, or child rearing will be considered.

The Daphne Jackson Trust
http://www.daphnejackson.org//
Funding only for residents of the U.K. but anyone interested in re-entry or re-training grants should look over this website.

Letters to the Editor

Editor's note: In response to the article on "Induction vs. Deduction" (*Gazette*, Fall 2003), we received several letters which present additional information on this topic and which we would like to share with our readers. To clarify an apparent numerical discrepancy, the editor notes that the "over 10:1 at math SAT levels exceeding 700" in the Fall 2003 article referred to an educational testing experiment by Benbow and colleagues in which 49,747 *12-year olds* took it in the early 80's. 700 was the 99.4th percentile of all students in that study. Ruskai refers to 1,406,324 college-bound seniors in 2003, for whom 700 was the 93.4th percentile. In the Benbow study, the ratio of boys to girls at this percentile was about 3. (See Behavioral and Brain Sciences, June 1988, 169-232) There are many articles on this study in the education and psychology literature, from which readers may make their own conclusions.

Response to "Induction vs. Deduction"
In an article in the Fall, 2003 CSWP Gazette, Dr. Peter Foukal asserts there that is a "startling over-representation of males over females, at the highest levels of math aptitude. Although the mean SAT values show no significant gender difference, males outnumber females by over 10:1 at math SAT levels exceeding 700." A check of the College Board web site gives these figures for 2003 for the Math part of the SAT Reasoning Test.

Score	Male	Female
750-800	21,033	9,407
700-750	30,341	23,431

For the full 700-800 range this gives a net ratio of 51:33 which is less than 2:1. To take into account the fact that more women take the SAT, I computed the % of each that scored in the 700-800 range. This gave 7.9% vs 4.4%; still less than 2:1, and a far cry from 10:1.

In 1990, Robert Romer, then editor of the American Journal of Physics asked me to respond to a letter which stated, "It is not disputed that males outperformed females on tests of mathematical ability." A thorough search of the literature showed that, contrary to what was widely believed and reported, differences were small to non-existent. My findings were reported in Amer. J. Phys. 59 (1) January, 1991 pp. 11-14. Subsequently, the AAPT included the article in a CD-ROM of resource material for physics teachers. I find it extremely discouraging that, almost 15 years later, unreliable assertions about male math superiority continue to be reported, and often accepted as true, even in places that ought to have higher standards for accuracy.

Dr. Foukal follows his statement above with the further assertion that, "Individuals headed for physics graduate schools tend to come from this cohort of high achievers in math." What evidence does he have for this?? In recent years women have earned about 30% of the PhD degrees granted in MATHEMATICS in the US. Indeed, data compiled by the American Mathematical Society shows that since the mid-1970's women received over 20% of the PhD's in mathematics each year. If a 10:1 over-representation of males on some math test were correlated with talent for analytical reasoning, one would expect to see it more strongly reflected in the proportion of women among mathematicians than among physicists. But this is not the case.

Of course, physics requires skills in addition to analytic and deductive reasoning. In particular, Dr. Foukal can serve as an example of someone with a successful physics career despite evidence for a deficiency in his analytic reasoning.

Mary Beth Ruskai
Emeritus Professor of Mathematics, Univ. of Mass Lowell
Research Professor, Dept. of Mathematics, Tufts University

Note: A pdf version of Dr. Ruskai's article can be read on the CSWP's website at http://www.aps.org/educ/cswp women-links.html, Studies and Reports.

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Letters to the Editor, continued

Participation of Women in Physics

The Fall 2003 issue presents a number of significant points regarding the participation of women in the profession of physics, including the nature of the obstacles they continue to encounter. I am moved to raise several related issues.

First among them is the eclipse of history. It is heartening to read of the efforts of the AIP Center for History of Physics (Gazette pp. 6-7) to promote awareness of the achievements of women in physics and astronomy, but the fact remains that these achievements are iteratively subsumed and the achievers forgotten. A number of comprehensive books on women in physics and related sciences (partial bibliography below) have been published in recent decades, but they languish in libraries. Their content doesn't make it into the sidebars of physics textbooks for students to absorb and grow on, and ultimately take for granted.

At a recent regional meeting of physics teachers (Southern California Section, AAPT) a young woman described her program of data gathering on cosmic rays, during which she cited their discovery by Victor Hess. In the question period I commented that she needed also to include a summary of the work of Marietta Blau in her historical introduction. She reacted with surprise bordering on shock: "I never heard of her!" That, I then stated, is a prevailing problem: students never hear of the women during their formative years, if ever. Neither do the teachers. The sole and possibly grudging exception is Marie Curie. The resulting impressions of "can't do" and "never did" generate and reinforce bothwomen's convictions of impossibility and men's presumptions of superiority and entitlement — i.e. arrogance (p. 1 and pp. 3-4).

Second, I am disheartened by the fact that CSWP and other APS groups still – in the 21st century – have to sponsor "survival" workshops for women. It means that in each generation young women have to start from substantially the same "square one" as I did, about 65 years ago. Yes, there are many more women doing physics today. There are also billions more people on the planet. I'm not sure that the ratio has kept pace.

Third, is the numerical difference between women biologists and women physicists really explainable by the contrast between inductive and deductive reasoning (pp. 9-10)? Consider at least one of the societal pressures on girls, in which they are repeatedly told that they "owe" it to humanity to be nurturing, so that "life"science may be acceptable as a career choice but "hard" science is ipso facto a travesty of the "feminine role" (and better a nurse than a doctor). In light of that influence, to say naught of present-day "entertainment" influences on all adolescents, I find it specious to posit intrinsic differences in brain "wiring" as an explanation of this disparity.

Fourth, the question of math is treated too facilely (p. 9). Again, the societal pressures are ignored: girls are "not supposed" to be good at math, and they are punished in many nasty little ways if they insist on demonstrating mastery of it. Much of that punishment arises among their peers, an ugly kind of collective phenomenon. The discrepancy in performance is thus a coerced self-fulfilling prophecy. Where are the math teachers who should be telling girls that they can and must master math rather than be "forgiven" for not meeting such standards? I will be most interested in any follow-up discussion that the Gazette can accommodate.

Frieda A. Stahl
Emerita Professor of Physics, California State University, Los Angeles

A Short, Partial Bibliography

Louise Grinstein et al. (Eds.). *Women in Chemistry and Physics* (Greenwood Press, Westport, CT, 1993).

Caroline Herzenberg. *Women Scientists from Antiquity to the Present:* An Index (Locust Hill Press, Cornwall, CT, 1986).

Ruth H. Howes and Caroline Herzenberg. *Their Day in the Sun: Women of the Manhattan Project* (Temple University Press, Philadephia, 1999).

Sharon Bertsch McGrayne. *Nobel Prize Women in Science: Their Lives, Struggles, and Momentous Discoveries* (2nd ed., Birch Lane Press, New York, 1998).

Margaret Rossiter. *Women Scientists in America: Struggles and Strategies to 1940*;
————————: *Before Affirmative Action, 1940-1972* (The Johns Hopkins University Press, Baltimore, 1982, 1995).

Benjamin F. Shearer and Barbara F. Shearer (Eds.). *Notable Women in the Physical Sciences* (Greenwood Press, Westport. CT, 1997).

There also are recent biographies of individual women physicists. In addition, women physicists are included in standard reference works such as *American Men and Women of Science, Dictionary of Scientific Biography, and Notable Twentieth Century Scientists.* The website, Contributions of 20th Century Women to Physics, www.physics.ucla.edu/~cwp includes biographical entries on scores of major women physicists and bibliographic resources for further searching.

Editor's Note: The ratio of women in physics has improved a little. The good news is that we now are numerous enough to share survival experience with the women coming up, and that APS helps.

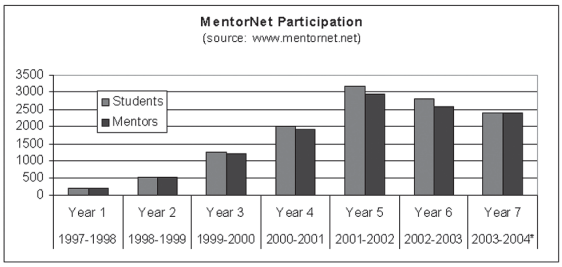
E-Mentoring Students in Physics—A Strategy for APS?

Laura A. Smoliar, Lightwave Electronics

Structured mentoring is a key to MentorNet's success.

Retaining physics students through undergraduate and graduate school programs is a continuing challenge, but well-structured E-mentoring may give APS a proactive, effective method for increasing retention of students while drawing professional physicists into society activities. E-mentoring enables students to talk with professionals, either in industry or academia, about current struggles and career concerns, and it allows them to get a perspective from outside their immediate environment. For professionals, it is an opportunity to change the next generation of physicists entering the workforce—perhaps impacting diversity or encouraging broader skill sets. A wonderfully successful nonprofit initiative called MentorNet (www.mentornet.net) provides a great example of a structured E-mentoring program that truly takes advantage of the Internet. It is based in the College of Engineering at San Jose State University in San Jose, California.

MentorNet, the E-Mentoring Network for Women in Engineering and Science, was created in 1997 to specifically address retention and success of women in engineering and science. Since its inception, the number of students and mentors has grown to well over 2000 each (see chart). Currently, about 1% of participants are in physics. Originally, the MentorNet staff matched students and mentors, but now the program uses protégé self-matching (new in 2003). The program also expanded in 2003 to include academic career E-mentoring in addition to the original industrial career e-mentoring.



Structured mentoring is a key to MentorNet's success. In addition to connecting mentors and protégés, MentorNet sends "Bits and Bytes" emails with discussion topics that assist mentors and protégés in raising issues of interest. When the pairing is first set up, the MentorNet staff keep in close contact to make sure a healthy pattern of communication is established.

In the past, a number of professional societies had affiliations with MentorNet that enabled their student members to participate as protégés. However, access for students in now entirely through college or university membership. Professional societies can, however, work in partnership with MentorNet to hook up mentors and protégés from within the society. In addition, societies, such as APS, can encourage colleges and universities to become a participating campus (the cost is $1,000-$4,000 per year, depending on size). A current list of participating campuses can be found on the website at http://www.mentornet.net/Documents/Partners/Campuses/. Working in partnership with MentorNet would help make students aware of APS, would draw members of the society in as mentors, and through positive E-mentoring could help improve retention of physics students.

Sarah Bant, who completed her Ph.D. in the Laser Photonics Group at the University of Manchester, U.K. in 2003 was able to join MentorNet as an SPIE student member last year (SPIE is the International Society for Optical Engineering). "Emailing … helped me through a very difficult year with both my PhD to finish and important career decisions to make, and as a result I have finished my PhD in good time and have set off on a career that I absolutely love. The most important aspect for me initially was the opportunity to find out about the possible careers in industry, which I knew little about and knew no one that I could talk to, with all of my family and friends being in teaching or healthcare, and all my colleagues having been academics since graduation. Over time the regular contact with someone who was interested in my progress became far more important, and the ability to talk through my range of options and get some very useful advice on everything was a blessing." Although she never met her mentor in person, she did trade pictures, resumes, and many emails through the course of her final year of graduate school.

Sarah Bant, Ph.D., Laser Photonics Group, University of Manchester

CSWP recently heard a discussion of the benefits of a potential affiliation with MentorNet, which could be structured in a number of ways. Do you have an opinion on this? Are you interested in an APS E-mentoring program? If you are a student, would the availability of E-mentoring influence your decision to become an APS member? Please email responses to Lsmoliar@sbcglobal.net.

Laura Smoliar is currently an APS General Councillor. In the past, she was the Chair of FIAP, the Forum on Industrial and Applied Physics. She is a Product Development Manager at Lightwave Electronics in Mountain View, CA.

Suzanne Therese Staggs is Winner of 2004 MGM Award

Sue Otwell, APS Staff

Suzanne Therese Staggs

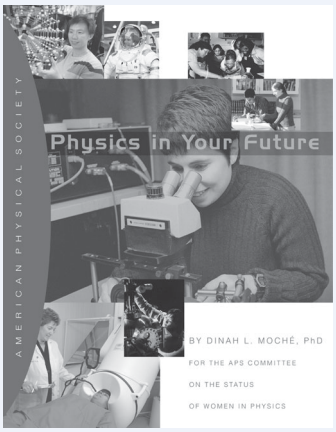
Suzanne Staggs of Princeton University is the winner of the 2003 Maria Goeppert Mayer Award for her original and lasting contributions to experimental cosmology, in particular in the area of cosmic microwave background studies, and for leadership in multi-institutional collaborations to measure CMB anisotropy. She is an associate professor of experimental physics in Princeton's Department of Physics' Gravity Group, where she makes measurements of the Cosmic Background Radiation (CBR).

Suzanne graduated from Rice University in 1987. In 1993, she received a Ph.D. from Princeton University with a dissertation on a long-wavelength measurement of the absolute temperature of the cosmic microwave background (CMB) radiation, with David Wilkinson. In 1994, she accepted an Enrico Fermi Fellowship at the University of Chicago, and then continued at Chicago for the next two years as a Hubble Fellow, with more work on the CMB, constraining the amplitude of any spectral distortions from the blackbody curve. She also spent ten Saturdays in 1996 lecturing on cosmology to the general public as Compton Lecturer. In 1996 Suzanne returned to Princeton University as an assistant professor of physics and was promoted to associate professor in 2001.

At Princeton, Suzanne began work on an experiment to measure the polarization of the CMB, for which she received a NIST Precision Measurement Grant in 1998. That same year, she was selected as an Alfred P. Sloan Research Fellow. In 2000, she received an NSF CAREER award for a related multi-channel, multi-frequency CMB polarimetry experiment. She continues work on CMB polarimetry, and on the fine-scale primordial and secondary anisotropies of the CMB.

The MGM Award was established in 1985 and is sponsored by the General Electric Foundation (now the GE Fund). The award is given to a woman during the early years of her career, not later than ten years after the granting of the Ph.D. degree for scientific achievements that demonstrate her potential as an outstanding physicist. The award is open to any female physicist having US citizenship or who is a permanent US resident. The lectures must be given at institutions within the United States or its possessions within two years after the award is made. Nominations are active for three years. The nominee's PhD must have been received during the ten-year period prior to the nomination deadline.

Information past winners and on how to nominate a woman for the MGM Award can be found at: http://www.aps.org/praw/mgm/index.html



"Physics in Your Future"

Available at no charge to students and their parents, educators, guidance counselors, and groups who work with young women. To order or to view an electronic version, please go to http://www.aps.org/educ/cswp/future.html. Shipping is free, however we reserve the right to limit quantities.

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 15-18.

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

APS Names Women Fellows for 2003

Sue Otwell, APS Staff

CSWP is pleased to congratulate the 17 women who were named to Fellowship in the American Physical Society in 2003. Their names are included on the CSWP's website at http://www.aps.org/educ/cswp/women_fellows.html. A complete listing of all 215 Fellows of the APS for the year 2003, both men and women, can be found at http://www.aps.org/fellowship/. There are also complete instructions on how to nominate an individual for fellowship, forms, and deadlines for nomination.

The new Women Fellows of the APS for 2003 are:

Eva Andrei
Rutgers University
For outstanding contributions to the experimental study of vortex matter and two-dimensional electron systems, including Wigner lattices

Nelia Anne Davies
US Dept of Energy
For her successful efforts guiding the fusion research community through a difficult transition from a program of energy technology development to a healthy program focused on the critical scientific and technology foundations of fusion energy research.

Giulia Galli
LLNL
For important contributions to the field of ab initio molecular dynamics and to the understanding of amorphous and liquid semiconductors and quantum systems.

Laura Justine Garwin
Harvard University
For her outstanding contributions in increasing the strength and prestige of physics and biological physics at Nature, and for her service to the community of physics and biology as a bridge between these disciplines.

Amanda E Hubbard
MIT
For significant contributions to the understanding of the plasma edge pedestal formation and of the transition to an improved confinement regime in magnetic fusion confinement devices.

Deborah S Jin
JILA/University of Colorado
For her innovative realization and exploration of a novel quantum system, the degenerate Fermi atomic gas.

Young-kee Kim
University of Chicago, Enrico Fermi Institute
For her precision measurement of the mass of the W boson and her leadership in commissioning the CDF-II detector.

Priscilla Laws
Dickinson College
For her numerous contributions to physics education and for her development of data collecting computer tools and methods to use them efficiently.

Anne Mayes
MIT
For outstanding theoretical and experimental research on the interfacial behavior of polymers and the phase behavior of polymeric materials.

J Ritchie Patterson
Cornell University
For her key role in the analysis and interpretation of CLEO data on the weak decays of B mesons, the determination of the elements of the CKM matrix, and the search for physics beyond the Standard Model.

Mara Goff Prentiss
Harvard University
For her pioneering work in manipulating matter with electromagnetic fields, including pioneering atom lithography and chip based atom optics.

Lisa Randall
Harvard University
For contributions to the theory and phenomenology of electroweak symmetry breaking, CP violation, supersymmetry, cosmology, and extra dimensions.

Helen Louise Reed
Arizona State University
For her innovative research in boundary-layer stability and receptivity, and her leadership in promoting and communicating fluid dynamics.

Ilme E. Schlichting
Max Planck Inst for Medical Research
For her outstanding contributions in protein crystallography and structural biology.

Frieda A Stahl
California State University
For her scholarly contributions to the history of ideas in physics, history of condensed matter physics, and history of women in physics.

Karen I Winey
University of Pennsylvania
For exquisite application of electron microscopy and x-ray scattering to the determination of the microstructure of polymers and to elucidating the role of microdomain geometry on polymer properties.

Aihua Xie
Oklahoma State University
For her outstanding contributions to experimental studies of protein dynamics, in particular the use of time-resolved infrared studies to probe the dynamics of photosensitive proteins.

Women in Physics: A perspective from the UK

Wendy Kneissl, Institute of Physics

Introduction

There is a need in the UK, as elsewhere, to create a diverse skills base in support of a strong economy. Physicists especially are in high demand for their problem solving skills, though the numbers choosing to study the subject at university has remained nearly static over the past decade at around 2500 per year. Represented in this number is a disappointingly small female cohort of little more than 20%. Women are missing out on the opportunities a physics career gives, and physics is missing out on half of the country's best minds.

With approximately 37,000 members (19% of whom are female), the Institute of Physics represents the physics community in the UK, and is well placed to take at least partial ownership of this diversity problem. Significant resources have been made available to establish a series of activities at the Institute, aimed at increasing the profile and participation of women and girls in physics, and entitled the Women in Physics Programme. The programme works alongside both the women in physics policy committee, advising Council on diversity issues, and the women in physics professional group, which since its formation in 1995 has formed the interface between the Institute and its women members. In this article, the approach and activities of the programme - managed at the Institute's headquarters in London - will be outlined.

In terms of approach, whilst it is recognised that quality data are required to clarify the problem and monitor progress, there is a strong move at the Institute to start pumping up the tyre, rather than to measure ever more accurately that it is flat. The activities of the programme therefore are a combination both of action, and of filling some the gaps in our understanding through research. Where action is taken, the approach is to mainstream, with a long-term aim of making the work or study place as inclusive as possible, rather than to target projects at women as individuals. This is seen as the best use of the available resources for the widest impact.

Status report

Figures 1, 2, and 3 represent the best gender disaggregated data sets available in the UK, all of which are now routinely collected through the relevant Government agencies on a national level. The 20% participation rate of girls in A level physics[1] carries through to undergraduate level, and thereafter the representation of women towards senior levels falls off rapidly, with only around 4% of physics professors in the UK being female. This is an illustration of the UK's "leaky pipeline" in physics. With 10% women in undergraduate physics in 1960, and 16% in the early eighties, this fall-off with seniority cannot simply be explained by recourse to 'history'.

The Institute suffers a similar effect, with approximately 25% women among the student membership, through to approximately 4% at Fellow level. The overall position however at 19% female members (higher than the national average across all seniorities) and 23% among the Boards and Committees of Council, indicates nonetheless a good success rate for retention and a high level of their professional involvement of women at the Institute.

No complete dataset regarding the position of women in UK physics-based industry yet exists. A study[2] recently performed by the University of Essex indicates that, if anything, the situation is worse in commercial environments. A sector-by-sector analysis of the top 350 UK registered companies revealed that in the "high-tech" arena, on average 99.5% of executive directors are male. The chances of a woman becoming a physics professor are apparently considerably higher than for her to reach the top of the career ladder in industry. This is particularly disappointing given that industry is the largest employer of physicists in the UK. A business case is building nonetheless for companies to assess their position, and to address the issues. Costs associated to recruitment and training of staff run high, and the loss of intellectual capital can be more expensive still if women leave the workforce, for example, to start a family, or through relocation with a spouse's job. With physicists in short supply, it makes good business sense for companies to work hard to retain their scientific staff, and that means women too.

The above, somewhat incomplete, picture has been relatively static over the previous decade, in spite of the admirable efforts of many under-resourced volunteer organisations. This illustrates the clear need for a more strategic approach, funded with greater stability, as is now happening in the UK. Both the Royal Society and the Institute of Physics have appointed managers to oversee diversity projects, and the Government has recently launched a new resource centre for women in science, engineering, and technology (SET). Part of the mandate of the centre will be to co-ordinate the various initiatives on-going across the country, bringing a better degree of focus to the community.

The women in physics programme: overview

Though the Institute has for many years been active in encouraging the participation of women and girls in physics, a recommendation was made to Council in Autumn 2002 that a formal, dedicated, programme of activities be initiated to co-ordinate on-going projects, as well as to initiate new ones. The women in physics programme has, as a result, been operational since March 2003.

There are 4 main areas of interest of the programme in which projects run, usually in collaboration with the relevant Institute departments. These are:

- Girls and physics at secondary[3] school
- Women in the academic workplace
- Women in commercial environments
- Career break management

continued on page 12

Women are missing out on the opportunities a physics career gives, and physics is missing out on half of the country's best minds.

Women in Physics: A perspective from the UK, continued

Another problem is that of keeping qualified women in the SET workforce after a career break.

These cover the "main bases", against a general backdrop of raising the profile of the issues in general, and forming collaborations wherever possible.

Among these components, probably the least tractable of problems is that of attracting more girls into physics in school. Whilst a vast literature of anecdote exists, together with a multitude of so-called 'attitudinal surveys', little hard evidence exists as to why young women drop out of physics at the first available chance, and schools interventions have been left largely unevaluated. In this area then, the Institute has constructed a series of research projects, each of which has been designed to answer some specific questions, and with a clear view to a future potential action. In summary, these projects areas follows.

Case studies of best practice in physics teaching: whilst the average participation rate of girls in physics classes at A level is approximately 20%, some schools consistently outperform this. The case studies project sees a consultant visiting 20 such schools to identify common themes in physics teaching and practice, which might be disseminated more widely. This project is funded jointly by the Institute and the NESTA endowment[4], with participation by the Department for Education and Skills (DfES).

The research review: during 2004, the Institute intends to commission a critical analysis of research carried out in the UK in respect of girls and science. Implications for physics will be determined where possible.

The international study: Across the World, and indeed across Europe, significant variations exist in the participation of women in physics. Italy, Spain, Turkey, and France for example all outperform the Northern European countries in this respect. Whist many of these differences can likely be accounted for culturally, the Institute will be exploring common themes in teaching and learning styles of physics and allied subjects in schools internationally, to explore the impact of the latter on the take-up rate of physics by women.

Another problem is that of keeping qualified women in the SET workforce after a career break. In a report recently commissioned by the Secretary of State for Trade and Industry, the Rt. Hon Patricia Hewitt[5], it was estimated that only 25% of women SET graduates are currently employed in a SET career in the UK. This is compared to a figure for men of 40%. Charitable organisations such as the Daphne Jackson Trust[6] are working through their fellowship scheme to bring people (men and women) back into the workforce after an extended break from a SET career. The Trust offers a programme of retraining and support to bring each fellow back up to date, but expansion in this area is clearly required in order to meet demand. Additionally, new schemes are needed to keep scientists and engineers in touch with their fields *during* the break, which would be complimentary to programmes helping them back to the workforce when they are ready.

Since workplace culture is largely local, the Institute is now running a Site Visits scheme, based on that of the American Physical Society, and offered to both university physics departments and laboratories in physics-based industry. This scheme sees a panel of typically 6 professionals spend a day at a given site, meeting with male and female staff (as well as students in the event that the site is a university department), to assess the local gender culture, as well as the attitudes of staff towards policies and procedures. Available statistics and publicity material for the site are also examined. The visits take place only by invitation of the head of department (or equivalent for industry), are carried out with full confidentiality, and have a two-fold aim. The first aim is to provide useful feedback to local management, in terms both of recommended actions and a list of good practice elements at the site. The second is to aid the Institute in building and publishing a guide to best practice in the workplace for wider dissemination. The visits are highly popular, and from the launch in autumn 2003, bookings are being taken well into 2005.

In order to guide further activities for women in industry, the Institute manages an industry working group, in collaboration with the Royal Society. This group consists of 12 representatives from large companies across the SET employment sector, and explores issues facing women in commercial SET environments. An equivalent group for small and medium sized enterprises – for whom the issues will be largely disparate – is to be formed during 2004.

Career Break Study

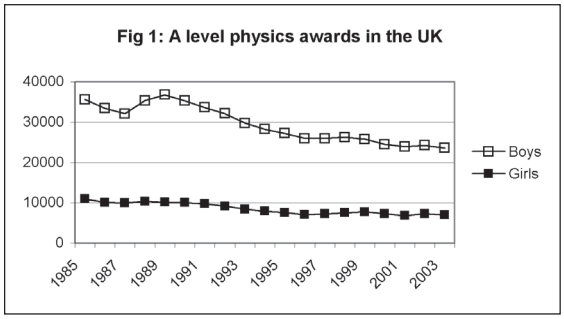
In addition to these studies of gender in the workplace, the Institute has recently commissioned an independent consultant to survey a sub-group of Institute members, including all women Members and Fellows (but excluding most students and Associate Members), for information on career break activity. This study was undertaken in collaboration with the Daphne Jackson Trust. As the Institute does not hold information regarding current and past career break activity (though a new career break category of membership has recently been introduced) not all Institute members canvassed would be on or have had a career break. The return rate was high nonetheless, at about 22%, representing nearly 300 career breaks.

The survey was designed to address the following 5 main questions:

1. What is the level of career break activity among membership?
2. What prior plans did those taking a career break make?
3. How did/do people keep up to date in their fields during the break?
4. For those not currently on a career break, how did they return to work?
5. What would have made career breaks and/or return to work easier?

continued on page 13

Women in Physics: A perspective from the UK, continued



Trends in career break activity were also explored indirectly through obtaining information on jobs by sector before and after any given break.

Some of the results of the survey were predictable, for example, the majority reason for taking a break is childbirth and rearing, with relocation of a spouse's job coming a relatively poor second. Some findings were more surprising however, such as the extremely low level of preparation and planning generally made prior to the break (though the majority clearly had 9 months advance notice!).

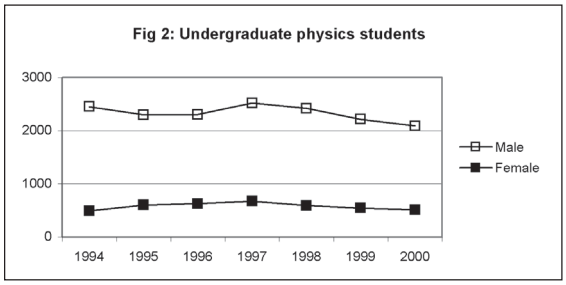
It was also surprising that only 40% of workers returned to their prior employers after the break (of typical duration 1 year), and of the remainder - who found work elsewhere - sadly 12% left SET employment altogether.

There was also a noticeable attrition of women from industry into the academic sector associated with returning after career breaks. This may be related to the apparently lower availability of part-time working in industry, as evidenced by the lower proportion of part-time working on return to work in industry as compared to the public and academic sectors.

The full results of the study will be published in early 2004, and will be used to form recommendations for future Institute activity in this area. Projects already planned include a guide to career break management, which will be designed to help those considering a career break using the experience of those who already have, and an email listserve (available also to non-members of the Institute) dedicated to career breaks, to facilitate discussion and reduce isolation.

In Conclusion

Further details can be viewed at http://diversity.iop.org[7].



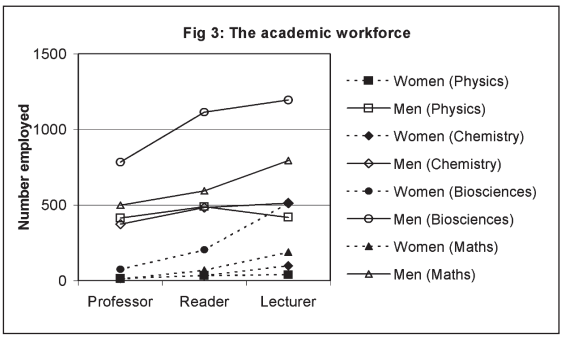
Whilst some of the issues of concern in the UK will be country-specific, it is to be hoped that much of the knowledge gained may be country-portable, enabling the Institute to both share the knowledge it gains internationally, and to learn from others.

The UK and the European Union are in the midst of exciting times for women in SET, with dedicated funding offered both on a country, and an EU-wide basis. A new resource centre for women in SET should be operational in early 2004, and at the European Commission, a unit for women and science already exists[8] with a network for women in SET across the EU currently in commission.

The activities at the Institute should be viewed as complementary to these larger scale initiatives, with the programme now well placed to network directly into the larger picture as it develops. Women in physics, and by association engineering, represents the underrepresented of the underrepresented in SET employ, and it is important that a strong voice for the community is heard at this time. The Institute and its collaborators intend to ensure that this is the case.

References

1. 'A' levels are the final examinations of the first non-compulsory stage of education in the UK. Candidates typically take exams in 3 subject areas at the age of 18, with subjects chosen in accordance with future career aspirations.
2. "Between Glass Ceilings" C. Li & B. Wearing WP No. 02/02 June 02.
3. Schooling between ages 11-18yrs, compulsory from 11-16yrs.
4. Information about NESTA can be viewed at http://www.nesta.org.uk/index.html
5. SETFAIR: A report on women in science, engineering, and Technology from The Baroness Greenfield. November 2002. Copies may be downloaded at http://www.set4women.gov.uk/set4women/research_the_greenfield_rev.htm
6. More information regarding the Trust can be viewed at http://www.daphnejackson.org/
7. Or directly from the Programme Leader, Dr Wendy Kneissl, at wendy.kneissl@iop.org.
8. Details at http://europa.eu.int/comm/research/science-society/women-science/women-science_en.html



The UK and the European Union are in the midst of exciting times for women in SET.

The American Physical Society 2003-2004 Travel Grants for Women Speakers Program

Limited Funding is Available for the 2003-2004 Academic Year! Apply online at www.aps.org/educ/cswp/travelgrant.html

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 2003-2004 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/educ/women-speaker.html. 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/educ/cswp/travelgrant.html) should be submitted to APS identifying the institution, the names of the two speakers to be invited and the possible dates of their talks. Please note that funds for the program are limited. The Travel Grants for Women Speakers Application Form should be submitted as early as possible, even if speakers and dates are tentative, or if the speakers are scheduled for the spring semester. The application form will be reviewed by APS, and the institutions will be notified of approval or rejection of their application within two weeks. Institutions whose applications have been approved will receive a Travel and Expense Report Form to submit for reimbursement.

See page 15 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 http://www.aps.org/educ/women-speaker.html

Women physicists who would like to be listed on the Women Speakers List or those who'd like to modify their existing entries can do so at http://www.aps.org/educ/women-speaker-enroll.html or see page 18.

APS also has a companion program for minority speakers. Information on the Travel Grant Program for Minority Speakers can be found at http://www.aps.org/educ/com/travelgrant.html The Minority Speakers List can be found at www.aps.org/educ/minority-speaker.html.

2003-2004 Travel Grants For Women Speakers

♦ Application Form ♦

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

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

DATE: _____

INSTITUTION: _____

DEPARTMENT: _____

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

APPLICATION PREPARED BY (Required): _____

NAME: _____ **TITLE:** _____

PHONE: _____ **FAX:** _____

EMAIL: _____

Please list information on the speakers below. Please 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:

Arlene Modeste Knowles, 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

Women Speakers List (WSL)
Enrollment/Modification Form 2003-2004

Additions/Modifications may also be made on the Internet at www.aps.org/educ/women-speaker-enroll.html
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

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 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:

The Roster of Women and Minorities in Physics ◆ The 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 Number: _____

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.

AMERICAN PHYSICAL SOCIETY
Committee on the Status of Women in Physics
One Physics Ellipse
College Park, MD 20740-3844

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