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GUEST EDITORIAL: *Building Things That Last*

By Nancy Haegel, Distinguished Professor of Physics, Naval Postgraduate School, Monterey, CA, Member of CSWP



Nancy Haegel

PHOTO: JAVIER CHAGoya, NPS

Recent travel has provided me the opportunity to reflect a bit on things, both physical and social, that human beings build. In Israel last year, I was working by day with an atomic force microscope, an invention dating from 1986, while the evenings provided an opportunity to stand in front of the Western

Wall, with its large stones dating from 20 BCE. This past week, in Germany, we met with colleagues to discuss advances in e-beam lithography. Flight timing allowed for a quick visit to the castle in Nürnberg, with its earliest buildings dating to 1050. As you visit such places, you reflect on things that humans build, and you wonder, what is it we are building today that will last, that will be visited by tourists hundreds, maybe thousands of years from now? Will they come to museums to see our AFMs and integrated circuits? Will we continue to preserve the ancient sites, in the face of challenges of air quality and budget constraints and the

sheer press of time? What will we have done that will cause visitors to move around the globe, to visit, take pictures and reflect upon the efforts of those long gone?

So too with the social and organizational things we build. The Jewish religious tradition that built the Second Temple has certainly evolved, and, despite historic threats to its very existence, is with us today. The institution of government persists, though for most of us it looks nothing like the feudal systems of Germany in the Middle Ages. Professional organizations like the APS also have a long history. Doctors trace their earliest gatherings and reflections upon professional ethics to the followers of Hippocrates of Kos, circa 400 BCE. The Royal Society was officially founded in 1660. The APS, of course, has a shorter history, dating from 1899. We are a relatively new lineage, but on an (also relatively) old tree.

As I finish three years as a member of CSWP, it is an interesting exercise to reflect as well upon its history and its future. CSWP was started in 1972, with a purpose of encouraging women in physics and initiating programs to assess and support their status and career development within the field. One assumes that 100, maybe even 1000 years from now, APS will

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Interview with Dr. Kate Kirby, Executive Officer of APS

By Nancy Haegel, Distinguished Professor of Physics, Naval Postgraduate School, Member of CSWP

Gazette: *Dr. Kirby, from CSWP and all friends of CSWP, welcome to your new position at APS. To start us off, what brings you to the executive director position at APS at this point in your career? What excites you about this position?*

Dr. Kirby: I have been involved with the APS in several leadership capacities — first through the Division of Atomic, Molecular and Optical Physics, serving as Secretary-Treasurer (1984-87), and then as Chair (in the chair-line 1996-99), and second as an APS Council and Executive Board member. Through this involvement and my committee work for the Society, I have

come to know the organization and many of its staff members very well. So when I received very strong encouragement to consider this position from various people within APS I found myself quite excited about the opportunity. I had been fortunate to spend my entire professional career as a scientist at Harvard-Smithsonian Center for Astrophysics, but I think I was definitely ready to move on to new problems and challenges. What excites me, in particular, about the Executive Officer position is the opportunity to advocate for the field of physics and to serve the physics community. I think we need to be taking advantage of the current

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Conversations on Gender Equity: A New CSWP Program

By Catherine Fiore, MIT, Past Chair of the Committee on the Status of Women in Physics

The Committee on the Status of Women in Physics (CSWP) is introducing a new type of visit to university physics departments and national laboratory directorates. In an effort to build on the success of the 2007 APS CSWP workshop, "Gender Equity: Strengthening the Physics Enterprise in Universities and National Laboratories," a series of visits featuring "Conversations on Gender Equity" will be conducted. (For more information on the workshop, the final report can be viewed at www.aps.org/programs/women/index.cfm) The intent is to follow up with the department chairs and laboratory directors who participated in the workshop using visits by a small group of physicists who are well versed in the problems of attaining gender equity in physics. These visitors have been selected from members of the workshop steering committee, CSWP, and other physicists who are fully engaged in diversity issues. They will be dispatched to physics departments/national laboratories to talk with chairs and other departmental members about the process of integrating gender equity into their programs. At the same time the visitors will collect feedback from the visits that will be used in developing suggestions on what programs work best for addressing this issue. It is anticipated that a total of 15 visits will be conducted over 28 months.

During the original workshop, a large list of recommendations for improving gender equity at physics departments/national laboratories/funding agencies was developed. The chairs and directors who attended were asked to select a few of these recommendations for immediate implementation at their home facilities. The purpose of these "Conversations" is to obtain information on the success/failure of the recommendations that were generated. It is also important to learn about other institutional changes that were made or attempted in order to explore what works for different departments and laboratories. At the same time, this is an opportunity to make suggestions if there are areas where CSWP can be helpful.

The visits are designed to foster dialogue between the visiting physicist discussion leaders and the members of departments that have invited the CSWP to engage in a conversation. These visiting discussion leaders are prepared to spend a day at the host institutions talking to the department chairs and selected faculty representatives. Travel expenses for the discussion leaders will be borne by APS (with funding from the NSF). The discussion leaders would like to meet with students, faculty, the department chair, and his/her designees. They would also plan to facilitate a brainstorming session for departmental personnel to examine the departmental culture and how it affects the climate for gender equity and expansion of diversity. This would help the faculty to find solutions that can work for their own institution. At the end of the day, a summary will be generated that can be used both by the hosts and by CSWP to forward the goals

of increasing the diversity of the physicist population in the US. The purpose is to learn what works best for physicists and to carry that information forward into future visits and programs.

This process is very different from the formal site-visit program of the CSWP and the APS Committee on Minorities (COM). It is expected that this will be a dialogue with input flowing in both directions. Notes generated will be approved by both the hosts and the discussion leaders and will be used by CSWP to broadly disseminate these ideas (without any identifying information).

The discussion leaders are primarily peers of the departmental chairs/laboratory directors, drawn from chairs who attended the original workshop as well as current and past CSWP members. Most are working physicists, and in addition, there are a few social scientists among our discussion leaders who will contribute to facilitating this dialogue. They met at the 2009 APS April meeting where they learned facilitation techniques and about specific methods of working on gender equity/diversity issues.

These visits begin in the fall of 2009 with the goal of completing five visits before the end of the calendar year, and another five visits by the end of the academic year. Scheduling is underway for the fall visits.



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The APS Career Center is part of the Physics Today Career Network, a niche job board network for the physical sciences and engineering disciplines. Jobs and resources are shared with four partner job boards - Physics Today Jobs and the American Association of Physics Teachers (AAPT), AIP Science and Technology of Materials, Interfaces, and Processing, and IEEE Computer Society Career Centers.

Interview with Dr. Kate Kirby, continued from page 1

climate in Washington, DC to articulate the case for the support of physics research and education. Physics is at the core of our technological future and thus the economic future of our country.

Gazette: *Our readership is always interested in how people become interested in physics and choose to stay in the field. What drew you to a career in physics?*

Dr. Kirby: As a young child I was always very interested in medicine — and greatly encouraged in this by my mother, who was a lawyer. In college, however, I found that my interests were much more at the intersection of mathematics and science, rather than in biology and biochemistry — so I did a dual major in chemistry and physics. I found it really exciting to form a mathematical model of a system or process, then to solve equations in order to obtain quantities which could be physically measured.

Gazette: *You join the APS leadership team at a challenging time for the country. What particular challenges does the recession bring to a professional society like APS?*

Dr. Kirby: The recession has had an unfortunate impact on young physicists — those just entering the job market. The anecdotal evidence is that a number of assistant professor searches were terminated this year without a hire being made. In addition, the recession has impacted a number of physicists in industry, with lay-offs occurring in that sector. I am certainly hopeful that the economy will begin to rebound very soon. What is challenging for a society like APS is to figure out how to be helpful to our members during difficult financial times. Finding ways for members to network more effectively (such as on APS-Physics LinkedIn!) and ways to make career and job opportunities more accessible to physics job-seekers is a high priority. At the same time, like everyone else, the APS financial portfolio has suffered, and thus we are operating under significant budgetary constraints.

Gazette: *You received your PhD in 1972, the same year that CSWP began as an APS committee. What are some of the key changes you've observed during your career for women in physics?*

Dr. Kirby: There are definitely more women involved in the physics enterprise — education, research, science administration and leadership. Many more young women are majoring in physics and receiving a PhD in physics, than back in the 1970's. But the numbers have not improved as rapidly or as dramatically as one might hope. So there is still a lot of work to do!

Gazette: *You have a history of committee service at APS that spans 18 years. What would be your suggestion to early career individuals interested in getting involved with APS at the national level?*

Dr. Kirby: Participating in APS meetings is one of the best ways to establish contacts and to network with colleagues. Let people in leadership positions know that you are interested in working on a committee or organizing a session. APS is always interested in supporting and encouraging volunteers — because we couldn't function without them!

Gazette: *Last question. What do you like to do when you're not working? What helps you to turn off the computer and forget the email?*

Dr. Kirby: I have always put my family life as a top priority. I have four children — my oldest born when I was a 2nd-year grad student at the University of Chicago. Although my husband and I have an "empty nest" at this point, we love to spend time visiting our children or having them come back to visit our home in Cambridge, MA. Our older daughter is married and has two little boys (ages 5 and 2), so next weekend, for instance, we are headed out to California to stay with our grandsons so that my daughter and her husband can go to a wedding in Wisconsin! My greatest joy is having all the kids (and grandkids) at home together at the same time. That happens usually at least once a year!!



Kate Kirby

Have you moved? Changed jobs? Changed fields?

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

www.aps.org/programs/roster/enroll.cfm

Three Blewett Scholarship Winners Named for 2009

By Mike Lucibella, APS Science Staff Writer

[A version of this article appeared in the August-September 2009 *APS News*]



Janice Wynn Guikema

“The continued funding will help me more firmly establish my research career and maintain momentum.”

Three women have been awarded the M. Hildred Blewett scholarship by APS’s Committee on the Status of Women in Physics. This year’s recipients are Janice Guikema at Johns Hopkins University, Marija Nikolic-Jaric at the University of Manitoba, and Klejda Bega at Columbia University.

Each year the committee selects women who are returning to their research careers after being interrupted for family or other reasons. The scholarship is a one-year grant of up to \$45,000 that can be used towards a wide range of necessities including equipment procurement, salary, travel, tuition and dependent care. This is the fifth year the scholarship has been awarded.

Janice Wynn Guikema

After taking time off to follow her husband and start a family, Janice Wynn Guikema is continuing her return to the laboratory as a second time recipient of the Blewett Scholarship. She currently has a part-time research position at Johns Hopkins University where she is primarily studying graphene.

Graphene molecules are one-atom-thick sheets of carbon atoms organized in a hexagonal pattern like a honeycomb. Since its first synthesis in 2004, it has quickly become one of the hottest fields in condensed matter physics because of its remarkable structural and electrical properties.

“It was amazing how many sessions there were on graphene at the March meeting,” Guikema said.

She plans to use funds from the Blewett Scholarship to further research the feasibility of using graphene as a sensitive magnetic detector. She said that graphene has a lot of potential for use as a Hall effect detector to detect nanoscale particles and map out magnetic structures. Currently she is continuing to look for ways to make the material as sensitive as possible. In addition she will use scanning probe microscopy to further explore the nature of graphene.

Guikema first left her postdoctoral research at Cornell University in 2005 when her husband received an offer to join the faculty at Texas A&M and they relocated to Texas. There she took a lecturing position teaching introductory physics classes while pregnant with her first son.

“I really like teaching and would like to see it in my future some time from now,” Guikema said.

Her son David was born in the summer of 2006 after concluding her first semester. Guikema returned to the university that fall, balancing teaching part-time with “finding time to learn how to be a mom.”

In January of 2008, the family pulled up stakes again and moved to Maryland after her husband was offered a position at Johns Hopkins University. She saw this as a good opportunity to return to research. Though Guikema enjoyed teaching, she missed the hands-on aspect of running her own experiments.

“I wanted to get back to learning something new,” Guikema said. “My interest was more in finding out new things about the world.”

The scholarship will allow her to further her experiments on graphene and continue working with an undergraduate research assistant. She said also that the scholarship will give her time to line up funding through regular channels. Additionally, switching from teaching to research has given her more flexibility to care for her newest son Matthew, born in June.

“The continued funding will help me more firmly establish my research career and maintain momentum after having the [second] baby,” Guikema said “It’s really encouraging...to have the committee decide what you’re doing is worthwhile.”

Marija Nikolic-Jaric

Though family tragedy postponed Marija Nikolic-Jaric’s PhD, she never doubted she would ultimately complete it and return to the lab.

She is currently doing her post-doctoral research on biomicrofluidics at the University of Manitoba, Canada. She is investigating the effects of shear induced rotation of aspherical particles in non-uniform electric fields. Studying these effects will allow researchers to better identify a particle’s structure based on its behavior in these electric fields.

“From these rotating particles, we will be able to deduce more about the particles’ electrical signals shape and symmetry,” Jaric said. “It will allow us to know what the limitations are on performing measurements on spherical particles and establish the limits of uncertainty in the present approach in situations where aspherical particles like biological cells are assumed to be spherical.”

She hopes to use these methods to help identify a living cell’s characteristics in order to improve medical diagnostic and therapeutic technologies. With more work these methods could be used in medical instruments to detect defects in living cells remotely. Identifying the electronic signatures of diseased cells would mean that doctors could analyze large numbers of cells at a time without needing microscopes.

“We work on making these detectors very sensitive and do these detections via electronic means,” Jaric said, “If you can do the whole thing electronically you can miniaturize it, which is essential for lab-on-chip applications.”

In August of 1996, everything Jaric was working on had to be put aside. Just weeks before she was due to defend her thesis, her husband, also a physicist, was diagnosed with a rare brain tumor. That year the couple travelled a great deal for both professional and medical reasons, and Jaric continued to work wherever she could find the chance. Caring for her ailing husband and young child took priority and completing her

degree would have to be put off for a while. After her husband’s death the following year, she moved back to Canada to be closer to her parents. To complete her thesis Jaric spent a time trying to cull the disparate pieces of her research together from the many machines around the world on which her data were saved, but soon found that she would have to start over again almost from scratch.

During her time away from research, Jaric volunteered at her son’s elementary school, helping to teach math to the students through games. Though the work at the school was rewarding she knew she wanted to return to conducting research.

“The challenge of research was definitely missing there,” Jaric said. “I knew I had to just go back to what I loved to do the most.”

Her step-father’s death in 2007 put off her defense an additional semester. But in January of 2008 Jaric was finally able to defend her thesis at Simon Fraser University in Vancouver, finishing the PhD she started years before. She said the Blewett scholarship has given her a solid financial and psychological boost, and she is now awaiting publication of her first paper since her return to research.

“It’s just amazing,” Jaric said. “This hand extended to me is just wonderful.”

Klejda Bega

Klejda Bega is excited to return to research after four years working as a management consultant. Now back in the lab, she plans to develop new approaches for creating ultracold diatomic molecules in optical lattice traps at microKelvin temperatures. Once cooled, she will conduct precise measurements of these molecules including determining their resonance frequencies. Her first order of business will be to construct and operate the laser systems, which will be used for creating, cooling and probing the molecules.

One possible application of her work will be in the creation of a molecular clock. Today’s atomic clocks operate by measuring the fundamental resonance frequency of an atom, most commonly cesium or rubidium. Molecular clocks operate by measuring resonance molecular vibrational frequencies and Bega hopes to accurately measure these vibrations. In addition to upping the standard for super-accurate clocks, Bega said that results from her experiment will be used to further define fundamental physics constants.

“These molecular vibrations are very sensitive to the variation of the proton/electron mass ratio,” Bega said, “and will provide the only model-independent measurement of these variations to date.” It had always been Bega’s dream to study physics after she first read the biography of Marie Curie when she was nine. She first came to the United States after the old communist regime in her native Albania collapsed, making studying in the West possible. She earned both her BS and PhD at CalTech and did her graduate work at SLAC National Accelerator Laboratory.

Unfortunately Bega soon had to put her research ambitions on hold. In order to support aging family members still living in Albania and cover their medical expenses, she worked as a management consultant. There, Bega found that her scientific background helped in her new consulting job.

“My physics education came in very handy,” Bega said, “One could use the same analytical skills to first define and then solve a complicated business problem, and just like in physics, of course nothing is straight forward.”

She said also that this time away from research helped her realize she was eager to return to it.

“It made me realize how much I actually like physics.”

Last year, Bega married and moved to New York and joined Prof. Tanya Zelevinsky’s lab at Columbia University. With the help of the Blewett Scholarship, Bega hopes to complete her postdoctoral work and obtain a permanent research position.

Bega is also expecting a baby in September. She joked that with the scholarship, “even if it crossed my mind, there is no way I am taking another break now.”

M. Hildred Blewett was a particle physicist who left much of her estate to APS when she died in 2004, at age 93. She wanted to establish a scholarship to help women in physics overcome the obstacles they often face in the field. Blewett started her career in Schenectady New York in the 1940s working for General Electric where she developed a method to control the pollution emitted by smokestacks. In 1947, she and her husband John were among the original team members at Brookhaven National Laboratory. Later she worked at Argonne National Labs and finally CERN until her retirement in 1977.



Klejda Bega

It had always been Bega’s dream to study physics after she first read the biography of Marie Curie when she was nine.



Marija Nikolic-Jaric

“The challenge of research was definitely missing there. I knew I had to just go back to what I loved to do the most.”

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

Looking Back, Looking Forward: An International Perspective

By Eliane Lessner, DOE Office of Science and CSWP member



Judy Franz

In her presentation at the APS March Meeting in Pittsburgh, retiring APS Executive Director Judy Franz gave a perspective on the international progress attained by women physicists, and a short history of the International Union of Pure and Applied Physics (IUPAP.)

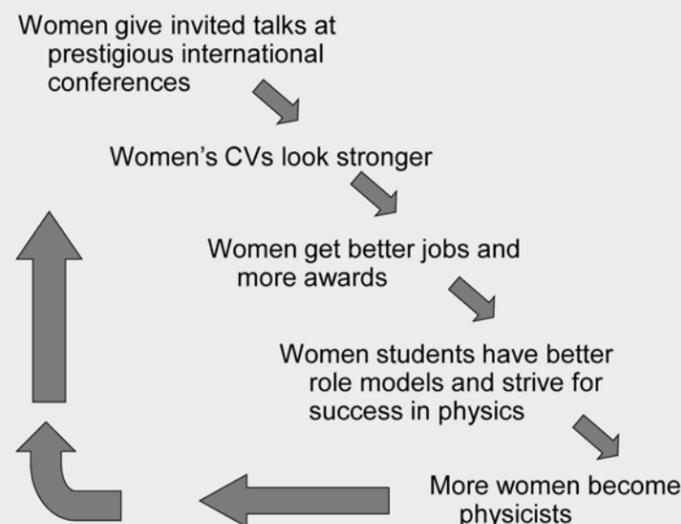
Franz was nominated secretary of the US Liaison Committee in 1994 and became IUPAP's first women officer in 1999. Thanks to her efforts, the participation of women in the Liaison Committee increased by two orders of magnitude in a five-year period. Franz also helped organize the Working Group of on Women in Physics (WGWP), established not without opposition by a motion of the 1999 General Assembly.

The first International Conference on Women in Physics was held in Paris in 2002. It was the first time so many women physicists had gathered in one place! Important follow up activities were press releases and publicity in the participants' local communities and the startup of local women physicists' groups. Another notable benefit from the 2002 and subsequent conferences was the opportunity to form international collaborations, particularly important to physicists from countries with restricted travel funding. Of the eight resolutions, one of particular

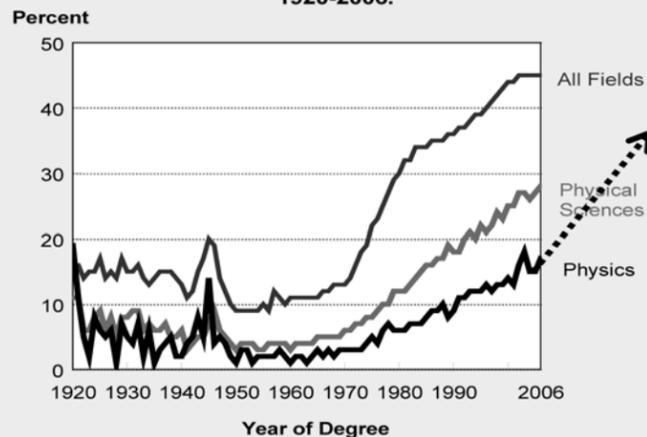
importance was the resolution requiring that IUPAP sponsored conferences include women on the advisory and program committees, and that the number of invited women speakers be reported to IUPAP. This policy has become part of the "criteria and requirements" for any IUPAP-sponsored conference, with important implications for women physicists' career advancement and for young women physicists in particular. Women physicists now can be part of the feedback loop, as men have been for years. This "feedback loop", as depicted in Figure 1, leads to more women invited as speakers, to the enhancement of their curriculum vitae, to better jobs and serving as role models, and ultimately to increasing the number of women physicists.

Franz takes an optimistic view of the future for women in physics. In Europe there is pressure from the European Union to include women in all decision making committees. The Korean and Japanese government acknowledge the need to increase the number of women in physics. In Africa the situation is very difficult for all physicists, particularly so for women physicists. In the US progress, has been slow – Figure 2 shows it to be at about 4% per year. The slow increase can be traced to several causes: guidance counselors who discourage girls from mathematics and physics; fewer role models; the negative effect of dual-career marriages; and the extra weight of care-giving responsibilities assumed by women. These causes have an accumulative effect and will need our collective effort to be minimized, if not eliminated.

In closing, Franz said, "... Continued effort by all of us to attack all of these hurdles is still needed. But we should take pleasure in the real change has happened, and if we all work just a little harder, then we should be able to increase the slope of the curve....I am optimistic that women will make an increasing contribution to physics. I expect to see more women giving invited talks, more women receiving APS prizes and awards, and more women getting the Nobel Prize."



Percent of PhDs awarded to women in selected fields, 1920-2006.



National Research Council, National Opinion Research Center, and National Science Foundation. Data compiled by AIP Statistical Research Center.

Memories ...

Judy Franz retired in July after 15 years as Executive Officer of APS. CSWP and the *Gazette* wish her the best in this new phase! Her accomplishments are too numerous to list here (and have been mentioned elsewhere), so we asked a few people who worked closely with her to offer some memories.

Judy,

Remember when you received your scooter? Everyone, including me, thought it was a cute joke. That is until we saw you coasting down the hall to the other end of the building (talk about shaking things up!) Actually, that would be the best way to describe your leadership at APS: always shaking things up in a good way. Making sure people were aware of their actions, and the resulting consequences. During the time that I have worked with you, I found you to be a very fair and honest person. You are always willing to listen to a reasonable explanation. You may not agree, but you will listen. I will miss your wisdom, sense of loyalty, kindness and dedication.

—Jacquelyn Biemon-Kiene,

Executive Office Administrator

Hi Judy,

It is hard for me to imagine that you will be retiring from Executive Officer of APS after many years of outstanding service to the physics community. Like Bill Havens, who before you had a long tenure of service, leaving an imprimatur of efficiency on the organization, you left an imprimatur that efficiency could also be friendly. I am hoping that your retirement from this high profile and high responsibility position is not the end of your service to the physics community, especially to the women in physics and international physics sub-units that you have served so well. I am expecting Sue Otwell to have a few choice assignments for you and for me from time to time so that we can keep in touch.

Warmest regards,

Millie Dresselhaus, MIT

Judy,

Thanks for always working to find a way forward — toward our goal — without causing unintended consequences. We will miss your progressive, yet pragmatic leadership.

—Sherry Yennello, Texas A&M

Around the World in 180 Minutes: Differences and Similarities Among Women Physicists

By Eliane S. Lessner, DOE Office of Science, and CSWP member and Cherrill M. Spencer, SLAC National Accelerator Laboratory and member of the Forum on International Physics Executive Committee

The session organized jointly by the Committee on the Status of Women in Physics (CSWP) and the Forum on International Physics (FIP) held at the March 2009 APS Meeting recruited prominent speakers and panelists from participants in the Third IUPAP International Conference on Women in Physics (ICWIP2008), which was held last October in Korea. The speakers and panelists, representing different regions of the world and different career stages, analyzed the progress being made in promoting women in physics and how it varies amongst different cultures, based both on personal experience and on what they learned from participation in ICWIP2008. Four of the five invited speakers covered statistics and information on women physicists in Africa, the Middle East, Asia, and the Caribbean and gave a worldwide summary of the status of women physicists. Judy Franz, APS Executive Officer, spoke eloquently of how the ICWIP conferences came about and her own experiences with the International Union of Pure and Applied Physics (IUPAP), which behaved like a “men’s club” until she became its first female officer. After 12 years of efforts to increase female physicists’ participation in IUPAP, Dr. Franz called it a “leader in inclusiveness for women.” Dr. Franz also reported on the slow improvements in the status of women physicists in the USA over the past 35 years and ended with an optimistic prediction that the percentages of women in physics at all levels could be made to grow faster, especially if “we all work a little harder.” To see all the speakers’ slides visit the website: www.aps.org/programs/women/workshops/index.cfm.

The ICWIP2008 conference congregated 283 women and men physicists from 57 countries to share the participants’ scientific accomplishments and evaluate international progress in improving the status of women in physics. In her excellent overview of this conference, Dr. Yevgenya Zastavker (Olin College of Engineering), co-chair of the 22-person US delegation, described the conference’s purpose, what happened during its 5 days and the resolutions it forwarded to IUPAP. For a detailed article on the Conference see the CSWP Spring 2009 Gazette, Vol. 28, No. 1. Each country presented a report on their women physicists and there were more barriers than successes reported. In Namibia they believe “Physics is a man’s subject, it’s too difficult for the fragile girl’s head to handle”; in Brazil, to enter a fellowship program, women need twice the number of publications compared to male applicants; in Pakistan, women cannot do professional training because parents will not allow their daughters to attend co-ed colleges. In Argentina however, female scholarship holders who have babies are given up to 100 days paid leave and their scholarship term is extended appropriately.

A perspective on women physicists in Egypt and the Arab world was presented by Professor Karimat El-Sayed of Ain-Shams University, Cairo, the 2009 APS Marshak Award recipient and revered role model. In Egypt, as in many Arab countries, women face difficulties from having to attend girls-only schools and colleges, where the quality of education may be lower than in all-boys schools, and there are far fewer females-only higher-education institutions; even now, many parents and husbands oppose careers considered “for men only”. Girls believe that physics, mathematics and technology are tough and male subjects, and that men prefer spouses with non-scientific backgrounds, a powerful deterrent in a society where stable marriage is a high priority. In 1995, 30% of the Egyptian students who finished secondary schools specialized in science, and 30% of those students were girls. More recently the ratio of female to male university students is increasing; in Iran, for example, 60% of university students are women.

Dr. Young-Kee Kim (Associate Director, Fermi National Laboratory) talked about the status of women in science in Asia in general, and in Korea in particular. Asian women have participated in science for 4,000 years. In the past access to scholars and scientific information depended on location, birth, luck, and on a father, husband, or brother who was willing to share their knowledge. Presently, Korean women represent 30% of the physics majors and 13% of engineers. In Japan, women constitute 11% of the scientific workforce, of which 20% are in the physical sciences. In China, more than 35% of physics Ph.D. students are women, but they constitute less than 20% of full pro-

fessors at the China Academy of Science’s Institute of Physics. There are huge variations in education among Asian countries affecting everyone, caused by differences in government funding, literacy rates, classroom conditions, laboratory facilities in universities, and access to scientific information. Segregation by gender for high school and higher education is common. However, this may offer some advantage for the girls, allowing them to become more assertive. In Asia, women holding high positions in society are rather common. More important, there does not seem to be a general perception that women lack the intellectual skills required for a career in physics. Instead, the problems seem to arise from societal perceptions of appropriate roles for women. Comparing Malaysia and Pakistan, for instance, Malaysian women are generally well respected and given equal chances with men to pursue their careers by their government’s policy. In Pakistan, obstacles to women’s higher education are early marriage, subsequent family responsibilities, and lack of support from elders and husbands to continue education – similar factors to those encountered in Arab countries. Of those women that pursue higher education, the majority adopts either medicine or teaching professions, as society accepts these as appropriate female professions and they offer part-time job opportunities.

The status of women in physics in the Caribbean is quite singular, as told by Dr. Kandice Tanner (Post doctoral associate at the University of California, Berkeley). For the last five years the number of female undergraduate physics students in Trinidad’s campus of the University of West Indies (UWI) has been comparable with the number of male students. Seven out of the twelve students pursuing graduate studies are female, specializing in astronomy, materials science, environmental physics, medical physics and quantum physics. However, only one UWI campus has women in the physics faculty, remarkably, at the 30% level. The majority of primary and secondary schools are segregated, a factor that seems to enhance, rather than weaken the ability of girls to succeed in STEM disciplines. Dr. Tanner is herself a good example, having been selected, based on a national exam at age 11, to attend one of the “prestige” all girls’ schools in Trinidad. At age 18, she was recruited by an American college with a full scholarship and has done all her physics university education in the USA.

A panel discussion followed the presentations with intense audience participation from the over 200 attendees. Asked about differences in quality between all-boys and all-girls schools, both Drs. Kim and Tanner answered that not only had their schools offered excellent education but also helped them to gain confidence in choosing science as a career. It was pointed out that there is not yet a “critical mass” of women in physics and that society as a whole has to change so that critical mass can be attained. For instance, the childcare plus housekeeper roles are hard to perform with full time jobs: in Korea women prefer to pursue teaching jobs that allow 2-3 working days per week. When the child-care issue was raised, Dr. Franz pointed out that being able to follow a career path is more

important than access to good child care: having the ability to move, to go abroad, in order to better one’s career. Figure 1 illustrates the difficulty of returning to work after a prolonged child-bearing break, depicted as a noticeable drop in the percentage of women employed between the ages of 25-34 in Japan and Korea and the subsequent employment percentage is less than in Sweden and the USA. American and Swedish women do not generally quit working after child bearing (Sweden has an excellent child care support system, though the US does not), which explains the flatness of the corresponding curves.

Also discussed were the importance of roles models, mentoring and reaching out to pre-teen girls, emphasizing to them that the quality of life need not be affected by their choice of career, and that the notion that physics is “tough” should not be a deterrent. Figure 2 displays the answer distribution by 14-16 years old boys and girls to the statement “I would like to become a scientist.” In European countries, both boys and girls disagree, with girls disagreeing more. In India and African countries girls and boys agree with the statement, with a few more Ugandan girls than boys agreeing. These differing opinions are food for thought.

In summary, the problem of under-representation of women in scientific professions, especially physics, is universal, and there are significant regional similarities and differences in the manifestations of the problem. In Muslim countries, segregated schools are a disadvantage for female students, whereas in Asia, the Caribbean, and the United States, good segregated schools allow girls to become assertive and independent. Social perceptions influence women’s ability to succeed in physics: in countries that emphasize the role of women as caretakers opposition to a career in science is naturally very strong, and women need to demonstrate exceptional achievements to be able to progress. Experiences and perceptions vary also with age – women physicists who obtained their Ph.D. more than 20 years ago seem to have encountered more difficulties than women who obtained their degrees more recently, illustrating that we are approaching the “critical mass” (in some countries) mentioned in the discussions, since the number of women in physics is increasing, albeit slowly. Efforts continue to be required, by all physicists, to improve the status of women in physics, worldwide.

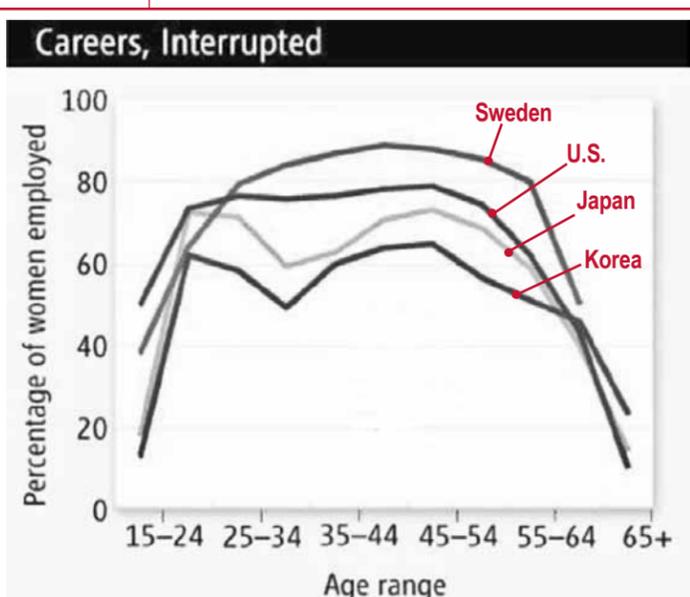


Figure 1. Affect of quitting employment to raise children on subsequent employment rates.

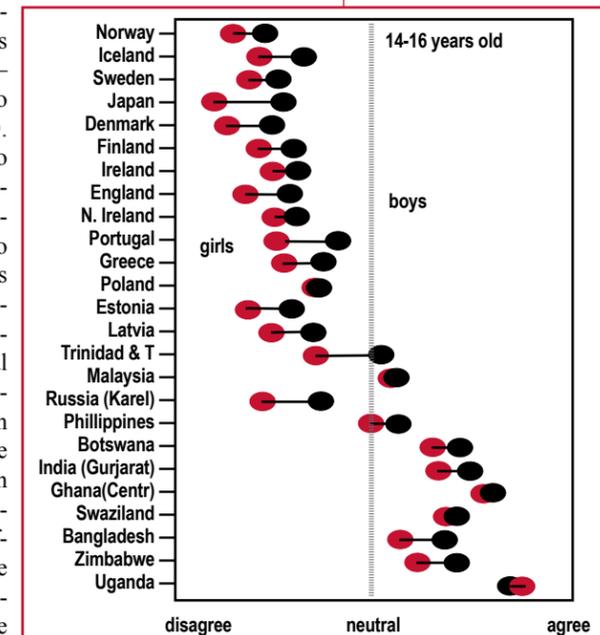


Figure 2. Global variation in children’s attitudes towards being a scientist.

Building Things that Last, *continued from page 1*

still exist. The odds are there will be new physics and new generations to discover it, new technologies that arise from basic science and a continuing need for the community to work together to influence the national discussion. Will CSWP still exist? Should it? If so, what form might it have? What will it be doing?

The June release of the National Research Council report, *Gender Differences at Critical Transitions in the Careers of Science, Engineering and Mathematics Faculty*, provided additional new data that might shed some light on future efforts. It suggests significant progress in areas of historical concern to CSWP (such as percentages of women interviewing for jobs, receiving tenure and being promoted to full professor), while raising new questions about how and where women choose to apply for academic positions. Women are not applying for tenure-track positions at the 89 research-intensive institutions included in the survey at the same rate they receive PhDs in the field. This discrepancy, interestingly, increases with increased percentages of women PhDs in a given field. The title of the press release (*Women Faring Well in Hiring and Tenure Processes for Science and Engineering Jobs At Research Universities, But Still Underrepresented in Applicant Pools*) suggests both areas for future study and the complexity of the issues: Why are women “still underrepresented” in applicant pools in areas where recent statistics of success (hiring, tenure, promotion) suggest they are “faring well”?

One thing to remember is that these relatively recent statistics still exist in a much longer history. Reading the broader world and national news quickly reminds one that we do not emerge suddenly or unscathed - individually, nationally, or worldwide — from millennia of culture that implied that women were “less” — less worthy of education, less intellectual, less likely to be in positions of leadership. On one recent Sunday, going through the *New York Times*, I read an article about the confirmation hearings for Judge Sotomayor, an article about the continued at-

tacks on schools for girls in Pakistan, an article about the critical role of maternal health care in underserved communities, an article about the influence of popular media on the self-image of girls and young women. All these issues are stories about history and culture, as well as the specifics of the day.

We seem to be making progress in creating a physics community in the US where opportunities are given fairly and performance is assessed equally, based on individual accomplishment and consistent standards, and not on stereotypes or assignment to groups. My experience on CSWP has taught me that there is still work to be done. That is reflected in the large number of volunteers who devote their time to CSWP, to the Committee on Minorities in Physics (COM), to education and outreach efforts that seek to assure that individuals who are interested in physics find a welcoming and supportive community and that the physics community, in critical symmetry, will benefit from the full range of talent and creativity available in the population today and in the future. The rate of change, since the founding of CSWP in 1972, suggests that we will get there someday. Will it be like a challenging hike, where we reach the end and everyone agrees we’ve arrived? Or will it be a more asymptotic approach, where early rates of change decrease with time and the final distances will be dramatically less, but increasingly hard to cover?

So, I will make some bets. I bet that 50 years from now, CSWP will still exist and it will still have its original charter. And I bet that 500 years from now, it will no longer exist alone - it will have evolved and be part of a Committee on the Status of People in Physics (CSPP). It will work on programs to assess and support and develop the quality of work life for everyone in our community, recognizing, as CSWP has, that things that improve the work climate for women today in physics generally improve the climate for everyone. The bet is on. Win or lose, if we meet in 50 or 500 years, the drinks are on me.

Please Update Your Address

Dear Gazette Reader,

The APS Roster of Women and Minorities is also used as the Gazette mailing list. If your address has changed and you wish to continue receiving the Gazette, please visit www.aps.org/programs/roster/enroll.cfm to re-register and select The Gazette Mailing List as your Roster group.

Questions? Contact Arlene Modeste Knowles at roster@aps.org.

We’d love to keep you reading the Gazette!

In Memoriam: Carol Jo Crannell

By Irene Engle, US Naval Academy, founding editor of the Gazette

Dr. Carol Jo Crannell was born November 15, 1938, in Columbus Ohio, and died May 10, 2009, due to complications of a progressive debilitating disease, from which she suffered for some years.

Carol Jo, as she liked to be called, developed a love of physics in high school and pursued her love of the field with a passion for the rest of her life. She received a BA degree from Miami University in 1960 and her PhD from Stanford University in 1967, studying electromagnetic cascade showers under the direction of Nobel Laureate Robert Hofstadter. For several years afterward, she studied high energy cosmic rays with the NASA/Goddard research group led by Jonathan Ormes. Carol Jo joined the Solar Physics Branch at Goddard in 1974, analyzing observations of hard X-ray celestial sources, and she continued these investigations until she retired in 2004. She contributed to our understanding of astrophysical x-ray and gamma-ray observations in several important ways. She was a leading advocate of solar x-ray and gamma-ray imaging, first as a member of the Pinhole/Occulter Facility Definition Team and then on the MAX ‘91 Study Committee. During this period, she was the Principal Investigator of the Solar Physics Branch’s balloon program with a number of flights of x-ray spectrometers in the 1980’s. She was also Principal Investigator for the High Energy Imaging Device (HEIDI) that was flown on a balloon in 1993. This instrument played a vital role as an engineering prototype for the Ramaty High Energy Solar Spectroscopic Imager (RHESSI), an imaging technique incorporating rotating modulation collimators and the solar aspect system. She was a Co-investigator on the numerous proposals that eventually led to RHESSI.

Carol Jo was a pioneering leader who encouraged women to enter physics and was an outspoken advocate of equal opportunity for all. As an early chair of the APS’ Committee on the Status of Women in Physics (CSWP), she was instrumental in establishing the National Science Foundation (NSF) program of Visiting Women Professorships and the data base of women in physics. She was also a NSF/REU site director at Goddard and was responsible, through her connections with The Catholic University of America, for the ongoing program that brought up to 50 students, undergraduates, graduate students, and post-docs to work at Goddard each summer.

She was recognized by Women in Aerospace with the Outstanding Achievement Award in 1990 for her dedication to expanding women’s opportunities for career advancement and for increasing their visibility through her activities as an aerospace professional. She was elected to Fellowship in the American Physi-

cal Society in 1992 and Fellowship in the American Association for the Advancement of Science in 1998.

Carol Jo was a gifted and sought-after public speaker and was invited often to address members of public interest groups and students in elementary schools, high schools, and colleges. During her career she taught courses at The Catholic University of America, where she was an Adjunct Professor, at the University of New Hampshire, and at the California Institute of Technology.

In the latter part of her career she concentrated more on educational outreach. She was the Education Outreach Coordinator for RHESSI. She initiated and ran the highly successful SUNBEAMS program (Students United with NASA Becoming Enthusiastic About Math and Science) that involved working closely with teachers and students from the District of Columbia. There are still web sites from students in one of the week-long SUNBEAMS sessions at Goddard proclaiming that it was “The Best NASA Experience.”

Outside of her professional life she was strongly involved with the Girl Scouts. Carol Jo was a Girl Scout Leader of Brownie, Cadet, and Senior Troops for more than 30 years. She was a trainer for other Girl Scout Leaders at all levels up to and including Introduction for Leaders to Wilderness Camping. She became a Red Cross Certified Canoe Instructor so that she could teach the Scouts canoeing.

Carol Jo and her husband Hall raised three daughters, who have each earned advanced degrees in mathematics or science. Carol Jo encouraged her daughters not only in school and in Girl Scouting, but also in their swim leagues (serving as Clerk of Course at swim meets), family life (sharing a family dinner almost every night), and community participation (speaking in their schools and serving on the PTA). Her daughters recall her active engagement in their lives, her high standards, and her philosophy of giving her children equally high levels of responsibility and freedom.

For relaxation and amusement Carol Jo enjoyed square dancing at the advanced level, grand and light opera, and she was an excellent, if occasional, seamstress. Many people’s lives were touched by their interactions with Carol Jo, and she is widely remembered with great affection.

Note: Dr. Carol Jo Crannell was one of the initiators of the CSWP Gazette. This brief synopsis of her life and some of her contributions to physics and society was created by those who know her best, her husband Hall, and daughters Annalisa, Francesca, (Crannell) and Tasha Jessup.

New! Career Development Speaker Travel Grant Program to provide assistance to physics departments that are trying to increase their career development activities and to raise the career awareness of students seeking undergraduate and graduate physics degrees.

The Committee on Careers and Professional Development will reimburse up to \$600 for one of two speakers invited to give presentations at colleges or universities on topics concerning careers in physics. Act quickly as there are a very limited number of Travel Grants available!

For more information and to fill out the online application, please visit www.aps.org/careers/educator/travelgrant/index.cfm.

Professional Skills Development Workshops for Women Physicists

Improve your negotiation skills and learn to communicate your great ideas to your colleagues.

When

Friday, February 12, 2010 | Washington, DC (Postdocs and senior tenured women faculty)
Sunday, March 14, 2010 | Portland, Oregon (Postdocs and junior, tenure-track women faculty)

Who May Apply

Women post doctoral associates and women faculty in physics. Each workshop will have one session aimed at post docs and one session aimed at women faculty.

Deadlines to Apply

November 9, 2009 (for February 12)
December 7, 2009 (for March 14)

First consideration will be given to applications received by the deadlines. Workshops will be limited in size for optimal benefits. Women of color are warmly encouraged to apply.

Participants are eligible to receive a stipend to help cover the cost of travel and up to two nights lodging.

Details at www.aps.org/programs/women/workshops/skills/index.cfm.

These workshops are funded by a grant from the National Science Foundation



Childcare Funds Again Available for APS Meetings

Sue Otwell, APS Women and Education Programs Administrator

Attending the annual meeting of the American Physical Society is an important part of networking within the physics community and a source of professional support for physicists, especially at the beginning of their career. Yet, for young families, attending an annual meeting with a small child in tow can present significant challenges, both logistical and financial.

The Committee on the Status of Women in Physics is happy to report that funds will be available again in 2010 for attendees at the APS February/March meetings who are accompanied by small children. A grant from the Elsevier Foundation's New Scholars program allows CSWP to make awards of up to \$400 to APS meeting attendees who are bringing small children or who incur extra expenses in leaving them at home (i.e., extra daycare or babysitting services). Details are available on the APS Meetings website at www.aps.org/meetings/april/services/index.cfm (Feb-

ruary) and www.aps.org/meetings/march/services/index.cfm (March). Please see the Services and Support section.

The grants can be used to help with extra costs associated with bringing a child or in leaving one at home. These costs might include airfare for a babysitter or grandparent who comes along to help out, or for extra daycare expenses at home.

Last year a parent who attended the meeting with spouse and child said, "I personally greatly appreciated the flexibility of the program in that it served to help both parents with children at the meeting, and parents who could not bring their children to the meeting but still incurred extra costs as a result of arranging child-care at home."

The grant from Elsevier augments funds provided by the American Physical Society. The Elsevier Foundation is funded by Elsevier, a leading global publisher of scientific, technical and medical information products and services. www.elsevierfoundation.org.

The American Physical Society 2009-2010 Travel Grants for Women Speakers Program

Limited funding is available for the 2009-2010 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 2009-2010 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.

◆ 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

◆ ENROLLMENT/MODIFICATION FORM ◆

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: _____

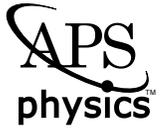
New Entry Modification

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.	<input type="checkbox"/> Add this title <input type="checkbox"/> Delete this title	<input type="checkbox"/> Accelerators <input type="checkbox"/> Astrophysics <input type="checkbox"/> Atomic/Molecular <input type="checkbox"/> Biological/Medical <input type="checkbox"/> Chemical <input type="checkbox"/> Computational <input type="checkbox"/> Condensed Matter <input type="checkbox"/> Diversity	<input type="checkbox"/> Education <input type="checkbox"/> Fluid Dynamics <input type="checkbox"/> General <input type="checkbox"/> Geophysics/ Environmental/Energy <input type="checkbox"/> History <input type="checkbox"/> Interface/Device <input type="checkbox"/> Materials	<input type="checkbox"/> Nuclear <input type="checkbox"/> Optics/Optical <input type="checkbox"/> Particle <input type="checkbox"/> Physics & Society <input type="checkbox"/> Plasma <input type="checkbox"/> Polymer <input type="checkbox"/> Statical/Nonlinear <input type="checkbox"/> Other
2.	<input type="checkbox"/> Add this title <input type="checkbox"/> Delete this title	<input type="checkbox"/> Accelerators <input type="checkbox"/> Astrophysics <input type="checkbox"/> Atomic/Molecular <input type="checkbox"/> Biological/Medical <input type="checkbox"/> Chemical <input type="checkbox"/> Computational <input type="checkbox"/> Condensed Matter <input type="checkbox"/> Diversity	<input type="checkbox"/> Education <input type="checkbox"/> Fluid Dynamics <input type="checkbox"/> General <input type="checkbox"/> Geophysics/ Environmental/Energy <input type="checkbox"/> History <input type="checkbox"/> Interface/Device <input type="checkbox"/> Materials	<input type="checkbox"/> Nuclear <input type="checkbox"/> Optics/Optical <input type="checkbox"/> Particle <input type="checkbox"/> Physics & Society <input type="checkbox"/> Plasma <input type="checkbox"/> Polymer <input type="checkbox"/> Statical/Nonlinear <input type="checkbox"/> Other
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