

# STATUS

## A REPORT ON WOMEN IN ASTRONOMY

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**The Status of Women in Physics - What, Why, and How to Change**

By Aparna Venkatesan and Meg Urry

**A Summary of the IUPAP Meeting of March 2002 in Paris, France**

THE NUMBER of women in physics is low, in the U.S. and globally, and has been increasing only very slowly. The best physics demands the best brains from more than just half of humanity; excluding women weakens physics and all of science. Just as important, women deserve the same opportunities as men to have stimulating and rewarding careers in physics. Also, a more scientifically

literate public — one that includes girls and women educated in physics — will lead to more public support of science. For all these reasons, the dearth of women in physics is an urgent concern.

On March 7-9, 2002, the International Union of Pure and Applied Physics (IUPAP) held an International Conference on Women in Physics at the UNESCO headquarters building in Paris, France. This meeting, the first of its kind, was organized



*Meg Urry and Aparna Venkatesan sharing a ride to the top of the Eiffel Tower.*

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*Delegates to the IUPAP Conference in Paris emphasized many different obstacles to the progress of women in physics, stemming from their diverse cultures. But one universally held conviction was that, in order to have both a family and success in physics, one had to marry the right man. This article, reprinted with permission from The American Prospect (April 8, 2002 issue), explores the concept of an egalitarian marriage, and what it would take create a society in which such equal partnerships were common.*



*Janet C. Gornick is an associate professor of political science at the Graduate Center and Baruch College at the City University of New York. She and Marcia K. Meyers of the University of Washington are writing a book on family policy and gender equality that focuses on lessons from Europe and Canada.*

**Reconcilable Differences: What it would take for marriage and feminism to say "I do"**

By Janet C. Gornick

FEMINISTS have long been queasy about marriage, but our queasiness is not about marriage per se; it concerns the way marriage has been practiced. The religious right paints feminists as opposed to marriage and all that goes with it: heterosexuality, men, family, love, caring, and children. Campaigning against the Equal Rights Amendment in the 1970s, Phyllis Schlafly flatly warned that "feminists hate men, marriage, and children." Twenty years later, Pat Robertson advised would-be supporters in a fundraising letter: "The feminist agenda is not about equal rights for women. It is about a socialist, anti-family political movement that encourages women to leave their husbands, kill their children ... and become lesbians."

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**IUPAP Meeting** *continued from page 1*

with two major purposes in mind: (1) to understand the severe under-representation of women in physics and related fields worldwide, and (2) to develop and implement strategies to increase the participation and representation of women in physics.



The conference was motivated by the fact that the global scientific workforce is under-utilizing a large percentage of the available talent pool. Although the situation differs widely from country to country, there is a remarkable consistency in one sobering pattern: the percentage of women in physics decreases markedly with each step up the academic ladder or with each level of promotion in industrial and government laboratories. The presence of women physicists in the upper echelons is critical for the health and diversity of the field. Since a number of physics faculty positions should be coming open as faculty hired in the sixties and seventies retire, it was especially timely and important to have an international forum to address the under-representation of women in physics.

More than 300 participants in delegations from 67 countries attended the conference. The delegates came from academic institutions, national laboratories, industry, and other sectors. The U.S. delegation was organized under the auspices of the American Physical Society and selected by the APS Committee on the Status of Women in Physics (see Table 1 on page 3).

The format of the IUPAP conference included significant input and feedback from the participants, who brought an enormous diversity of backgrounds and issues to be addressed at the meeting. As an introduction to the status of women in their countries, each delegation submitted a 2-page contribution for the proceedings, as well

as a poster on the topics concerning women in physics in their country. The conference itself included plenary sessions with invited speakers and small group discussions on the following specific topics:

- Attracting Girls into Physics
- Launching a Successful Physics Career
- Getting Women into the Physics Leadership Structure Nationally and Internationally

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**STATUS**

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<http://www.aas.org/~cswa/status>

- Improving the Institutional Climate for Women in Physics
- Learning from Regional Differences
- Balancing Family and Career

The discussion groups generated many ideas for improving the status and representation of women in physics. These were distilled into a set of resolutions ratified by the conference, plus an additional set of more detailed recommendations for use in participants' home countries as appropriate. Specific resolutions were directed at individuals, schools, universities, research institutes, industry and industrial employers, scientific and professional societies, national governments, granting agencies, and the IUPAP itself. These consensus guidelines will be used by individual delegations to stimulate change in their own countries, with the exact language modified according to the culture and conditions of each country.

The resolutions and recommendations represent one of the key results from the IUPAP conference. IUPAP also plans to provide extensive online resources related to women in physics, including the materials from the conference, a database of women physicists worldwide, opportunities for global exchange and collaboration, and links to international organizations for women in physics and science, as well as to other international institutes and conferences on related topics.

Further information may be found at:

[www.if.ufrgs.br/~barbosa/conference.html](http://www.if.ufrgs.br/~barbosa/conference.html)

#### Findings, Results, and Highlights

Prior to the conference, the IUPAP Working Group on Women in Physics, in collaboration with the Statistical Research Center of the American Institute of Physics, undertook an international benchmark study on women in physics. They collected demographic information from more than 800 women in 50 countries. The data included individual experiences and concerns as well as education and employment histories. Results were presented at the conference and are available online (Ivie, Czujko, and Stowe, <http://www.aip.org/statistics>).

Two-thirds of the women surveyed had Ph.D.s or higher degrees. Three out of four respondents said that they would choose the path of physics again, although the same fraction of women felt the situation for women physicists in their country must be improved. By its very nature, the survey did not include women who left physics, or those who never pursued it. Thus, it is worth noting that we do not have

**Table 1:**

#### Members of the U.S. Delegation

<b>MEG URRY, Chair</b>	Yale University
<i>Astrophysics, active galaxies, jets, black holes</i>	
<b>KIMBERLY BUDIL</b>	LLNL
<i>Condensed matter and shock physics</i>	
<b>HOWARD GEORGI</b>	Harvard University
<i>Particle theory</i>	
<b>KRISTINE LANG</b>	NIST, Boulder
<i>High-temperature superconductors, scanning tunneling microscopy, superconducting devices</i>	
<b>DONGQI LI</b>	Argonne National Lab
<i>Experimental condensed matter, magnetic thin films and nanostructures</i>	
<b>LAURIE MCNEIL</b>	U. North Carolina, Chapel Hill
<i>Condensed matter/materials physics, optical spectroscopy of semiconductors and insulators</i>	
<b>PETER SAETA</b>	Harvey Mudd College
<i>Condensed matter, nonlinear optics, semiconductor physics</i>	
<b>JENNIFER SOKOLOSKI</b>	CfA-Harvard
<i>Astrophysics, accreting binaries, asteroseismology</i>	
<b>SHARON STEPHENSON</b>	Gettysburg College
<i>Experimental nuclear physics</i>	
<b>SHEILA TOBIAS</b>	
<i>Author, expert in science education, feminist</i>	
<b>APARNA VENKATESAN</b>	U. Colorado, Boulder
<i>Astrophysics, cosmology, the first stars</i>	
<b>YEVGENIYA ZASTAVKER</b>	Wellesley College
<i>Experimental biological physics</i>	

Footnote: The authors thank the other U.S. delegates for contributions to this article.

data concerning the very women who must be brought into and/or retained in the profession if the numbers are to change significantly.

Statistics show that women around the world face similar barriers to their success in physics. Even in countries where it is as common for girls to study physics as for boys, the number of women physicists drops sharply with advancing level. At the top of the profession — senior faculty and directors of research institutions — women are typically only a few percent or less of the total. This cannot be explained entirely by history (i.e., the lower numbers of women studying physics in past years), since women continue to leak out of the profession at every level even today. To a large extent, the absence of women from physics is not commonly discussed in the international physics community, and few resources are devoted to improving the situation.

The large variations from country to country, and, in particular, the 50/50 mix of young men and women at the undergraduate level in many countries, indicate that there are no intrinsic intellectual barriers to women's participation in physics. Rather, the barriers must somehow be cultural, i.e., related to societal norms and educational practices in the individual countries.

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*IUPAP Meeting continued from page 3*

The conference identified some critical factors leading to the low representation of women in physics throughout the world. First, societal and individual family pressures often dissuade women from becoming or staying involved in physics careers. Both the survey data and the conference discussions made clear that support from women's families, husbands, teachers, advisors, and colleagues is crucial in attracting women to physics and keeping them in the field.

Second, the long apprenticeship period in some countries encourages the disproportionate attrition of women in going from undergraduate and graduate studies to permanent positions in their sub-fields of physics. In particular, the "post-postdoc" phase appears to be the leakiest stage of the pipeline. Many delegates speculated that this was because of the overlap of the early-career years with the peak marriage/childbearing years and because of the requirements for frequent relocation and travel.

Third, two serious concerns for women in physics across almost all nations were the dual career or trailing spouse problem (because most women physicists are married to other physicists or scientists), and balancing career and family. These issues tend to affect women's careers far more than men's, with women physicists reporting broken or commuting marriages, and deferred or no childbearing. (From the AIP report, two-fifths of respondents had no children, with one-fifth of those older than 45 years having had no children). Many conference participants emphasized the importance of choosing one's spouse to ensure mutual understanding and support of each other's careers, and equal participation in family duties.

It is worth noting, however, that family issues cannot be the major barrier to success for women already in physics. Women without children do not appear to have more success in physics than women with children. Countries with strong family support systems (daycare and maternity leave), like some Scandinavian countries, have, in fact, some of the lowest representations of women physicists. Finally, women are present in higher numbers in biology, medicine, chemistry, mathematics and other very demanding professions — there is nothing specific to physics about the conflict between work and family. At least one study (in Germany) showed that men in physics with children tend to have more influential and well-paid jobs than men with no children, whereas the exact opposite is true for women physicists, showing that male physicists are directly rewarded for factors for which their female counterparts are penalized.

Fourth, women have little exposure to physics early in life; many societies believe that physics is not for "normal" people, and if for anyone, then for men. In addition, there is a general lack of appreciation of the usefulness of physics and a lack of awareness of the excellent job prospects for physicists and specifically for women. These issues, complicated by the fact that young women lack role models and female peer groups in physics, lower the numbers of women in physics in very early stages of education and begin to explain why physics has fewer women than sciences with similarly demanding lifestyles, such as biology or medicine.

Fifth, nepotism (the support of one's own students) and "cloning" (the selection and nurturing of students who resemble the professor) lead to the exclusion of women in male-dominated environments, of which physics is one of the most extreme examples.

Sixth, the lack of transparency in recruitment and hiring processes tends to work against women. Shifting or poorly articulated standards for hiring and promotion lead to uneven reviews, which are particularly detrimental to those without strong advocates within the system. These inequities can also serve as deterrents, making science far less attractive for women.

Seventh, sexual harassment and overt discrimination strongly discourage women from pursuing physics and related fields. While perhaps rare, such events are devastating when they occur.

Together these issues begin to explain the dramatic under-representation of women in physics relative to other scientific fields. At the IUPAP conference, much attention was paid to concerns about balancing career and family, including childbearing and the two-body problem, but it was also noted that these issues are common to women pursuing any demanding career. So why are women better represented in other scientific and technical fields than in physics? A closer examination of those factors that are particular to physics must be undertaken. Both the structure of physics education and the "chilly climate" for women in physics may be contributing factors, and indeed may be coupled. Simply increasing the number of women in the physics educational pipeline will not improve the professional situation if women continue to leave the field at a high rate at each juncture in their careers.

When women are represented at all levels of the decision making, many of these issues are effectively addressed, a point made decisively by U.S. professor of biology Nancy Hopkins about her institution, the Massachusetts Institute of Technology. Sustained cultural change occurs when women are fully integrated at all levels in

*Continued on page 5*

an institution. This appeared to be the case in France, for example, where representation of women is much better than in the U.S., and where the presence of women in leadership roles is seen as commonplace. When women are marginalized and when a culture is not under pressure to change, the aggressive, competitive, non-collaborative atmosphere that some call “combat physics” can prevail.

#### Across Many Nations

The IUPAP conference revealed regional differences arising from social, cultural, and economic considerations. Although there were no clear pan-national solutions, an ambitious first step in that direction was the identification of common deterrent factors, as well as of the differing needs of women physicists around the world. For example, marriage and childbirth occurred far earlier in developing than developed countries. From the AIP report, about one-third (one-fifth) of women physicists in developed (developing) countries are not married, with about 38 percent (60 percent) of marriages occurring during their education. There were also significant differences in the timing of having children. The percentage of women physicists in developed (developing) nations who made the decision to have their first child in school, after their final degree, or to have no children was respectively 13, 34, and 53 percent (40, 32, and 28 percent).

There were some socio-statistical surprises. Scandinavian countries, whose employment systems reduce some of the family-related barriers to women, nevertheless have some of the lowest female physics Ph.D. rates. Several countries stand out as having large undergraduate enrollments in physics, notably India, Iran, and Italy. In India there are roughly equal numbers of men and women physics students through the Master of Science level. Iran had the highest percentage of female college-level enrollment in physics, whereas Sweden was almost last in the world. In several developing nations, women were free to use their maiden name on their publications but, perhaps surprisingly, in a well-developed country like Belgium, women physicists are required to use their husband’s last name on their publications. It was also found that developing nations often led developed ones in providing flexible working hours and state support for couples trying to balance the needs of family and career.

#### Recommendations

A primary focus of the conference was to articulate ways to create a better future for women in physics — a future in which the physics culture is more inclusive of difference,

whether it is gender, race, or class. Some proposed steps to achieve this future are listed here. (These are meant as possibilities rather than a complete set of recommendations, and they are not expected to be applicable in all situations).

- 1) Recognize the positive benefits of a diversity of perspectives to physics as a discipline.
- 2) Include women in the power structure to help make the decisions that shape the field.
- 3) Ensure that key decision-making processes are transparent — i.e., policies are well-known and outcomes are clearly reported. Key decisions include those related to hiring, salary, promotion, resource allocation, peer review, and speaker selection.
- 4) Work for the positive portrayal of physics and physicists. Increase the visibility of women physicists in the media and press and in the next generation of physics textbooks.
- 5) Ensure a grant system and academic path that do not discriminate against women. In regions or sub-fields where the numbers of women are particularly low, institute special incentive scholarships for girls and awards or prizes for women.
- 6) Abolish a source of age discrimination by using academic age (years since Ph.D.) rather than biological age in competitions for prizes, positions, and grants/fellowships.
- 7) Recruit more women into national and international collaborations.
- 8) Emphasize the value of doing physics early in science education. Improve physics teaching and provide talented enthusiastic physics teachers for schools.
- 9) Encourage interaction between universities/labs and schools.
- 10) Provide mentoring programs for young girls in physics. Counsel parents, teachers, and career counselors to encourage girls to pursue physics.
- 11) Establish flexible career paths from the

*Continued on page 6*

**IUPAP Meeting** *continued from page 5*

Ph.D. through the tenure phase in order to integrate the demands of family and career more easily. Provide an option to stop the career clock while women (or men) are preoccupied with family. Organize flexible grant structures that can adjust to non-traditional career paths. Possibly offer permanent positions earlier to women.

- 12) Provide convenient and affordable day care. Make work-related travel easier during the years when children are young.

**Summary and Conclusions**

In addition to the highly informative and eye-opening aspects of the conference, the IUPAP delegates shared a sense of excitement and solidarity, generated by the presence of so many outstanding women physicists. Many delegates, both men and women, described how empowering it was to have an international forum in which to discuss the integration of their love for physics with their values and goals as human beings and as members of society. Despite the fact that most of the women had overcome severe obstacles in order to reach their present positions, they communicated a sense of hope and a positive vision of the future, with a shared message of “Let us do physics: as women!” ❖

**Reconcilable Differences** *continued from page 1*

Clearly, the right misrepresents feminists’ struggle with marriage, but many moderates and even some progressives have misunderstood feminist concerns. What have American feminists really said about marriage? During the first wave of the American women’s movement, which intensified during the 1840s and culminated with the achievement of suffrage in 1920, feminists battled for egalitarian marriage as passionately as they fought for voting rights. In 1848 — in the Declaration of Sentiments adopted at the First Women’s Rights Convention at Seneca Falls, New York — Mary Ann McClintock and Elizabeth Cady Stanton wrote:

The history of mankind is a history of repeated injuries and usurpations on the part of man toward woman... . He has made her, if married, in the eye of the law, civilly dead. He has taken from her all right in property, even to the wages she earns... . In the covenant of marriage, ... the law gives him power to deprive her of her liberty and to administer chastisement.

For the most part, nineteenth-century feminists did not oppose marriage itself. Rather, they fought tirelessly for the legal rights of wives, gradually winning statutory reforms that granted married women property rights.

A second wave of American feminism emerged in the 1960s, catalyzed in part by Betty Friedan’s 1963 book *The Feminine Mystique*, which sparked a nationwide soul-search about the emptiness of housewifery. “It was a strange stirring, a sense of dissatisfaction, a yearning,” Friedan wrote. “As [each suburban housewife] made the beds, shopped for groceries, matched slip cover materials, ate peanut butter sandwiches with her children, chauffeured Cub Scouts and Brownies ... she was afraid to ask of herself the silent question — ‘Is this all?’” Friedan’s

book pulled countless wives into the women’s movement and dovetailed with activist efforts aimed at breaking down employment barriers.

While the legal constraints that galvanized their predecessors a century earlier were mostly gone, the new women’s liberationists found that marriage, *de facto*, still served many women poorly, especially in conjunction with motherhood. Sexual divisions of labor, locked in by the social norms of marriage, yielded gender inequality both in the labor market and the home, saddling women with the lion’s share of housework. Those divisions of labor institutionalized wives’ economic dependence on their husbands; in the worst scenarios, that dependence placed women in outright danger. Furthermore, feminists argued, the centrality of marriage in the dreams and expectations of girls and young women crowded out long-term aspirations for education, employment, and civic and political engagement.

Those were the central feminist concerns about marriage nearly four decades ago, and they are still the central feminist concerns today. Pegging feminists as coldhearted haters of heterosexuality, love, care, and commitment has always been a bum rap. Were marriages between women and men to become truly egalitarian — especially in economic terms — most contemporary feminists would rejoice. Were same-sex couples invited to participate, feminism and marriage could announce a full truce.

During the 1990s, a new “marriage war” broke out, one that is now front-page news. This time, conservatives fired the first shot when they inserted marriage-promotion policies into welfare reform. Feminists tend to resist these schemes because the assumptions that underlie them are largely nonsense. Basically, conservatives argue that if low-income women could be

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persuaded to marry, they would join the ranks of the economically secure. Indeed, that might be true if poor women in the South Bronx could marry stockbrokers in Westchester. But poor women's options are usually much less promising, and ample social-science research confirms that marriage-promotion policies per se are unlikely to reduce poverty. I leave the critique of marriage promotion as welfare policy to others in this issue of the Prospect in order to pursue here the challenge of egalitarian marriage.

#### **Unequal Marriage: The Price Women Pay**

Today, a small minority of couples consists of an exclusive male breadwinner and a full-time female homemaker; in most marriages, husband and wife are both employed. However, the labor-force attachment of husbands remains considerably stronger, especially in families with children; very few men are on a career-sacrificing "daddy track." Married mothers often withdraw from paid work when their children are young; many more work part-time; and a substantial share forgo remunerative jobs that require "24-7" commitment, nighttime meetings, or travel. Few married fathers make such accommodations to family. Not surprisingly, despite progress in women's employment, men remain the primary breadwinners. As of 1997, among American married couples with children under age six, fathers took home three times the earnings of mothers. And studies confirm that wives, even wives employed full-time, still devote substantially more time than their husbands do to unpaid work — both care-giving and housework.

Certainly, children need and deserve their parents' time. It's appropriate that parents weaken labor-market ties when their children are young. The trouble, however, is that marital divisions of labor shape up along gender lines, there are hazards associated with being the non-earner or lower earner, and those hazards are very unequally distributed.

Non-earners (and lower earners) in intact couples lack bargaining power both in the economy and in the marriage. And the lower-earning partner is financially vulnerable in the event of marital dissolution, despite divorce and child-support laws intended to protect them. In addition, weak labor-market ties often mean tenuous civic and political ties, which translate into compromised power both inside and outside

the home. In his 2000 book *Bowling Alone*, Robert D. Putnam contradicts the old picture of housewives as pillars of local civil society and links women's connections to employment to their participation in public forms of civic engagement.

Another problem: Huge numbers of married women are plain exhausted, battling worse "time poverty" than their husbands, particularly if they have young children and are also in paid employment. And where are the fruits of wives' unpaid work? One place is in their husbands' wages. A recent study reported in

*Business Week* found that wives' unpaid work raises married men's hourly wages by about 12 percent—a "marriage premium" for men that is explained by the "likelihood that wives shoulder household tasks." Women, meanwhile, suffer reduced earnings, not because of marriage per se, but owing to the presence of children. And nearly two-thirds of married women have children. As Ann Crittenden establishes in *The Price of Motherhood*, because of their family responsibilities women in effect pay a hefty "mommy tax" on their earnings — a tax not incurred by their children's daddies.

In their much-argued-about book *The Case for Marriage: Why Married*

*People Are Happier, Healthier, and Better Off Financially*, Linda Waite and Maggie Gallagher dismiss most of these concerns. Wives, they argue, are simply better off financially because they have access to their husbands' (increased) income as well as their own (albeit diminished) income; the two together add up to more than she would have had living alone or cohabiting. As for wives' economic dependency on their husbands, Waite and Gallagher are largely unmoved. (I suspected that when, on page 1, they characterized the women's movement as criticizing "marriage per se, which the more flamboyant feminists denounced as, ... worst of all, 'tied up with a sense of dependency.'") For the most part, these writers view the underlying economic inequality as the result of women's choices — "married moms earn less because they choose to work less" — but they don't seriously consider whether those supposed free choices are constrained by the absence of good alternatives that is inherent in archaic notions about gender, inflexible employment practices, and unsupportive public policies. In the end, they argue that making divorce more difficult and enacting divorce laws

**In the true  
marriage relation  
the independence of  
the husband and wife is  
equal, their dependence  
mutual and their  
obligations reciprocal.**

— *Lucretia Mott*  
(1793-1880)

**Reconcilable Differences** *continued from page 7*

that repay women for the sacrificed labor-market attachment can indemnify wives against any losses that they incur. Fairer divorce laws are fine — but why wait for marriages to end? For all their advocacy of marriage, Waite and Gallagher leave untouched the underlying inequities that make marriage costly for so many women.

**“Given today’s economic and social realities, it’s impossible to know whether women’s and men’s current choices reflect enduring preferences or are, instead, accommodations influenced by inflexible working arrangements, limited options for non-parental child care, and career penalties for allocating time to parenting.”**

**Toward Egalitarian Marriage**

Among feminists, there are two broad views about greater equity within marriage. “Difference feminists” argue that women’s unique characteristics, such as their stronger ties to children, should be celebrated and rewarded. From this perspective, gender equity would be achieved by making parenting a less-unequal sacrifice; essentially, wives would be repaid for the losses that they incur as individuals. “Sameness feminists,” by contrast, look toward a greater convergence in gender roles — a rearrangement of marital divisions of labor so that on average wives and husbands, in Francine Deutsch’s phrase, would “halve it all.”

The latter approach seems more promising. Reliably indemnifying women against losses caused by their greater role in family care-giving is improbable because it is so easy for husbands, employers, and even governments to free-ride on women’s unpaid work. And any solution that continues gendered divisions of labor leaves in place problematic power imbalances, both public and private.

Across Europe, feminists have taken seriously this idea of greater convergence of roles in the workplace and the home. In her recent book *Restructuring Gender Relations and Employment: The Decline of the Male Breadwinner*, British sociologist Rosemary Crompton lays out the contours of what she calls a “dual-earner/dual-career” society. This is a society in which women and men engage symmetrically in market work and in care-giving work — a society that incorporates time to care for family members. Wives would

not simply become “like husbands are now”; both wives and husbands would end up with substantial time for care-giving at home.

On the whole, what would a shift to gender-egalitarian time allocations entail in the United States? Imagine that mothers and fathers, on average, spend equal time in paid work. The accompanying table summarizes how much time married mothers and fathers in the United States spend working for pay each week (parents who are not employed — mostly women — are included in these averages). The far-right column lists the number of hours that each parent would work weekly if the couple’s combined hours on the job were shared equally.

This table tells us three noteworthy things about marital arrangements in this country. First, married mothers’ time in paid work is sensitive to the ages of their children; their hours on the job rise as their children spend more hours outside the home and need less parental time. Second, married fathers’ time at work, in contrast, is absolutely constant — perhaps not surprisingly, given that few are primary caregivers. Third, the average time that married mothers spend in employment lags behind that of their husbands, and by a considerable margin.

An egalitarian solution would entail both parents working a slightly-shorter-than-standard workweek and sharing care-giving in the home. In principle this might seem appealing to men, who often say they are sick of employment pressures, want more balance in their lives, and hope to be better fathers than their own fathers were. But for this solution to be attractive to both sexes, workplace practices have to change so that neither spouse suffers a setback as the result of caring for children. And social policy also has to change — starting with, for example, the enactment of generous paid family leave for both fathers and mothers.

At present, the idea that men as a group might shift substantial time from paid work to care-giving is remarkably controversial in the United States. But unless we settle for a society in which families “outsource” unacceptably high levels of family care-giving, a reduction in men’s working time is a prerequisite for a shift toward an egalitarian division of labor both at home and at work. Mainstream advocates of “work/family balance” and “family-friendly programs” rarely suggest that men lessen their working time. But truly egalitarian marriage rests on such a shift.

This scenario of change raises at least two fundamental issues. Do women and men want to share earning and caring in a more egalitarian way? And would couples that share and share alike incur joint costs?

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Conservatives — and even many progressives — often argue that wives simply want to be at home more than their husbands do; some claim intrinsic differences, while others cite the effect of social norms. There is no question that current work-and-family arrangements reflect the individual and joint decisions of women and men. But those decisions are made in a world with gender-specific constraints and opportunities. Given today's economic and social realities, it's impossible to know whether women's and men's current choices reflect enduring preferences or are, instead, accommodations influenced by inflexible working arrangements, limited options for non-parental child care, and career penalties for allocating time to parenting. The meaningful question is not "What do women and men want now?" but, rather, "What would they prefer in a much changed world — one with expectations not based on gender, with flexible employers, and with supportive policies in place?" The answer to that question is classically counterfactual; in today's socially constructed and highly constrained world, it can't be answered.

An often-raised concern is that there are gains to specialization, so that equal sharing might lower families' total earnings. If both spouses, for example, rejected 50-plus-hour-a-week employment, the couple might be forced to rule out certain highly remunerative occupations altogether. But this too remains an open question; there is remarkably little empirical research on the economic impact of divisions of labor shaped by gender. It's possible, for instance, that having to fit into gender-role expectations reduces parents' productivity, and perhaps that of their children when they reach adulthood. Conversely, some degree of economic loss might be more than offset by non-monetary benefits — such as distributional justice, for starters. And benefits from equal sharing might accrue to society more broadly. The rise of egalitarian marriage and the strengthening of fatherhood could produce healthier children who are enriched by the balance in their parents' lives and by more contact with their fathers. It could also help stem ongoing declines in marriage and childbearing rates and produce more reliable parenting of children generally. Scholars of the family understand that many women, in particular, forgo family after assessing the dismal prospects for combining work and family in a satisfying way.

#### **Supportive Public Policy**

How might we get from here to there? As European feminists painted portraits of the dual-earner/dual-career society, they also envisioned a change process. Clearly, private changes in gender relations and shifts in employment practices

are part of the story; but the state also plays a crucial role, both in shaping social policy and regulating labor markets.

Couples' capacity to choose egalitarian arrangements would be facilitated by a package of government policies, many of which are in place across the European welfare states [see "Family-Friendly Europe," by Karen Christopher, on page 59]. A supportive policy package would have at least four aims: to enable and support the employment of mothers with young children; to provide incentives for men to engage in care-giving at home; to support the development of high-quality reduced-hour work for both mothers and fathers; and to provide income and tax supports for families that would ease the need to maximize market hours while providing incentives for more-equal divisions of labor.

First, paid maternity leave and decent child care would go a long way toward supporting the employment of mothers with young children. Women begin to incur the mommy tax shortly after they have their first child, especially if they're not entitled to paid maternity leave — and most American women are not. All of the Western European nations and many developing countries grant mothers paid maternity leave financed by social insurance funds. Public-maternity-leave schemes have been found to increase mothers' postnatal employment rates, increase the probability that mothers return to the same employer, and lessen the wage penalty associated with time away.

In addition, high-quality, affordable child care enables mothers to work for pay. As with leave, Americans get incredibly little child-care support from government. In the United States, about 5 percent of children under age three are in publicly provided or financed child care, compared with one-quarter in France, one-third in Belgium and Sweden, and fully half in Denmark. Not surprisingly, in all of those countries, married mothers with young children take home larger shares of parental earnings than do American mothers.

Second, paid family leave for fathers, especially if designed with incentives so that fathers actually use the leave, creates a way for men to take off time from employment, temporarily, to provide care at home. Fathers in several European countries are entitled to paternity leave immediately following a birth or adoption and, more consequentially, to paid-parental-leave benefits that can be used throughout the early years of their children's lives. Furthermore, policy makers in Europe have learned that parental-leave benefits that can't be transferred to female partners and

**Reconcilable Differences** *continued from page 9*

that include high wage-replacement rates encourage fathers to take the leave to which they're entitled.

In addition, several European governments are running public-education campaigns that urge men to do more at home, either via family leave or more broadly. While the jury is still out on their effectiveness, even the Swiss government is going this route; an ongoing campaign in Switzerland — “Fair Play at Home” — is aimed at “nudging married men” to share the work at home. Despite all the lip service conservatives pay to the value of marriage, American social policy does almost nothing to encourage fathers in intact families to contribute more at home.

Third, Americans log the longest employment hours in the world. As University of Pennsylvania sociologist Jerry Jacobs observes, long hours on the job and gender equality work at cross-purposes; that is especially true in labor markets that lack options for high-quality, reduced-hour employment. Government policies aimed at shortening standard working time — either directly or via incentives placed on employers — could go a long way toward enabling men to spend more time at home. Several of the European welfare states provide models for working-time regulations designed explicitly to support gender-egalitarian families. Working-time policies (such as maximum hours) can shorten overall hours — a number of countries are aiming to set a new standard of 37.5 hours per week — and “right to time off” policies guarantee parents the right to work part-time while their children are young. (The United States neither limits total hours nor provides rights to time off.)

Further, labor-market regulations throughout the European Union protect workers who work less than full-time by requiring employers to provide equal pay and prorated benefits. So in a more egalitarian world, each spouse might log hours in paid work that fall into a new range — more than standard part-time hours but fewer than standard full-time hours. Public policies can encourage the growth of reduced-hour employment and shore up its rewards.

Finally, income supports and tax reforms would help. Some form of universal child benefit, via transfers or refundable tax credits, could replace some or all of the earnings that couples might sacrifice if husbands lessen their time in employment and wives' increases don't make up the difference. For low-income couples, in particular, cash benefits could relax the necessity to maximize (his) hours in the labor market, no matter how high the personal cost. (Among

married couples, average gender differences in employment hours are approximately the same at every point on the income spectrum.) Compared with nearly every country in Europe, the United States spends very little on public income supports for couples with children, even including the Earned Income Tax Credit. And a shift to purely individual-income taxation would encourage a more equal sharing of employment by couples. Joint taxation increases the de facto marginal tax rate on the first dollar earned by the “secondary earner” and that sets up a disincentive for wives' labor-force participation. Individual-income taxation has been implemented in several countries in Europe; it is a major factor underlying Sweden's high female-employment rate. In contrast, the U.S. tax code imposes the same income-tax burden on one- and two-earner couples. Given that employment has fixed costs, this formula disadvantages two-earner couples.

From a policy perspective, it would be hard for the United States to do less to encourage and enable economic gender equality in marriage. Across Europe, extensive public provisions support gender equality within couples, and many of these policies were implemented exactly for that reason. These policies are influential; they are part of the reason that wives and husbands in several European welfare states share employment time and earnings more equally than we do in the United States.

**Feminist Marriage: Political Prospects**

These are conservative times in the United States, especially at the federal level. It is unlikely that new social-policy offerings along these lines will be enacted any time soon. Yet the current battle over marriage and Temporary Assistance for Needy Families, silly as it is, could provide feminists and progressives a window of opportunity if it forces us to clarify our position on marriage and to organize our interests vis-à-vis the family, the workplace, and the state. Feminists should staunchly resist getting cornered into opposing marriage wholesale and, instead, focus on articulating and challenging the ways in which marriage has institutionalized inequality.

And what of the possibility for common ground between feminists and the conservatives who now hold the upper hand on the policy front? It seems that there is one serious stumbling block, but also considerable good news. In addition to pressing marriage on low-income women, conservatives have devoted much energy in recent years to homophobic legislation aimed at preempting gay and lesbian marriage. Conservatives argue that allowing same-sex marriage would devalue marriage among

straights. That logic escapes many feminists. The National Organization for Women, the leading U.S. women's organization, has endorsed same-sex marriage and resolved to fight all legislation prohibiting it, on the grounds that such laws are discriminatory. For many feminists, an enthusiastic endorsement of marriage hinges on the support of same-sex marriage — in my view, rightly so. The truth is that feminists and conservatives surely will not agree on this any time soon.

The good news is that a policy package that would support gender equality in marriage — expanded child care, paid family leave (especially for fathers), and a shift to individual-income taxation — actually has a lot in it for conservatives. These policies support the employment of women (including low-income women), strengthen fathers' ties to their children, and could raise marriage rates — all elements of the current conservative agenda. The problem is that

most conservatives will resist expanding social-policy outlays and granting women the freedom to choose nontraditional roles.

Feminists could hasten public support for gender-egalitarian marriage by clarifying, for conservatives and progressives alike, that feminists do not hate marriage per se and never have. In 1871, Elizabeth Cady Stanton wrote: "Conservatism cries out we are going to destroy the family. Timid reformers answer, the ... equality of woman will not change it. They are both wrong. It will entirely revolutionize it." Stanton was right. Truly egalitarian marriage will be revolutionary — and when it's achieved, feminists will celebrate. ❖

For a copy of *The American Prospect's* special issue on Marriage and Family, send \$1.95 to TAP, 5 Broad St., Boston, MA 02109.

*Scott Smallwood is an Assistant Editor at the Chronicle of Higher Education who writes about faculty and graduate student issues. This article first appeared in The Chronicle of Higher Education (Copyright © 2002 <http://chronicle.com>) in the March 20, 2002 issue. It has been reprinted in STATUS with permission.*

## **New Study at MIT Finds That Female Faculty Members Still Feel Marginalized**

By Scott Smallwood

**F**EMALE PROFESSORS at the Massachusetts Institute of Technology, even when paid about the same as their male colleagues, often feel like second-class members of the faculty, according to a new study.

The information came in a series of reports released this week on the status of women throughout the institution. The reports follow up on the well-known 1999 study on female professors in MIT's School of Science, which showed that women were being paid less and given fewer resources than men. That report, in addition to leading to change at MIT, prompted similar studies at numerous other universities.

The new reports, put together by four separate faculty committees, repeatedly point to women's complaints about being marginalized.

In a letter to the faculty about the new studies, Provost Robert A. Brown wrote that gender bias takes various forms, including salary inequities, but also "more subtle forms of marginalization." He cited women who feel excluded from major

decisions made within their own departments. "The overall result is the same," he wrote. "Women faculty members are not equal participants in our faculty community. A comment is repeated over and over that MIT is a 'man's world.' This must change."

Nancy H. Hopkins, a biology professor who spurred MIT to examine gender discrimination in the sciences, said that more than 200 professors came to a faculty meeting Monday to discuss the new reports. She said she was optimistic that MIT's willingness to confront the issue would prompt other institutions to do the same.

But Ms. Hopkins said the marginalization of women would be hard to undo. "You can fix salaries," she said. "But how do you change this? ... Each incident may be tiny, but when they accumulate they add up to a lot. It's a consciousness issue."

Some examples of the discrepancies highlighted in the reports:

- From 1990 to 1998, the electrical-engineering and computer-science department hired 28 men and no women. In 2000, 14 percent of the Ph.D.'s awarded in the field at MIT, the University of California at Berkeley, and Stanford University — the three institutions where the department gets most of its new faculty members — went to women.
- In another engineering department at MIT, women are rarely on faculty search committees. A female professor said that during

*Continued on page 12*

**New Study at MIT** *continued from page 11*

faculty searches, she was asked to talk with a candidate only if that person was a woman.

- In the School of Architecture, one female professor said faculty searches can be tainted by gender bias: “You have a mediocre guy and a woman. When they talk about the guy, they talk about his degrees. When they talk about the woman, they say she hesitates when she speaks, that she’s too heavy, that she won’t fit.”

- The study in the Sloan School of Management featured in-depth interviews, including meetings with all six tenured female professors in the school. The researchers “found a big difference particularly between the feelings of access, empowerment, and belonging of the men and the women faculty. None of the men had a fully negative experience on these dimensions; only one woman had a clearly positive experience.” ♦

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*Thomas Bartlett is an Assistant Editor at the Chronicle of Higher Education and regularly writes on teaching issues. This article first appeared in The Chronicle of Higher Education (Copyright © 2001 <http://chronicle.com>) in the February 12, 2002 issue. It has been reprinted in STATUS with permission.*

## **Women Who Have Children Early in Careers Hurt Their Chances to Achieve Tenure, Report Finds**

By Thomas Bartlett

**W**OMEN who have children early in their academic careers hurt their chances to achieve tenure, according to a new report.

The authors of “Do Babies Matter: The Effect of Family Formation on the Life Long Careers of Women” said colleges should do more to help female graduate students and tenure-track professors who start families. “We need to face these facts very early on and talk about what the real work/family issues are,” said Mary Ann Mason, dean of the graduate division at the University of California at Berkeley, who wrote the report with Marc Goulden, a research analyst at the university.

The problems women with children face cut across disciplinary boundaries. The report found that women who had at least one child before completing five years of post-Ph.D. work were 24 percent less likely in the sciences and 20 percent less likely in the humanities to achieve tenure than men who became fathers during that time. Women who waited to become mothers until later in their careers, or did not have children at all, were more likely to get tenure.

For men, however, it was a different story. Those who became fathers during the first five years of their careers were actually more likely

to achieve tenure than men who did not.

Also, a majority of women who achieve tenure in the humanities have not had children in the household — 62 percent. The number was 50 percent for women in sciences.

The trend remained consistent even at different types of institutions. “The early baby gap is evident at large, research universities as well as small, liberal arts colleges,” Ms. Mason said in an interview.

The report suggests several ways in which colleges could help women in academe who have children, including:

- Providing mentors for graduate and post-doctoral students specifically to focus on family/ career conflicts.
- Stopping the tenure clock for childbirth and caring for a young child.
- Creating faculty support groups for family issues.
- Accommodating couples in which both partners work in academe.
- Providing a part-time tenure track with “re-entry rights” and discounting “resume gaps” for candidates who have been inactive for a few years because they had children.

The report used data from the Survey of Doctorate Recipients, conducted by the National Science Foundation, from 1973 to 1999. ♦

Anneila I. Sargent is a Professor of Astronomy at the California Institute of Technology, and Director of Caltech's Owens Valley Radio Observatory and the Caltech/JPL Interferometry Science Center. Dr. Sargent's research has concentrated largely on understanding how stars form in our own and other galaxies and how extra-solar planetary systems are created and evolve. Dr. Sargent is the current President of the American Astronomical Society.

## Origins and Results from the Report on the Status of Women Faculty at Caltech

By Anneila I. Sargent



Anneila I. Sargent

WHEN A NEW scientific discovery is announced, it is not uncommon to find that several independent groups have been attacking the problem. A flurry of papers supporting and expanding on the original breakthrough often follows. In the spring of 1999, the Committee on Women Faculty in the School of Science at Massachusetts Institute of Technology (MIT) published a report that indicated patterns of gender bias. Perhaps most dramatic was the fact that the Dean of Science, Robert Birgeneau, and the President of MIT, Charles Vest, publicly concurred with the committee findings. Vest is quoted as saying, "I have always believed that contemporary gender discrimination within universities is part reality and part perception. True, but I now understand that reality is by far the greater part of the balance."

It should surprise no one that the MIT study was followed by a spate of similar studies and reports from other academic institutions. Caltech was no exception. In 1998, Dr. Alice Huang, Caltech Faculty Associate in Biology and formerly Dean at NYU, had undertaken a broad analysis of the situation of women at Caltech, including staff and students as well as faculty. Her report raised several potential concerns for women faculty and, as a result, when the MIT findings became public in April 1999, the entire female faculty at Caltech submitted a letter to President Baltimore requesting that a study be undertaken to determine if similar patterns existed here. The Caltech Faculty Board appointed an *ad hoc* committee, the Committee on the Status of Women Faculty at Caltech (CSWFC), to carry out the study. Our charge was to examine issues of gender inequity and related concerns among female professorial faculty at Caltech and to

report back to the Board with findings and recommendations. But we were also urged to identify conditions that might be adverse for men as well as women. Perhaps most difficult, we were asked to make recommendations in the light of our findings that would enable the Institute to maintain and improve its high standards for teaching and research.

Unlike the original MIT report we came to no firm conclusions about gender bias in the matter of salaries or of laboratory and office space. Our statistical studies led us to recommend ongoing monitoring of the situation of women in these areas. The biggest surprise was that men and women professors often voiced the same complaints, but the women were considerably more dissatisfied. Our report suggested that this result probably derived from the fact that at the time of our survey there were no women in Caltech's upper levels of academic administration, that the total number of women professors was low (11%), and that there were at least anecdotal accounts of past gender bias. This led inevitably to our prime recommendation, to increase the fraction of women faculty at Caltech to 25% in 10 years. However, most of our recommendations were based on comments from both men and women and were geared toward improving the working environment for everyone at Caltech.

The report was presented to the Caltech Faculty Board in December 2001. Overall, the reaction from the Administration has been both positive and supportive. Meeting the hiring goal will not be easy – a high proportion of all new hires will have to be women – but there seems to be a will to try, and efforts to implement other recommendations are also underway.

### Recommendations from the Committee on the Status of Women Faculty at Caltech – Final Report – December 3, 2001

The charge to the CSWFC from the Faculty Board states that an important goal is "to assure a working environment for all faculty that enables the Institute to maintain and improve its high standards for teaching and research." The Committee was requested to "make concrete recommendations so that there can be no argument later as to whether they have been implemented or not." We list below seven broad recommendations in areas where changes to current Institute practice seem to be called for. Suggestions as to how the recommendations might be implemented follow. With one exception, the recommendations are based on the findings of the previous section. The exception arises because the Committee is aware that it may be difficult for the Institute to respond to

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**Faculty at CALTECH** *continued from page 13*

all of the recommendations immediately. As a result, we urge that a means of tracking progress be put in place. We recommend that:

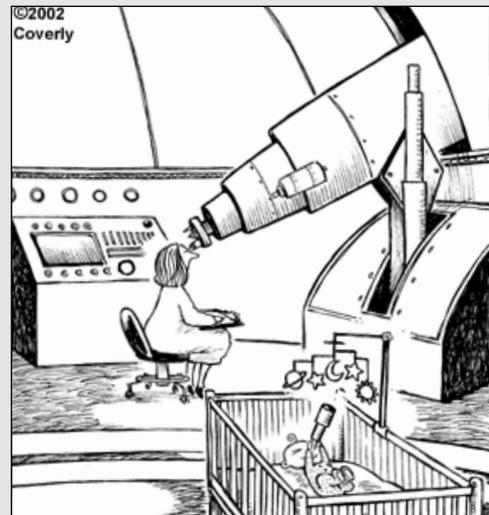
- the proportion of women on the professorial faculty be increased significantly.
- the Institute salary structure be monitored regularly to ensure equity between male and female professors; present or past inequities in salaries or raises should be remedied.
- every effort be made to follow the standard procedures leading to tenure decisions. The procedures should be conveyed to the candidates in writing.
- each Division establish and implement appropriate mentoring programs for junior faculty.
- programs that improve the working environment for all faculty and help retain women faculty should be aggressively pursued.
- the Institute initiate a fund-raising campaign focused on women in science and engineering.
- the progress on implementing these recommendations be monitored regularly, perhaps every 3 years. In essence, to achieve its full potential, Caltech needs to hire more women faculty, be more proactive in nurturing its junior faculty, and make itself friendlier to the working family. ❖

**Committee on the Status of  
Women Faculty at CALTECH**
**DIANA BARKAN BUCHWALD***Associate Professor of History***PAMELA BJORKMAN***Professor of Biology; Investigator, Howard Hughes Medical Institute***GEOFFREY A. BLAKE***Professor of Cosmochemistry, Planetary Sciences, and Chemistry***JOHN F. BRADY***Chevron Professor of Chemical Engineering***JUDITH L. CAMPBELL***Professor of Chemistry and Biology***JUDITH G. COHEN***Professor of Astronomy***DAVID M. GRETHER***Professor of Economics***JANET G. HERING***Associate Professor of Environmental Engineering Science***PAUL C. JENNINGS***Professor of Civil Engineering and Applied Mechanics***ANDREW E. LANGE***Marvin L. Goldberger Professor of Physics***JOANN M. STOCK***Professor of Geology and Geophysics***BARBARA J. WOLD***Professor of Biology***ANNEILA I. SARGENT***Professor of Astronomy, Chair*

The full report is available on-line at:

[www.aas.org/~cswa/caltech\\_report\\_2001.pdf](http://www.aas.org/~cswa/caltech_report_2001.pdf)

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*Meg Urry is currently a Professor of Physics and the Director of the Yale Center for Astronomy & Astrophysics. She does research on active galaxies, notably multi-wavelength studies of blazars. During her decade-long tenure at the Space Telescope Science Institute in Baltimore, MD, she was the chief organizer of the 1992 STScI conference on Women in Astronomy which led to the Baltimore Charter. She is currently the chair of the Committee on the Status of Women in Astronomy (of the American Astronomical Society) and a member of the Committee on the Status of Women in Physics (of the American Physical Society), and has been co-editor of STATUS since 1998 (with Lisa Frattare).*

## **Book Review: *Sex and Power*, by Susan Estrich**

By Meg Urry

**A**S A GRADUATE student and postdoc, I thought the rewards in life came automatically to the deserving — for example, that the smartest, best scientists would do well in their professions. The notion of having to ask for anything was, well, unseemly — it was too forward, too pushy. Even describing one's own work to colleagues felt uncomfortably close to bragging. Yet experience teaches that merit is not always the deciding factor, if only because it is so hard to evaluate. Instead, those who act deserving — who ask for honor and for power, explicitly or implicitly — seem to get it most easily.

I still meet young women today who, like me (or like I used to be), are reluctant to put themselves forward for positions or honors that they nonetheless believe completely that they deserve. In her book *Sex and Power* (Riverhead Books, 2000) Susan Estrich asks why women continue to play by different rules — rules that disadvantage them in the workplace. “American women have enormous power at their fingertips,” she points out, “... if [they] choose to use it.” So why don't they?

She has asked this same question of herself. In her book, Estrich describes hosting a weekly talk show on LA radio. When offered a chance to move her popular show to a higher impact, daily time slot, she hesitated because it would dislodge a fellow employee and friend. He and his wife were extremely grateful to Estrich for alerting them to the offer (he had been completely in the dark), and the move never happened. Then a year or so later, with no warning, the same friend took over Estrich's slot, and her show was canceled. He didn't hesitate and certainly didn't clue her in. Furthermore, the man's original slot was taken by a right-wing talk show, not a direction Estrich wanted to see talk radio go. What should she have done in the first event? Act “like a man” and seize her opportunity, bringing her ideas and liberalism to

the wider public but possibly hurting a friend? Should she condemn his later action or emulate it?

Estrich is well known on several fronts: she was the first woman president of the Harvard Law Review, the youngest woman to receive tenure at the Harvard Law School, and the first woman to head a national presidential campaign, for Dukakis in 1988. (In her book Estrich notes, “You still read about the first woman ‘this’ and the first woman ‘that.’ Why?” Good point!) Currently Professor of Law and Political Science at the University of Southern California — interestingly, a position she took at least in part to facilitate having a family — Estrich has spent many years in the public arena and is well-known for her generally Democratic leanings. She is a prolific writer and an insightful observer of modern life.

*Sex & Power* starts strong — with a reprise of the process of nominating Madeline Albright to be Secretary of State — and is compelling throughout. Although the book is about women in society generally, the issues are what women in science think about, and Estrich asks all the right questions. There are only three women heads of Fortune 500 companies, she notes. “Is it because there are only three women in America qualified to head a large corporation? Or is

it because qualified women don't get recognized as such?” Translate “Fortune 500 companies” to “top 10 university physics and astronomy departments”, and the point hits home.

Apparently getting ahead in law has everything in common with succeeding in science. “I vividly remember sitting in Harvard Law School faculty meetings and hearing one professor after another extol the virtues that he had in common with the would-be hire; the Ph.D.'s always thought a Ph.D. essential, while former Supreme Court law clerks would always focus on that particular line in the resume.” This can't help but sound like our hiring committees. Estrich gently skewers her former colleagues, and exposes their elitist practices as largely unconscious but implicitly discriminatory solipsism.



Meg Urry

**Sex and Power** *continued from page 15*

There are more parallels. Estrich talks about women in corporate America, who, “first and foremost ... cite a record of always exceeding expectations. Because less is expected, more is required.” My female science colleagues say this consistently. At the recent international meeting on Women in Physics (See STATUS Newsletter, June 2002, page 1), delegates argued over the factor by which a woman’s performance had to exceed her male colleague’s in order to reach the same level of success: 2.5, said Sweden. 10, said Russia! No one thought that it was sufficient to be “just as good.”

Estrich tackles a variety of areas: corporate America, law, motherhood, and politics. On motherhood she may draw the strongest reaction. She is impatient with women who opt out of professional careers to stay home and care for young children. Partly, she deplores the waste of talent and education, and, also, she insists that this path is not a simple time-out. “The problem

of the ‘mommy track’ isn’t that it represents a detour,” she argues. “A detour would work. The problem is that it’s a dead end.” Yet this also is a woman who potentially compromised her own career, giving up a tenured faculty position at Harvard in order to live in the same city as her husband. She knows the cost and wants us to make what compromises are necessary, but to hang in and stick with it and rise to the top. When I look around the halls of academe for the occasional female colleague, I want only to cheer her on.

She has a way of putting her finger on the precise point, better than most of us are able. About families and careers she says, “The assumption is that a man with children will work harder to support his family, while a woman with children will work less to be with her family. The assumption is that men are ambitious, that work is what matters most, and that women are more concerned with balancing their lives than with getting ahead.” As she points out, assumptions are not truths. Our job is to define the new truths. ❖

### **Words of Wisdom from Susan Estrich’s Book *Sex and Power***

#### *A Summary of Significant Points*

**To younger women who have not yet encountered discrimination and do not think they will:** *“It is a measure of how far we have come that so many young women today could believe that they don’t face discrimination.”*

**On the difficulty of identifying discrimination:** *“Given the subjectivity of judgment at this level, how do you prove discrimination? There will always be some other factor that can be invoked, not only by the decision-maker but by the woman herself. Maybe I just wasn’t good enough, we say to ourselves. Maybe it’s just me.”*

**On the unavailability of the “woman issue” for women in male-dominated professions:** *Early in her career, Estrich avoided teaching gender-related law, so as not to be pigeon-holed as a feminist first, law professor second. But, she says, she “learned an important lesson along the way [in her career], one that has led me to teach gender discrimination for the last decade or more: If that’s the way they see the world, they’ll see you that way, too, no matter what you do.” You can take extraordinary steps, compromise your family, put your job first, produce unprecedented results, “be extraordinary — and by and large, it still doesn’t work. They still look at you and what they see is a woman...”*

**On the goal of feminist action:** *“The purpose of recognizing discrimination is not to become a victim, but a revolutionary.”*

*Amy Simon-Miller received her Ph.D. from New Mexico State University and was a planetary science researcher at Cornell University for many years, working mainly with the Galileo and Cassini missions. She is currently an astrophysical researcher at Goddard Space Flight Center in Greenbelt, Maryland. She studies giant planet atmospheres and is a member of the Cassini CIRS team. Dr. Simon-Miller is a member of the AAS/CSWA and has recently become the CSWA web page and Women in Astronomy Database webmaster.*



### **American Astronomical Society's Committee on the Status of Women in Astronomy (AAS/CSWA) Website Updates**

*By Amy Simon-Miller*

**J**UST IN TIME for spring, the CSWA has decided to do some cleaning of its website! We are in the process of overhauling all the pages and updating links, while removing outdated information. All of the pages have been moved to our main site on the AAS servers: <http://www.aas.org/~cswa>.

The largest change has been in the Women in Astronomy Database (WiAD). The original database, designed in 1997 by Lisa Frattare, received overwhelming interest with nearly 200 entries

posted over the past five years. The design was such that new entries and modifications were emailed directly to the database administrator who had to manually add/change the entries. Many of the entries are out of date, and it is impossible to maintain the database in its current format. We have instituted a new database that should streamline entries and modifications.

Check out the new database information at: <http://www.aas.org/~cswa/WIAD.html>. Women may register as database users and then add or modify their own information at any time. In addition, a guest account will allow anyone to search the database to look for speakers or job applicants and to do statistical searches. Virtually any information or keyword can be used for a search, and you can also sort alphabetically by any of the information areas.

The previous database will remain open as a source for searching, however, we encourage women to submit information to the new database. Once it becomes populated, the old database will be taken off-line. Please encourage colleagues, students and other females in your department to submit information to the new database so that it too, may become a useful collection of and for female astronomers.

The Related Links page has also been updated. It now includes links to organizations, articles and meetings relevant to women in astronomy and other physical sciences. Please feel free to submit suggestions for links that should be included.

Finally, we wish to thank Lisa Frattare for her many years of service as the CSWA webmaster - her hard work has been truly appreciated! ❖

## **Important Women in Astronomy Web Links:**

AAS Committee on the Status of Women in Astronomy  
<http://www.aas.org/~cswa>

CSWA Publications: STATUS, AASWomen  
(How to receive them and links to archived issues)  
<http://www.aas.org/~cswa/pubs.html>

AAS/CSWA Women in Astronomy Database  
<http://www.aas.org/~cswa/WIAD.html>

## Clarification of January 2002 STATUS Article on Top Astronomy Graduate Schools in the U.S.

**A**N ARTICLE in the last issue of STATUS about the statistics of the top U.S. astronomy graduate schools (Urry and Kuck, STATUS, January 2002) gave a misleading impression of the astronomy program at the University of Arizona. The published data on first-year graduate students 1988-1992 included those in both the astronomy and planetary science departments at Arizona. The authors regret not having clarified this point in the table.

In astronomy alone, over the years 1988-1992 at the University of Arizona, there were 14 female and 19 male first-year graduate students, compared to 7 women and 17 men in planetary science (the previously published table listed 21 women and 36 men). Thus the calculated Ph.D. "yield" and "parity index" published in January 2002 did not refer to the astronomy department alone.

The graduate student data, obtained from Joan Burrelli at the NSF, come from summing the number of first-year graduate students reported to the NSF by the University over the five-year period 1988-1992. After double-checking the numbers, we do not know why the NSF data differ (slightly) from the numbers tallied now by the University (see *Letter to the Editors* on the following page). Based on the NSF data, correct values for astronomy alone are:

	Graduate St 88-92	Doctorates 94-98	Yield
<b>Women</b>	<b>14</b>	<b>9</b>	<b>0.64</b>
<b>Men</b>	<b>19</b>	<b>28</b>	<b>1.47</b>

This gives a parity index of 0.44 (yield for women divided by yield for men). The previously published parity index was 0.55. The University of Arizona calculates a parity index of 0.85 (see *Letter to the Editors* on the following page).

The number of Ph.D. degrees in the years 1994-1998 comes from the Survey of Earned Doctorate Degrees, and includes those designated by the Ph.D. recipient as "astronomy" degrees. Since "planetary science" is not an option in this survey, it is possible that some Ph.D. recipients in planetary science may have marked a category other than astronomy (e.g., "miscellaneous physical sciences"). This could contribute to low yields in the Urry & Kuck paper. In the present calculation, using only astronomy graduate students, it could cause high yields, greater than 100% (as could transfer students or those taking more or less than 5 years to finish). In neither case is there an obvious reason why these factors would affect women more than men, or lead to a parity index below 1, but we note that the small number statistics can introduce large uncertainties.

Finally, we thank the many readers who alerted us that some of the values for "Female" and "Male" graduate students in that January 2002 table were switched. The table has been corrected in the online version.

The authors regret these two errors, one in typesetting and the other in not having described the tabulated data more clearly. We welcome the following contribution from the astronomy department of the University of Arizona, who are justly proud of the successes of women in their graduate program. We would also welcome hearing from the other nine universities if they have any questions or concerns about the NSF data presented. ❖

*Meg Urry*

*Previous article by Urry and Kuck: STATUS, January 2002.*

**Attention:**

### "Yields" and "Parity Indices" for Top Astronomical Institutions

*By Meg Urry and Valerie Kuck*

**H**OW DOES astronomy compare to physics and chemistry in the advancement of women? In the accompanying article Kuck finds that top

more Ph.D.s in 1994-1998 than graduate students in 1988-1992.) Still, a few straightforward conclusions are possible.

The yield of Ph.D.s relative to entering graduate students varies tremendously for individual top-10 departments, ranging from 43% to 200% for women and 47% to 210% for men<sup>2</sup>. (Yields greater than 100% occur if people transfer into the program after the first year or take less than 5 years to finish.) The overall yield

It appears that

## Letter to the Editors



To: Meg Urry and Lisa Frattare, Editors, STATUS Newsletter

From: Ann Zabludoff, Jim Liebert, Rob Kennicutt,  
Department of Astronomy, University of Arizona

We wish to call your attention to serious errors in the statistics on the University of Arizona Astronomy Graduate Program that were summarized in your article on “Yields and Parity Indices...” co-authored with Valerie Kuck, that appeared in the January 2002 issue of “STATUS: A Report on Women in Astronomy.” The numbers listed in Table 1 of the article for students admitted and Ph.D. degrees granted are much higher than the actual numbers for our program. The net result is to seriously under-represent the Ph.D. graduation rates for our program and to grossly under-represent the graduation rate for women graduate students in particular.

We have looked up the correct numbers from our spread-sheet log of past and present students in our program. The numbers listed in Table 1 of the article and the actual numbers are listed below (we have also corrected the reversal of male and female admissions in the published table):

	Admissions 88-92			Ph.D.s awarded 94-98			Ph.D.		Parity Index
	Female	Male	Total	Female	Male	Total	Female	Male	
<b>Table 1</b>	<b>21</b>	<b>36</b>	<b>57</b>	<b>9</b>	<b>28</b>	<b>37</b>	<b>43%</b>	<b>78%</b>	<b>0.551</b>
<b>Actual</b>	<b>11</b>	<b>22</b>	<b>33</b>	<b>8*</b>	<b>19</b>	<b>27</b>	<b>73%*</b>	<b>86%</b>	<b>0.849*</b>

\* 9 of 11 women who entered our Ph.D. program in the 1988-92 period completed Ph.D.s at Arizona. Of the two remaining, one transferred to Harvard when her advisor moved there and completed her Ph.D. at Harvard. The other terminated at a Masters degree. So the true Ph.D. yield of the 11 women entering the Ph.D. program was 10 of 11, or 91%! Not counted among the entering students are 2 students (both women) who entered our Masters program from the start, not our Ph.D. program. (Arizona is unusual among the top departments for providing an unstigmatized terminal Masters option).

It is unfortunate that this erroneous information was published at a time when we and the other institutions cited were in the midst of recruiting the next academic year of graduate students. We do not know whether the data listed for other institutions are more reliable, but this example should serve to illustrate the perils of characterizing individual graduate programs with undocumented data of this kind.

We thank the Editors of STATUS for issuing the accompanying correction, and for allowing us the opportunity to correct the record. ❖

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