STATUS

A REPORT ON WOMEN IN ASTRONOMY

JANUARY 2014

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The 2013 CSWA Demographics Survey: Portrait of a Generation of Women in Astronomy

A. Meredith Hughes, Wesleyan University (Astronomy Department)

As we consider how best to promote the full participation of women in astronomy, it is important to use quantitative methods to monitor progress and identify problems. Accordingly, collecting demographic data is central to the mission of the AAS Committee on the Status of Women in Astronomy (CSWA). For the past 15 years, CSWA has built upon demographic data collection efforts spearheaded by a group of astronomers at the Space Telescope Science Institute (STScI) in 1992. The initial STScI survey was the first to investigate astronomy independent of physics. The CSWA's 1999 and 2004 surveys maintained a consistent methodology, and a large body of longitudinal data has resulted. To this day, the STScI/CSWA data set is unique in including not only Ph. D.-granting astronomy departments, but also the astronomy portions of some of the large combined physics and astronomy departments (e.g., Johns Hopkins, MIT, Stony Brook) and a sampling of non-academic institutions where many Ph. D. astronomers are employed (e.g., NRAO, NOAO, and SAO). It also differs from AAS demographics surveys in that it does not depend on membership in the AAS, which can vary substantially by academic level and institution. The results of previous surveys are presented in the proceedings of the conference on women in astronomy (1992)[1] and in past issues of *Status* (Urry 2000[2], Hoffman & Urry 2004[3]).

The current survey marks a decade since the last data collection effort and two decades since the initiation of the STScI demographics survey. With a rich, 20-year-long data set – and nearly 100% participation from the institutions surveyed – we are now able to provide an overview of how the representation of women in astronomy has evolved over the last generation. We obtained the data and contact information for previous surveys from Karen Kwitter, and much of the data collection and initial analysis was conducted with the help of volunteers from the community: Julia Kamenetzky, Brian Morsony, Karly Pitman, Stephanie LaMassa, and Johanna Teske. Surveys were initially sent to department chairs in December 2012, requesting that chairs report the demographics of their department as of January 1, 2013.

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http://www.aas.org/cswa/STATUS.html

The 2013 CSWA Demographics Survey continued

Survey Design and Sample Selection

Sample Selection: To maintain consistency with the longitudinal data, we surveyed the same list of 32 universities and four national research centers as previous data collection efforts. The 2013 survey also included three new research institutes and eight new universities, to increase the sample size and correct oversights in the initial choice of institutions. (For example, the Universities of Hawaii, Michigan, and Florida and a number of other prominent institutions are not included in the historical data). The new institutions were chosen partly to include the institutions for which CSWA has been tracking the fraction of tenured women[4] and partly to complete the list of institutions that offer a Ph. D. in astronomy. Table 1S (supplemental on-line material)[5] lists the institutions surveyed and the years for which we have data. In the analysis described below, the new institutions are included in the 2013 snapshot data, to provide a better representation of the field as a whole, while the longitudinal analysis includes only the institutions that participated in all the surveys.

Survey Design: The survey is very simple. Department chairs or administrators are asked to tally the number of men, women, and non-gender-binary astronomers at each level in their department, including graduate students, postdocs, assistant professors, associate professors, and full professors (with an option for "research equivalent" for the latter three categories). In combined physics and astronomy departments, the chair or administrator who completes the survey is asked to include numbers for astronomy personnel only. The decision about whom to include as astronomy personnel was made by individual department chairs, occasionally in consultation with CSWA members.

The 2013 survey included a few new questions: for the first time, we asked about the tenure status of faculty, the number of faculty with current administrative appointments, and the number of full-time and part-time adjunct faculty. The specific wording of the questions is given in Table 2S.[6] Several of the non-academic institutions pointed out to us that their staff hierarchy does not fit neatly into the categories provided by the survey (assistant, associate, full professor). The 2013 categories were constrained to be identical to the previous surveys, in order to maintain consistency in the longitudinal results, but upon request we consulted with staff at the non-academic institutions about how best to align their staff hierarchy with the categories in the table.

Astronomers: 2013 Snapshot and Changes over Time

Figure 1 (page 4) shows the fractional representation of women at all levels as of January 1, 2013 (including administrators and adjuncts). The raw numbers of men and women at each level are also indicated. The fraction of women decreases monotonically with seniority in the field, as expected due to the historic underrepresentation of women in the physical sciences. The exception is the adjunct faculty level, which does not fit neatly into the academic hierarchy and appears to be more male-dominated than expected for astronomers at similar career stages. The representation of women in administrative appointments is commensurate with their broader representation at the full professor level.

Figures 2 and 3 are snapshots of how women (Fig. 2) and men (Fig. 3) are distributed across seniority levels in each of the four surveys. It is immediately clear that women are still on average far more junior compared to their male counterparts: roughly three

Note from the Editor, Nancy Morrison

It is a great pleasure to undertake the duties of the Editor of *Status*. I would like to thank my predecessor, Katy Garmany, for her excellent work on this newsletter. She has now become one of the Associate Editors, who have responsibility for individual articles in each issue. As well, the rest of the editorial staff continues to maintain a high standard.

I would also like to thank Crystal Tinch and her colleagues in the AAS Executive Office for their past work in creating the finished product of *Status*. Now that *Status* is electronic only, it makes more sense to create the finished product ourselves, and I have undertaken that responsibility as well.

Already with the previous issue, we began the practice of posting individual articles to our blog, Women in Astronomy, as time permits. There, readers will be able to comment on individual articles. We will also begin archiving not only the whole issue but also individual articles as PDF documents so that they can be more directly referenced on the Web and in social media. They will be accessible through links on the Status *Newsletter - Past Issues - Table of Contents* web page.

To lead off this issue is Meredith Hughes' report on her excellent work on the 2013 CSWA Demographics Survey. There follow: Meg Urry's reflections on unconscious bias; the second of my two articles on the modern history of women in science; Johanna Teske's report on young scientists' views on work-life balance; and Dara Norman's reaction to frequent cases of unreported sexual harassment. I hope you enjoy reading!

quarters of women are junior (i.e., at the graduate or postdoctoral level) while men are more evenly split between junior and senior (typically tenure-track) ranks.

Since most astronomers are still men, Fig. 3 better reflects broader demographic trends in the field as a whole. Several general trends are apparent: in the past decade, the field has been skewing younger as the number of faculty jobs decreases and the number of graduate students increases. The assistant professor level has been particularly squeezed in the 2013 survey, with now roughly half as many positions as at the turn of the century. The more stable numbers for women in Fig. 2 reflect the fact that, even as women have increased their fractional representation at each level, the raw number of positions available has decreased, resulting in only modest (if any) numerical gains at the faculty level over the past ten years.

Table 1 provides the percentage of female astronomers by rank in each of the four surveys. The fraction of women at each stage has been steadily increasing over the past 20 years. A particularly substantial increase has occurred at the assistant professor level: the fractional representation of women increased by 50% in the past 10 years, rising from 17 to 26 percent. The fact that the assistant professor level now approaches (and is in fact statistically indistinguishable from) the 30% mark is notable in part because data collected by the Astro2010 DEM study group shows that for almost 20 years, approximately 30% of the prize postdoctoral fellowships in astronomy have gone to women (Schmelz et al. 2010)[7]. The fraction of female assistant professors now seems to be approaching the fraction of female prize postdocs, a healthy sign that the transition from postdoc to faculty position is now approaching gender equality. To pursue this hypothesis, we turn to a survival analysis of men and women over each of the two decades sampled by this series of surveys.

Table 2 compares the fractional representation of women at the graduate and the assistant professor levels in two sets of snapshots each separated by ten years. These two levels provide a particularly robust comparison, since the duration of the two career stages are comparable (5-7 years on average), and the elapsed time difference between the average graduate student and the average assistant professor is approximately ten years. For example, to investigate the fractional advancement of men between stages, we compare the number of male graduate students in 1992 to the number of male assistant professors in 2003 and calculate the fraction that advanced between these career stages over the course of a decade. We then perform the same calculation for female

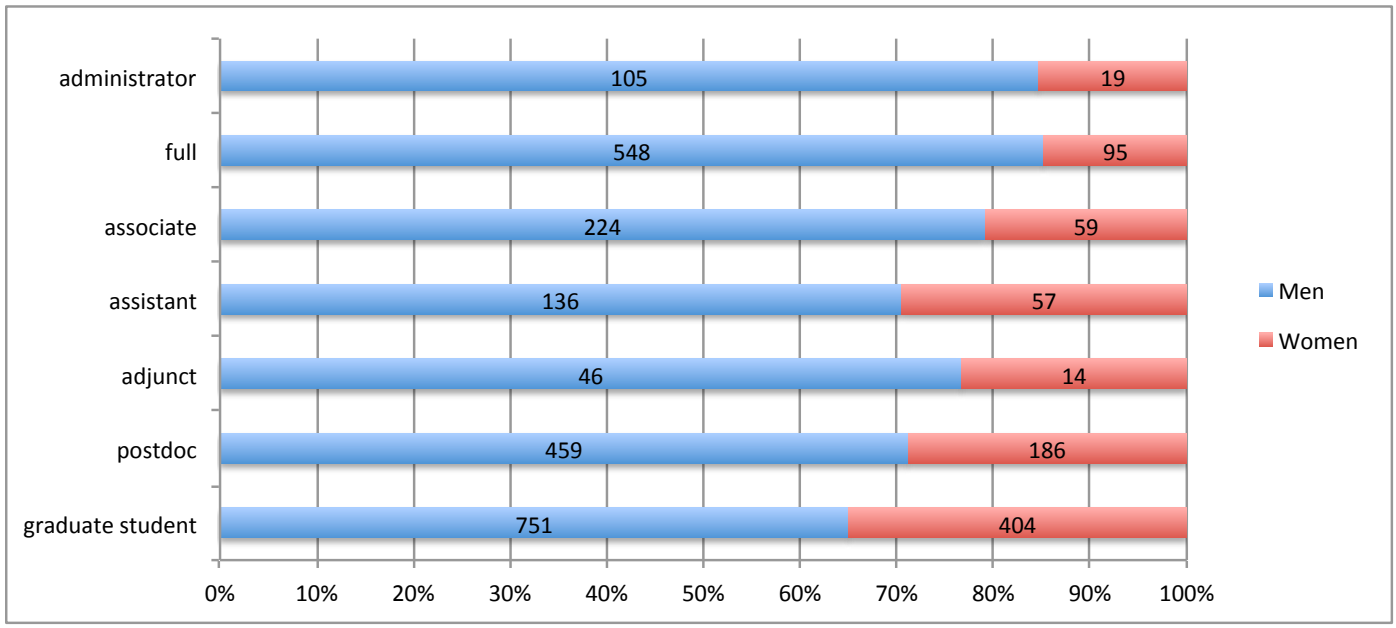

Figure 1: Snapshot of the gender demographics of astronomers as of January 1, 2013. The dividing line between red and blue indicates fractional representation of men and women, while numbers within each bar indicate the total number of men and women represented.

graduate students in 1992 and female assistant professors in 2003 and compare the resulting percentage. If women are being promoted and retained at rates comparable to men, then the fraction that advances to the next career stage should be equal for the two groups. We compare the 1992-2003 decade to the 2003-2013 decade to look for changes in the fractional advancement of the two groups. We also make the comparison for postdoctoral and associate professor cohorts in the two decades. More caution should be applied in this comparison, since the duration and elapsed time between the two stages vary far more than for the graduate and assistant professor levels. However, while the

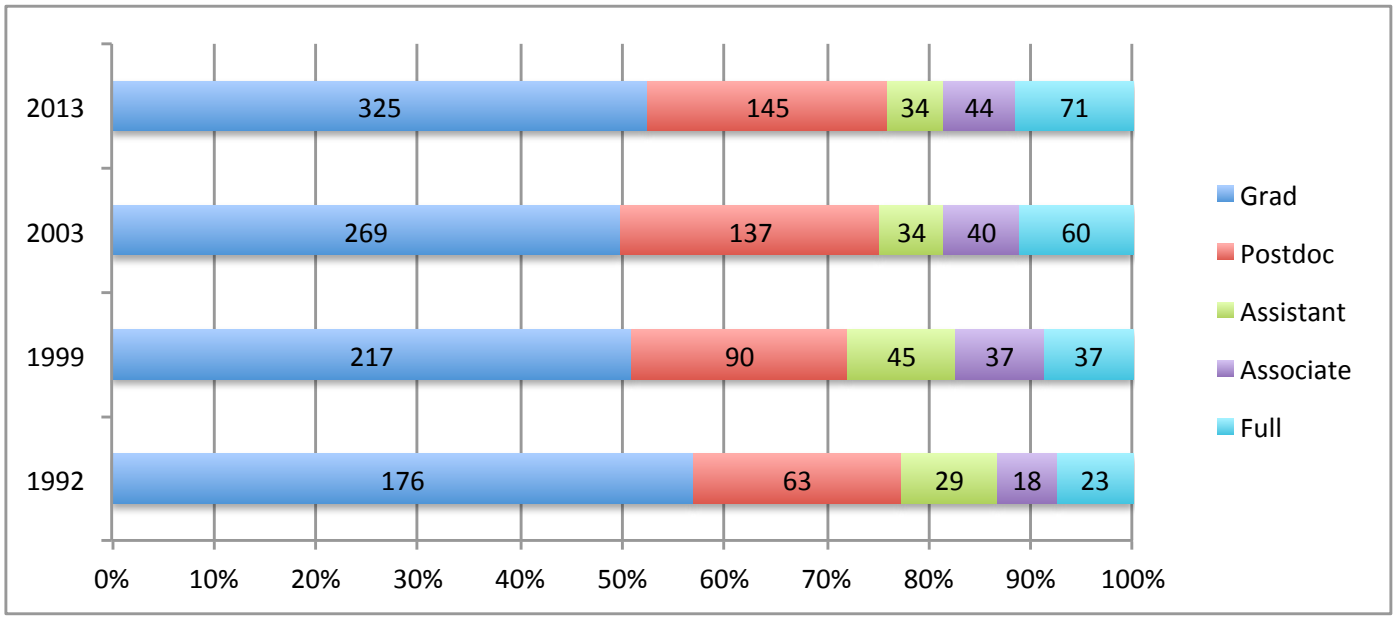

Figure 2: Distribution of female U.S. astronomers by professional rank in the 1992, 1999, 2003, and 2013 surveys. Both tenure-track and research-track scientists are included. As in Figure 1, the absolute numbers in each rank are indicated in black.

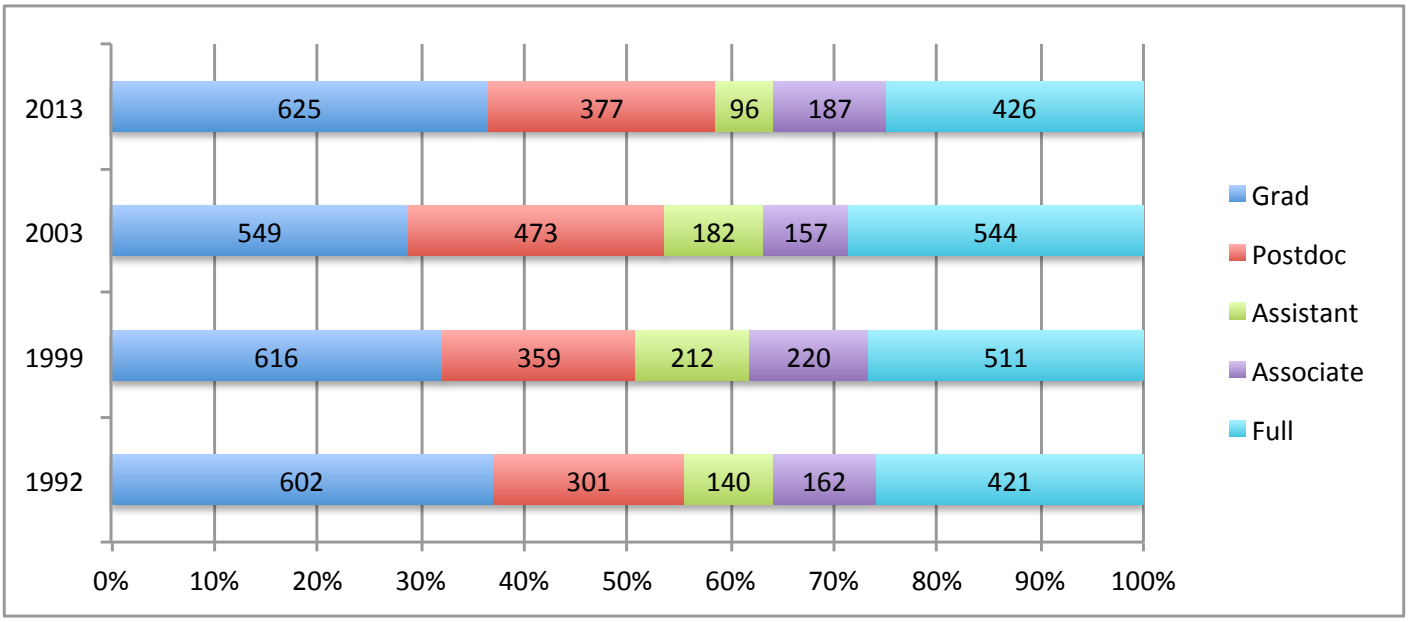

Figure 3: Same as Figure 2, but for male U.S. astronomers.

absolute values of the fraction of each cohort that advances should be treated with caution, differences between men and women are likely to be robust.

Perhaps the most encouraging result of the survey is that the gap in advancement for women at the graduate student to professor transition is closing. Between 1992 and 2003, (30±3)% of male graduate students advanced to the assistant professor level, while only (18±3)% of female graduate students did (errors are from Poisson counting statistics). In the most recent decade, by contrast, the difference narrowed to become statistically indistinguishable: (19±2)% of male graduate students advanced while (16±3)% of female graduate students did. Of course, the immediately striking trend is that the fractions have decreased for both genders over the past two decades: the job market is bad for everyone. The bottom line: while there is certainly no preference for hiring female assistant professors, the fraction of women that

Table 1: Percentage of US astronomers who are women, by rank. "Professor" positions are broken down into three categories: total (all data combined), faculty-track, and research equivalent.

Rank	**% Women 1992**	**% Women 1999**	**% Women 2003**	**% Women 2013**
Grad student	22	26	30	34
Postdoc	17	20	22	28
Assistant Prof (Total/faculty/research)	17/--/--	18/--/--	20/20/10	26/27/25
Associate Prof (Total/faculty/research)	10/--/--	14/--/--	21/21/19	19/21/18
Full Prof (Total/faculty/research)	5/--/--	7/--/--	9/9/9	14/16/11

Table 2: Survival analysis of men and women over the two decades of the surveys.

	1992 Grad Students	**2003 Assistant Profs**	**% Advancement**
# Men	602	182	(30±3)%
# Women	176	31	(18±3)%
% Women	(23±2)%	(15±3)%	
	1992 Postdocs	**2003 Associate Profs**	**% Advancement**
# Men	301	157	(52±5)%
# Women	63	39	(62±13)%
% Women	(17±2)%	(20±4)%	
	2003 Grad Students	**2013 Assistant Profs**	**% Advancement**
# Men	549	106	(19±2)%
# Women	235	37	(16±3)%
% Women	(30±2)%	(26±4)%	
	2003 Postdocs	**2013 Associate Profs**	**% Advancement**
# Men	473	194	(41±3)%
# Women	130	50	(38±6)%
% Women	(22±2)%	(20±3)%	

advances from the graduate to the assistant professor level has in the last ten years reached a rate that is statistically indistinguishable from that of their male peers.

One of the crucial transitions in the life cycle of an astronomer is from the (typically) pre-tenure assistant professor level to the (typically) tenured associate professor level. In Table 1 and Table 2, one of the most interesting trends is at the associate professor level. The fraction of female associate professors has not budged in the last 10 years: it has been (20±4)% since 2003. As Table 2 indicates, much of that low fraction can be explained by historically low rates of female postdocs: 17% among the 1992 postdoctoral cohort (and those female postdocs are the ones who filled the 2003 associate professor pipeline), and 20% in 2003 (and those are the postdocs that filled the current associate professor pipeline). Due to the small numbers of individuals involved, the percentage advancement from the postdoc level to the associate professor level over these 10-year timescales are the most uncertain numbers in our table, so it is difficult to determine whether the persistently low fraction of associate professors is due to lack of advancement, or simply lack of supply. But in the meantime, the fraction of women at the postdoctoral level has skyrocketed, providing adequate supply to substantially boost the number of associate professors in the next decade. These data predict that, by 2023, women should make up nearly 30% of the associate professoriate. Future surveys should monitor this trend to decide whether women are leaking from the pipeline at the crucial pre-tenure to tenure transition.

Institutions

In addition to trends across the field as a whole, the survey data allow us to investigate similarities and differences between institutions. Figure 4 plots the fraction of female faculty (on the left) and students and postdocs (on the right) as a function of each individual university's 2010 National Research Council (NRC) ranking. The methodology of assigning NRC rankings changed substantially in 2010, making it difficult to compare institutions' rankings over the two decades of the survey; furthermore, because the NRC now ranks according to several different sets of criteria, there is no single number to compare with each institution's demographic data. For simplicity, we therefore chose to average the high and low range of each institution's 2010 R-Rank (based on research productivity metrics) to gauge its preeminence in astronomy research.

The writeup of the 2004 CSWA demographics survey reports no correlation between the fraction of women at each institution and its NRC ranking, and indeed we do not observe much of a trend in the 2003 data. In the most recent

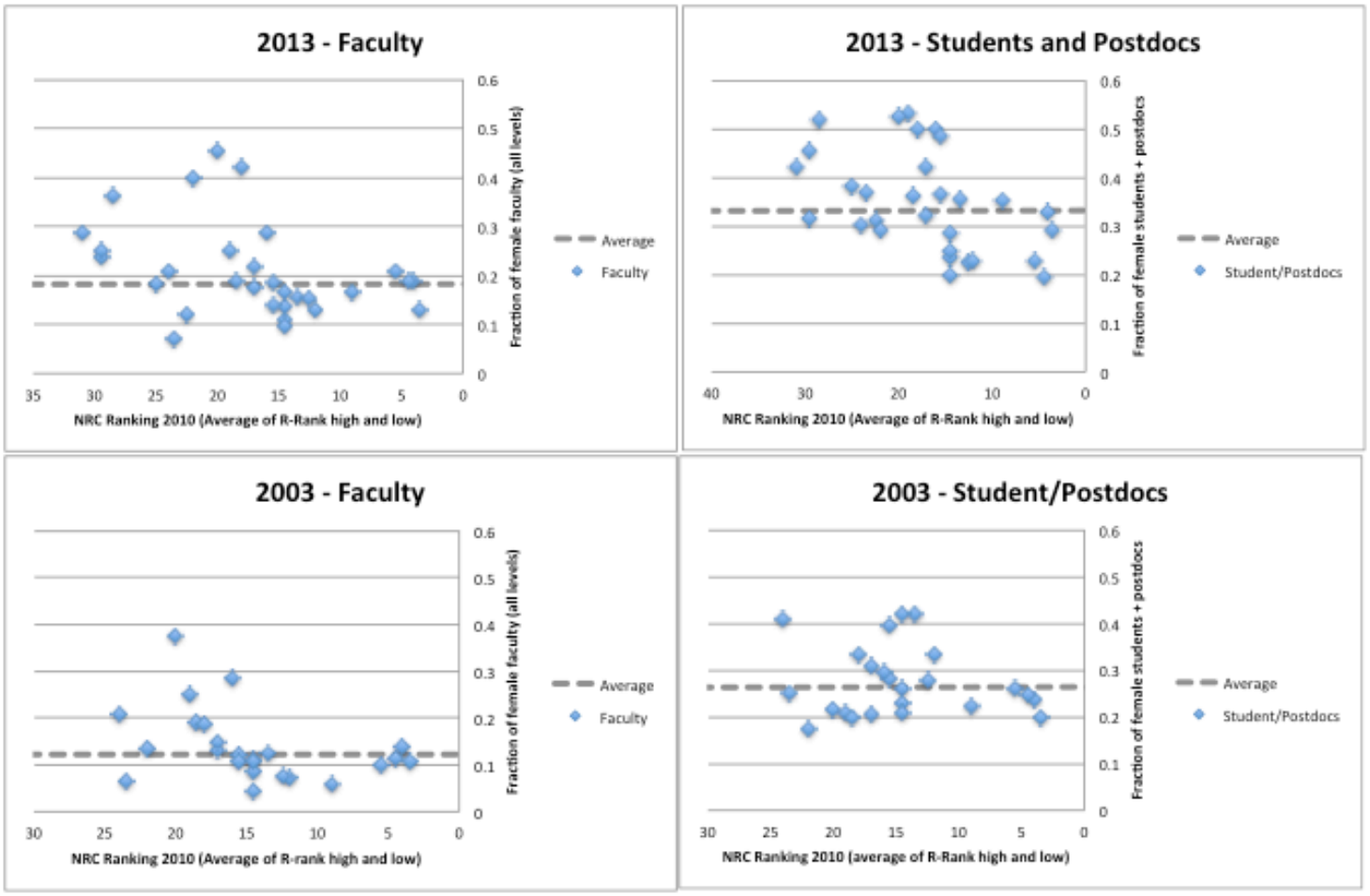

Figure 4: Fraction of female faculty and of students and postdocs as a function of the NRC R-rank of the institution

data, however, a correlation has developed between the fraction of women and the most recent NRC ranking of the institution: the higher-ranked the institution (indicated by a smaller numerical R-rank), the fewer women it tends to have at both the graduate student and faculty level. The difference has significantly intensified over the past decade, indicating that higher-ranked institutions have on average been slower to promote and retain women than their mid- to low-ranked counterparts. Nor is the trend simply a matter of department size: smaller departments are not more likely than larger departments to have a greater-than-average fraction of women. The "average" lines in Fig. 4 represent the total number of female faculty (or students and postdocs) across all institutions, divided by the total number of faculty (or students and postdocs) represented by the survey. The 2013 plots include all of the universities for which we collected data in 2013 (see Table 1S).

Furthermore, the 2013 data show that, as the representation of women in a department increases at one level, it tends to increase at other levels as well – and over the past 10 years departments have become more polarized in their representation of women. This trend is evident in Figure 5, which shows the fraction of female faculty vs. the fraction of female students and postdocs in a department. In 2003, there was no trend relating the fraction of female faculty to the fraction of female students and postdocs, but, over the past decade, such a trend has emerged in the data. While it is impossible to discern cause and effect from the simple data collected for our survey, it seems probable that whatever departments are doing (or not doing) to actively recruit, support, and retain women at one level is affecting women at other levels as well. Perhaps, with the increased number of women at all levels, it is more obvious when a department is particularly supportive or unsupportive, and therefore departments are becoming more polarized as women vote with their feet. Whatever the cause, this trend is both encouraging – in the sense that some departments have reached gender parity – and distressing, in that we see more extreme outliers at the low end of the distribution as well.

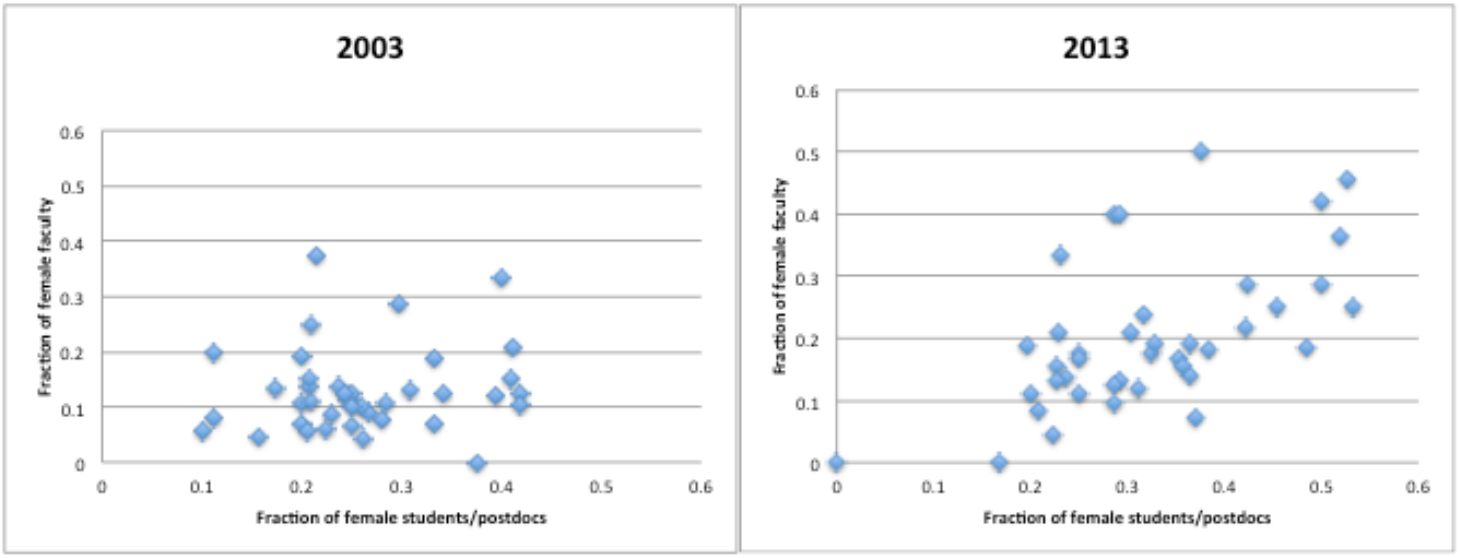

Figure 5: Fraction of female faculty vs. fraction of female students in 2003 and 2013

The increasing range in representation of women is well illustrated by the histories of two institutions that, in 1992, were similar in size, NRC rank, and representation of women. One of them has been gradually but steadily hiring and promoting women. In conjunction with strong growth in total faculty size between 2003 and 2013, it has reached gender parity. The other, while hiring and promoting at least four male faculty members since 2003, now has no women in its 18-person program at any level.

Comments and Summary

The 2013 CSWA survey suffered from many of the same limitations as the 2003 survey: it was difficult to standardize the ranks of the professoriate, particularly at non-academic institutions, and it was not clear whether consistent criteria for sorting employees were applied over the two decades of the survey. In the field of astronomy, small number statistics are always problematic, particularly at the faculty level. However, the relative uniformity of method, the consistent participation of a majority of the largest astronomical institutions, and in particular the long time baseline of this survey provide a reasonably robust overview of how the representation of women in astronomy has evolved over the last two decades. We urge CSWA to continue conducting this survey at least once per decade: in particular, the 2023 survey will be critical for monitoring the all-important pre-tenure to tenure transition and determining whether women are disproportionately leaking from the pipeline at this stage. The 2013 survey demonstrates that, for the first time, enough women have advanced to the postdoctoral and assistant professor levels to provide meaningful statistics for the transition to associate professor.

Here is a summary of our most important findings.

- Good news: In the last decade, universities have on average been recruiting and retaining women into assistant professor positions at rates approximately consistent with (but no greater than) their representation at junior levels.

- Morally ambiguous news: In the last decade, there is evidence that the currently highest-ranked institutions (according to the NRC R-Rank) have been slower to recruit, promote, and retain women than mid- to lower-ranked institutions. The research track is still more male-dominated than the tenure track.

- Unfortunate news: Departments have become more polarized in their recruitment and retention of women, with increasing numbers at the extremes of high and low fraction of female faculty, students, and postdocs.

We therefore encourage interested parties to take action at the department level. A PDF presentation containing the key figures, tables, and text is available on the CSWA website[8] and we encourage broad dissemination and discussion.

[1] *Women at Work: A Meeting on the Status of Women in Astronomy,* http://www.stsci.edu/institute/conference/wia/, http://www.stsci.edu/stsci/meetings/WiA/schreier.pdf . If your browser displays this file as unreadable text, save it to your hard disk and display it with a standard PDF reader.

[2] http://www.aas.org/cswa/status/status_jun00.pdf
Same remark as in endnote 1.

Corrected links: https://cswa.aas.org/status/status_junoo.pdf

[3] http://www.aas.org/cswa/status/STATUS_Jun04sm.pdf

https://cswa.aas.org/status/STATUS_Juno4sm.pdf

[4] http://www.aas.org/cswa/percent_tenured.html

https://cswa.aas.org/percent_tenured.html

[5] http://www.aas.org/cswa/status/online-tables-jan14hughes.html

https://cswa.aas.org/status/online-tables-jan14hughes.html

[6] http://www.aas.org/cswa/status/online-tables-jan14hughes.html#questions

https://cswa.aas.org/status/online-tables-jan14hughes.html#questions

[7] Schmelz, J., Brickhouse, N., Norman, D., Ulvestad, J., Bruff, S., and Barker, N. 2010, "The 30% Benchmark: Women in Astronomy Postdocs at US Institutions," in *Women in Astronomy and Space Science: Meeting the Challenges of an Increasingly Diverse Workforce*, Proceedings from the conference held at The Inn and Conference Center University of Maryland University College October 21—23, 2009, eds. A. L. Kinney, D. Khachadourian, P. S. Millar, and C. N. Hartman, p. 234, http://wia2009.gsfc.nasa.gov/

[8] http://www.aas.org/cswa/Jan14/CSWAtownhall.pdf

https://cswa.aas.org/Jan14/CSWAtownhall.pdf

Why We Resist Unconscious Bias

Meg Urry, Yale University, Department of Physics and Department of Astronomy

About ten years ago, I sat down at my computer to take the Implicit Association Test (implicit.harvard.edu) devised by Mahzarin Banaji, then my colleague at Yale University, now at Harvard University. I had just read a story in *The New York Times* about how she and her colleagues test reaction times for paired words and images, calibrating the experimental subject (in this case, me) on innocuous images, while we type "yes" or "no" to indicate whether the word belongs with the image. For example, you would type "yes" for a flower paired with the word "beautiful," and "no" for an iceberg and the word "hot."

I was pretty nervous. Prof. Banaji isn't interested in flowers or icebergs. She wants to know whether we are as color-blind and gender-blind as we would like to be. Has our society progressed to a point where we treat everyone the same way? Where women and men have equal opportunities to become physicists and homemakers?

Since then, I've read lots of related research. Experiment after experiment suggests we underestimate the qualifications of women in male-dominated fields. For example, Moss-Racusin et al. (2012)[1] found that science professors rate women science students lower, are less likely to mentor them, and offer much lower starting salaries. Uhlmann & Cohen (2005)[2] showed that men are more likely to be selected for a job as a police chief, whether or not they have the key qualities defined at the outset by the reviewers. In both cases, both men and women raters show the same bias against women in male-dominated fields.

It's all pretty consistent and repeatable. It's hard to escape the conclusions that these biases are real and we all have them. But I'm a scientist – a physicist. Our core value is objectivity. To do our jobs well, we have to be objective. So the Implicit Association Test threatens us where we live. The very last thing I want is to be biased.

Okay, enough procrastinating. I started the test. Calibration run: fine, I'm good at this video game. Now the "money" test: what would my fingers do when I saw a black man in a white lab coat and the word "scientist"? I hurried to push "yes" as quickly as I could – as fast as I did when the person in the white coat was white. When it was all over, I managed to fool the machine. The software reported that my bias was "undetermined" – not obviously absent and not obviously present.

Whew! "Indeterminate" was like a passing grade.

But I could feel the difference. I could feel the extra split second it took to push "yes" when the figure in the white coat was black. I might have been fast enough to beat Prof. Banaji's test, but I couldn't deny what I knew.

Ever since that moment, I've encouraged countless doubting Thomases – often scientists like me – to take the test at implicit.harvard.edu. Check it out. Maybe you too can fool the test. But I doubt you can fool yourself.

Some years ago, I had an interesting discussion with a group of colleagues. We had all served on a major university committee, and the provost invited us to a celebratory dinner. I had just read a fascinating sociology paper about the reactions of psychology professors to identical CVs, one bearing a woman's name and the other a man's, ostensibly candidates for a faculty job (Steinpreis et al. 1999)[3]. The men and women professors identified the same qualities as desirable in a new faculty hire, but, at a high level of statistical significance, most rated the male candidate higher. This was independent of the gender of the professor doing the rating.

For me, the only woman faculty member in the Yale Physics Department when I arrived in 2001, this evidence of bias was a revelation. I thought it (along with a ton of other similar experiments) showed that, perhaps, the reason women weren't progressing in science at the rate men were was not that they weren't brilliant and dedicated, but that all of us couldn't quite assess their value on the same scale as the men.

Why We Resist Unconscious Bias continued

There was some unarticulated, difficult to spot unconscious bias holding women back in male-dominated professions, like academia.

When I described the Steinpreis et al. study to a colleague across the table, he and I soon became the focus of this small dinner of a dozen faculty. He couldn't be biased, he shouted, he had hired a woman and tenured another woman and maybe he said he had had a woman student. I don't remember it all. I was horrified and embarrassed and wished I had never said a word.

However badly that interaction went, the clearest thing was how wounded my colleague felt at the implication that he might harbor unacknowledged biases. It's obviously not delightful to hear such a claim. It's only marginally better if the accuser 'fesses up to the same sin. Pretty much everyone is going to be offended.

But it's surprising how strongly offended scientists are. At first, I thought this was just defensiveness – after all, women are far below parity of numbers in science, especially in physics. So yes, maybe the leaders of those fields should feel defensive. For decades they've missed out on mentoring and working with some of the greatest minds of our time. (Read Sharon Bertsch McGrayne's *Nobel Prize Women in Science*[4] for some inspiring but often infuriating stories.)

But that ought to apply to bankers and financiers also. And lawyers, welders, and policemen. But it is scientists who proclaim angrily, "I am gender blind. I am color blind. I'm totally objective." So here is what may be at the heart of the matter: when we talk about implicit or unconscious bias, the listener hears, "You are not a good scientist."

It took me a long time to figure this out because I was excited to learn about bias and I loved reading about these experiments. I thought they explained so much of the physics world I lived in. I had not taken sociology or psychology in college; a counselor had tried to point me in that direction because I was a gregarious "people person," but I rebelled. I was determined to study physics because it was so simple and profound and powerful. Had I known just how cool the social sciences were, I definitely would have taken those classes!

So I was a late learner, starting in my postdoc years and continuing to the present day. In explaining the Steinpreis et al. (1999) experiment to my senior colleague across the table at dinner, I felt I was sharing with him the excitement of discovery, just as if I'd described one of my own astrophysics experiments. But instead of delight and interest, I excited anger. Now I see how it must have looked: me, a senior woman in the field, scolding a male colleague for being biased. (I forgot to tell him that women do just as poorly in these experiments. It's not men having unconscious bias against women, it's all of us having that bias.)

My biologist colleague, Prof. Jo Handelsman, says she encounters people who dismiss the social science results. Those of us with advanced degrees in science, they say, were trained to be objective and couldn't possibly be biased. It's an affront to the very idea of being a scientist. How can you be a good scientist if you are not objective? So pointing out that we might all be biased is equivalent to saying that we are all bad scientists.

Don't get me wrong. I'm convinced the social science is right. It has all the hallmarks of what we call science: there is a hypothesis, it's tested, the result is clear, and the results are reproducible. When these experiments are assessed according to the usual scientific criteria, most are reliable and repeatable.

Many colleagues have seen the light. At a recent picnic at work, a postdoc talked to me about how his outlook had evolved. He listened to a talk I gave, he said, and then took the implicit.harvard.edu test. Like me, he was anxious not to be biased, but he couldn't escape the conclusion that he did have these biases. (By the way, Mahzarin Banaji reportedly flunked her own test. So none of us should feel too bad.)

Why could that postdoc look objectively at this issue and come to an uncomfortable conclusion? Why can other colleagues not consider the possibility of bias?

The neat final point of the Uhlmann and Cohen (2005) paper was that those who said they were objective were more likely to change the stated criteria in mid-stream than those who said they were not objective. This suggests that being aware of bias makes one more careful about decisions. It's the people who are convinced of their own objectivity that we should be most worried about.

Where does this leave us?

Maybe not every scientist is biased. Some people might have been raised in countries or in families with minimal gender inequity. When leaders everywhere include plenty of women, maybe this bias will become less common. But, in today's world, why rule out the possibility *ab initio* when the evidence is so overwhelming? Why would any good scientist not

Why We Resist Unconscious Bias continued

evaluate the experiments? Isn't it time to act like the very best scientists and keep an open mind?

Reading the social science literature and doing our own experiments may be the only way some of us will be convinced that we have a problem. And then we can talk about how to fix it.

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[1]C. A. Moss-Racusin, J. F. Dovidio, V. L. Brescoll, M. J. Graham, and J. Handelsman 2012, *PNAS* September 17, 2012, "Science faculty's subtle gender biases favor male students,"doi: 10.1073/pnas.1211286109 http://www.pnas.org/content/early/2012/09/14/1211286109.full.pdf

[2]E. L. Uhlmann and G. L. Cohen 2005, "Constructed criteria: Redefining merit to justify discrimination," *Psychological Science*, **16**, 474-480

[3]R. E. Steinpreis, K. A. Anders, and D. Ritzke 1999, "The Impact of Gender on the Review of the Curricula Vitae of Job Applicants and Tenure Candidates: A National Empirical Study" *Sex Roles*, Vol. **41**, Nos. 7/8, 509-528

[4]Joseph Henry Press, 2nd ed., 1998

NSF Support of Women in Academia Since 1982

Nancy Morrison, The University of Toledo, Department of Physics and Astronomy (retired)

The Boston meeting of the American Association for the Advancement of Science (AAAS) in February, 2013, included a session on twentieth-century women in science.[1] This report, the second of two on this session, is based in part on the presentation by Sue V. Rosser, which was entitled, "Policy-Making for Women in Science: From NSF Visiting Professorship for Women to ADVANCE."

Rosser is Provost and Vice President for Academic Affairs at San Francisco State University. Previously, she was professor, then dean at Georgia Tech. According to the introduction to her talk, she has been influential in starting women's studies programs; indeed, she has headed two at other universities. Important for her presentation was her experience as Senior Program Officer for Women's Programs at the National Science Foundation (NSF).[2]

The NSF has been supporting women's advancement in science, engineering, and mathematics careers since at least the early 1980's. Foremost among the early programs was the Visiting Professorships for Women (VPW) Program, launched in 1982. By funding mid-career and senior women scientists and engineers to make 6- to 18-month visits to institutions of their choice for research purposes, the program aimed to make those women more visible as role models for younger women at the host institutions. The last awards under this program were made in 1996.[3]

In 1997, the VPW and other programs were merged to create POWRE (Professional Opportunities for Women in Research and Education.)[4] A "crosscutting" program, it acted across most, if not all, NSF disciplines. Unlike conventional NSF research grants, POWRE grants supported activities such as acquisition of new skills and exploratory research, and they provided focused support at critical career stages, e.g., after an interruption. Women in various positions were eligible. If they already held a faculty position, they could request support for activity at pretty much any sort of US or foreign academic or non-academic institution. If they held non-academic employment or were unemployed, the activity had to take place at a US academic institution, which would sponsor the proposal.

POWRE accepted proposals for only three years. Annually, it had total funding in the range $8 to $12 million and awarded over one hundred grants. Published abstract summaries[5] give insight into the program's support for its grant recipients: providing released time from teaching in order to re-establish a research program after prolonged illness; a visit to a foreign lab to acquire new skills; training in a new approach to a research field, thereby improving the prospects of a non-tenure track assistant professor for entering the tenure track; exploring new research approaches in mid-career; and a return to research after years spent in administration.

In 2001, POWRE was supplanted by ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers, likewise an NSF-wide program. Not a personal grant program, it accepts proposals from institutions' administrations for large-scale structural change designed to increase the participation and advancement of tenure-track faculty women. Emphasized are improvements in mentoring support, hiring practices, and work-life support. Smaller grants support self-studies and other activities in preparation for institutional transformation, especially for undergraduate and minority-serving institutions.[6]

From 2001 through 2008, 37 colleges and universities received the most substantial form of ADVANCE grant, the Institutional Transformation Award. Lesser but still significant awards were made to many additional colleges and universities. Based on experience gathered by awardees to that point, the 2009 brochure lists steps that universities can take on their own toward "a more equitable environment for women faculty."[7]

Knowledge of the outlines of this history was assumed in Rosser's presentation, which was largely drawn from her latest book, *Breaking Into the Lab: Engineering Progress for Women in Science*.[8] Among her activities at NSF, she was the agency's

NSF Support of Women … continued

liaison with the POWRE awardees. Experience with that program showed that many of the obstacles faced by those women were caused by structural problems at the universities, and it partly motivated the ADVANCE program.

In order to tease out these issues, Rosser interviewed 400 POWRE awardees. To illustrate her findings, she related some individual stories, with the women's names changed. Some of them illustrate the impact of the POWRE program on the awardees' careers.

For example, engineer "Sharon Smoakes" had a faculty position at a state university, but, on top of other problems, her department chair would not permit her to submit an NSF proposal. Thanks to NSF's allowing her to submit through another institution, and thanks to her POWRE award, she was eventually offered a faculty position near her husband's location in the Northeast. In another case, the POWRE grant to computer scientist "Mary Frail" enabled her to build a research career independently from her postdoc supervisor and eventually to obtain a tenure-track position.

Other stories don't cite the impact of the NSF program but illustrate the problems that academic women have faced in recent decades and still face today. Geologist "Sue Perimeter" said that, early in her graduate career, she was perceived as "a joke" because she was married and had a baby. Persevering, she applied to another program and succeeded there because of a more supportive climate. Biologist "Martine Ryeson" reported that she was not recommended for early promotion, even though a male professor with a weaker record was. She was eventually promoted, though, and subsequently obtained high-level administrative positions at other universities. Chemist "Angelina Longini" reported that geographical restrictions owing to her family situation required her to take a prolonged postdoc in which her supervisor "used her to run the lab."

In the interviews with the younger women, Rosser found that bias has become more covert and that the issues that confront women have taken on new faces. In hiring interviews, questions about women's plans to have a family have been replaced by the code question, "What are your plans for the future?" Overt sexual harassment by supervisors is less common than formerly, but negotiating the balance between career and family is, if anything, trickier than ever.

Rosser noted that women are learning to navigate these hazards, perhaps in part to her and her colleagues' work. Environmental engineer "Karen Frost" was interviewing for a faculty position soon after the birth of a child. Because she had to pump her breasts periodically, she was careful in selecting places to interview. Perhaps surprisingly (or not?), she received an offer from a department full of older, entrenched males, who had no problem with her situation. In a similar search for a family-friendly program, physicist "Betsy Forest" looked out for signs of overwork, such as students sleeping in the office or lab, and took note of people's reactions to her obvious pregnancy. POWRE awardees are more successful than average; many are on the tenure track, and all were able to beat the roughly 20% success rate of the POWRE program. Even they feel the effects of unconscious bias and of the "two-body problem," which are still with us today. Thus, as Rosser emphasized in her presentation, the overt discrimination she faced in her time in the 1970's as a scientist and parent has now taken on a new face.

Sue Rosser[2]

Regarding unconscious bias, she reviewed the study by Corinne A. Moss-Racusin and colleagues from Yale,[9] in which faculty from research universities rated the application materials for a laboratory manager position of a student who was randomly assigned a male or a female name. Regardless of age, faculty rank, or gender, the professors rated the fictitious male applicant higher, favored a higher starting salary, and contemplated offering more career mentoring, compared with the fictitious female applicant.

From her own experience, Rosser said, she not was surprised by the results of this study. As dean and provost, she has often seen bias in the tenure and promotion and the salary increment processes.

In hiring, the issue that most often derails hiring of women is the partner hire. Because of partner issues, women have more than their share of prolonged postdocs, which make their resumes seem less desirable to hiring committees. Partner issues also cause more women than men to be in urban locations that have more than one possible employer.

NSF Support of Women … continued

Rosser then turned to a review of the current status of women in academic science as viewed through the statistics of degree recipients and faculty position holders at various levels, broken down by field. The picture is familiar to readers of this newsletter: the proportion of women in each field declines from the Ph.D. recipient level through the faculty ranks. This pattern belies the "pipeline myth," the belief that, if women entered the lower ranks of the profession, their numbers would propagate upward. In the data available through 2006, there are "leaks" in every level of the "pipeline." This issue was another of the motivations for NSF's ADVANCE program, which had as one of its goals enabling women to achieve senior positions such as dean, provost, and university president.

By comparison, the numbers for university presidents (some of whom are scientists) are interesting: of all college presidents, 26.4% were women as of 2012. In the eight Ivy League universities, there were four women presidents (but only one scientist or engineer). Two major technological institutions have or recently have had women presidents. Of the ten University of California chancellors – all scientists, engineers, or physicians – three are women. Four out of the Big Ten have women presidents. Among public universities and the Big Ten, there is a trend toward scientists and engineers as presidents. Rosser pointed out that, in the course of managing grants, running laboratories, and interacting with funding agencies, scientists acquire leadership skills that are applicable to heading a university.

Why is it important for women to be in leadership positions? In addition to the usual concerns about visibility and role modeling, leaders are critical for setting the agendas of organizations. For example, when Bernardine Healy became head of the National Institutes of Health, clinical studies on heart disease had been done mainly on men. Women with heart disease tended to be underdiagnosed and inappropriately treated. They had higher death rates from angioplasty and bypass surgery because, it turns out, women have smaller arteries than men, who were considered the norm for those techniques (also a problem for Asian men). As a result of activism, legal efforts, and women in leadership positions, meaningful research was done and lives were saved.

A significant trend for the future is society's growing emphasis on technology transfer and innovation. In particular, funding has shifted from basic to applied research. A concern in this arena is a conspicuous gender effect in data on receipt of patents. For example, in pharmaceuticals, about 50% of the professionals are women, but women obtained only 21.4% of the patents in the US in 2001. Averaged over all countries and fields, women in 2001 obtained only 9.2% of the patents (up from 6.4% in 1993). The 2001 rates ranged from a low of 4.5% in Austria to a high of 17.5% in Spain; the US rate in 2001 was 11.1%.[10]

Detailed information is available from a study of MIT's biology department, where only 30% of the women faculty had patents, compared with 74% of the men. Although there was some age variation, essentially the same trend held for the younger women. For graduate students, the study found that, while men were trained to write patent applications, women training with the same mentor typically were not. Rosser recalled a similar feature of her graduate school years, when men students were typically trained to write grant proposals, but not women.

In order to investigate why women obtain patents at such low rates, Rosser interviewed women employed in Silicon Valley. The issues they identified are the same ones that have affected women in academic science: limited opportunities; the tendency for professionals to mentor and network with those who are like them; gender stereotypes; a tendency for women to avoid risk; and geographical constraints against gravitating toward technology "hot spots." This is where the money and the prestige are going, and the women scientists and engineers are not there. With this background, it was a pleasure to read recently about a jump in the fraction of patents awarded to women in the years leading up to 2010.[11]

Another reason for concern about the gender gap in technology innovation is that men and women tend to innovate in different sectors. Women tend to develop products for women and for underserved groups, but these products turn out to be useful for everyone. For example, curb cuts are designed for wheelchair-bound people, but they are also helpful for maneuvering bicycles, baby strollers, and wheeled suitcases. If women continue to avoid or be shut out of the technology sector, the resulting loss of diversity will harm everyone.

Rosser's presentation reminded the audience that the dramatic progress by women in science since the 1970's is due in part to forward-looking NSF programs. At the same time, she reminded us how many problems remain to be solved. In the question session, I asked whether research has been done on the effects of ADVANCE, similar to her research on the outcomes of POWRE awardees. Her reply was that she is in the process of repeating the interviews of the POWRE awardees after a time lapse of ten to fifteen

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years. Several studies of ADVANCE by others are in progress; information is available on the Virginia Tech ADVANCE portal.[12] I plan to report on this topic in a future article.

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[1] The session was held in celebration of the 25th anniversary of "the first multi-author collection of essays on the history of women in science, *Uneasy Careers & Intimate Lives, Women in Science, 1789–1979*." The speakers were Margaret Walsh Rossiter (Cornell University), Sue V. Rosser (San Francisco State University), Nancy G. Slack (The Sage Colleges), and Pnina G. Abir-Am (Brandeis University). Audio recordings of all the speakers and the slides from Rosser and Slack are available for sale here: http://www.dcprovidersonline.com/aaas/index.php.

[2] A summary of Rosser's distinguished career can be found at http://www.sfsu.edu/~academic/provost.html, which is also the source of the illustration.

[3] For more information: http://www.nsf.gov/pubs/1999/nsf9928/nsf9928.htm

[4] http://www.nsf.gov/pubs/1999/nsf99164/nsf99164.htm

[5] http://www.nsf.gov/pubs/1998/nsf9843/nsf9843.htm

[6] For more information: http://www.portal.advance.vt.edu/index.php/about, http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5383

[7] http://www.nsf.gov/pubs/2009/nsf0941/nsf0941.pdf

[8] 2012, NYU Press

[9] http://www.pnas.org/content/early/2012/09/14/1211286109.abstract, September 2012

[10] Data by Rainer Frietsch, Fraunhofer Institute for Systems and Innovation Research ISI

[11] http://nwbc.gov/news/more-women-obtaining-patents-trademarks-recent-years

[12] http://www.portal.advance.vt.edu/index.php/categories/workandlife

Report on "NextGen VOICES Results: Work-Life Balance"

Johanna K. Teske, University of Arizona, Department of Astronomy (Ph. D. student)

In July 2013, *Science* asked young scientists to answer this question: "What one change would most improve work-life balance for scientists?" In its October 4th issue[1], the journal ran excerpts from 15 responses, but the editors also recently made available "the best" of the additional multitude of responses.[2] As the work-life balance issue is central to the concerns of the CSWA, I thought it would be useful, and potentially revealing, to delve into these responses from young researchers across a range of scientific disciplines and see if there are broad themes and/or innovative ideas. In my synopsis, I try to stick to concrete ideas and suggestions that address the question directly. I include specific quotes, so that *Status* readers can go to the link above and search for the associated full essays.

We need better sensitivity and flexibility for families (parents in particular).

"It would be extremely beneficial to be able to take a parental leave of absence without consequence to career timelines, such as deadlines for tenure advancement."

"It [how unaccommodating some positions are for families] seems to be something that universities and institutes do not even consider when advertising the job. ... [P]ostdoctoral positions are sometimes set up with very little to offer in terms of social benefits. This can include not only important healthcare benefits, but financial aid going toward childcare costs ..."

"Many female scientists give up their careers because they cannot afford the expenses of their absence from home. The one thing I suggest for improving a work-life balance is that the government support working women scientists by establishing affordable governmental daycares and summer schools for their kids. In addition, the academic community, universities and funding agencies should keep in mind the differences in the social responsibilities between males and females."

We need a cultural shift towards more creativity in the way we approach research, time management, and skill development.

"How can we make a cultural shift toward giving ourselves more space for creativity, such that we might spend more time in the workplace pursuing new ideas, and consider time spent away from work a critical way to 'recharge'? One concrete proposal would be to shift toward longer-term (5-year) postdocs and grant cycles. This would give early-career scientists more flexibility to pursue original ideas, and to take time for home life, exercise, even full nights of sleep."

"To improve work-life balance and overall well-being, exercise during working hours should not be merely tolerated, it should be expected. … Nothing else comes close to bestowing the broad benefits of a solid exercise routine ..."

"Make 'No' part of your vocabulary. … Setting priorities helps to keep a work-life balance."

"We grow in these roles of entrepreneur and small business owner by trials and errors, without management training." [Therefore, universities should provide management training so that students can gain more confidence and skills, increase their funding base, and be more versatile in the job market.]

"The assumption that working long hours in the lab leads to improved productivity needs to be debunked. It has been shown many times that longer hours generally lead to inferior quality of work, inability to focus, and other effects detrimental to good science."

"Because scientists will not simply become less passionate and driven about their work, the solution to their work-life balance lies in allowing them to do the same work more flexibly. The development and implementation of precise and dexterous robots in research facilities, controlled remotely by

Report on "NextGen VOICES Results …"
continued

scientists in the comfort of their own homes, would provide these scientists with more time for life and would not detract from their working productivity."

We need better compensation schemes and more appreciation of nonresearch activities.

"A sharp increase in scientists' salaries, I think, will most improve work-life balance for scientists, especially for young scientists in China."

"... [T]he thing that will most improve work-life balance for all scientists is ethical treatment in laboratories. Too often we hear stories … of unethical treatment of students, professors, scientists, and researchers. … These ugly monsters raise their heads in the form of low salaries that require inhumane work hours as well as looking the other way when research integrity requires you to stand up and say 'this is unacceptable'."

"Genuinely acknowledging and rewarding … societal engagement, teaching excellence, and input and deliberation at key meetings and conference participation could go a long way toward balancing the demands of academic output to publish alone, thus lessening the pressure to spend endless weekends and vacation time writing for quantity rather than quality."

"In science uncertainty is inescapable, yet scientists operate within a reward system that increasingly demands quantitative consistency in impact factors and grant dollars, treating quality of discovery like a commodity. … We should reward outreach and ethics, as well as deep commitment to value, rather than mere quantity of dollars or impact."

We need radical change in our academic system.

"One strategy is to professionalize the postdoc as a permanent career: Researchers who want to continue a career in academy and do not want to become a principal investigator should be retained as permanent research staff for coping with all the aforementioned activities. This may lead toward smaller but more efficient laboratories, with more balanced 'work-life' conditions for young scientists."

"Reduce the number of people who are entering into academia by either reducing the number admitted into Ph.D. programs or directing people into alternative career paths. The competition is just prohibitive and there is not really any way to address the problem except by either increasing the resources that people are competing for or reducing the number of people."

"... [A] decrease in or removal of the postdoctoral years would definitely improve the work-life balance. … [I]nstead, academic institutions should pick students straight after completion of their Ph.D. for tenure-track positions and staff scientists with much higher salaries should replace postdocs."

"[Implement] a policy of compulsory 3 weeks of vacation a year. ... [I]t would lower stress levels and remove the notion that one needs to work all the time to stay competitive."

"... [O]nly when equal opportunity is presented for differing parties, can individuals, men or women, young and old, of any color and religion, reach their full potential and have the option of work and life balance."

We need to change the way we think about "work" and "life".

"... [I]f you come to work because nothing excites you more than a band on a gel (and the story behind that band, where all of a sudden everything falls into its place), then running that gel at 1:00 a.m. makes sense. Is it work? It's just life, perfectly balanced and happening at a workplace, not on a couch in front of the TV set. How to make sure that incoming graduate students understand that? Stop using them as cheap labor. Raise the salary, but raise the standards and expectations."

"There doesn't have to be a barrier between personal life and work! ... [Bring] your family to the lab and explain your research, give them a tour of your facilities and engage them in your everyday life … Not only will your life benefit for these simple activities, but it is quite likely that you will be able to break this barrier that precludes science from being an important aspect in everyday life."

"Can in the end our work not represent a positive factor in life's equation? ... I recommend that as scientists we strive not for an increased work-life separation. Rather, as scientists we should focus on achieving a healthy work-life integration."

Report on "NextGen VOICES Results …"
continued

Discussion

It's no surprise that many of these recommendations revolve around supporting a family. The balance between work and "life" might actually be, for most people, a balance between work and family. I was encouraged by the fact that men as well as women seemed to be emphasizing this point. Another related theme revolves around the all-too-common situation of having one post-doc after another, without a more permanent location and community. This contributes to mental and emotional stress, to difficulty in producing quality work and still "having a life," and (more often in the case of large labs) to inability to make a name for oneself as an independent researcher.

I also recognize a general sense that skills beyond "paper-producing power" need to be taught, encouraged, and valued, in order to better prepare scientists for performing the tasks required of senior positions, for interacting with people of different professions, and, if necessary, for a career shift. Several people go as far as suggesting elimination of postdoctoral positions altogether, but I have a hard time seeing how the system could financially support having "staff scientists with much higher salaries replace postdocs," while the postdocs go into tenure-track positions right away. This touches on an argument that I've heard before, though – we should not be accepting so many graduate students into Ph.D. programs, only to have so many leave the field due to the job market and/or their interests/priorities changing. Is the purpose of a science Ph.D. program just to generate more (academic) scientists?

There are a few suggestions, some of which are not included in the above digest, that I'm not so sure about. An "optimal living facility infrastructure," where you live and shop and eat and run errands all on the same campus where you work? A robot (advocated in two essays) that performs all the experiments on its own, from hypothesis to data analysis to verification? (Will our robotic telescopes ever approach this?) A "Monthly Spouse Letter," which is suggested as a way for a wife to get more time with her workaholic husband? I do find empowering the suggestion by several people that we abandon the notion that "work" and "life" are separate sides of a seesaw. I like my work, and find it interesting and exciting, and I like thinking about it and talking about it with others. But I fear those people might be missing the point that is exemplified by one person's suggestion of "compulsory vacation, so that everyone is on a level playing field." Unless everyone buys into the/any work-life balance "solution," it isn't going to be effective or last very long. And so perhaps, as this *Science* article beautifully illustrates, the phase that we are in right now as a science community is acknowledging that work-life balance – however you personally define it – is something worth aspiring to.

What do you think? How do you define "work-life balance," and what do you do (if anything) to practice it? Are any of these suggestions realistic, helpful, and sustainable in astronomy? You are encouraged to contact the author[3] if you are interested in contributing to a follow-up article in *Status*!

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[1] *Science*, 4 October 2013, "NextGen VOICES," **342,** no. 6154, 36-38

[2] http://www.sciencemag.org/content/342/6154/36/suppl/DC1

[3] Johanna Teske <jkteske@email.arizona.edu>

Fed Up with Sexual Harassment

Dara Norman, NOAO

I am not too social with my media and I am not much for reading blogs. However, even lacking modern connectivity, I still managed to hear about the "urban whore" episode through the electronic grapevine (a listserver). The outrage of the sender and the sketchiness of the account made me immediately curious. A very brief synopsis is that an African American female scientist who writes a blog for *Scientific American* under the title "Urban Scientist" was asked to contribute to another science blog. When she inquired about compensation, she was asked, in an email, by the editor if she was "an urban scientist or an urban whore." Googling "urban whore" turned out to be sufficient to get the story.

My reaction – probably typical – was a cascade of emotions. First, I went through shock: not only that the name-calling happened but, even more, that someone would demonstrate such blatant disrespect in an email! I was also outraged at the editor's assumption of his own privilege and power. I moved on to recognition that as a Black female scientist, similar power play put-downs have certainly happened to me. Finally I settled into a feeling of helplessness that these things continue to happen at all levels of science and in many scientific fields. In the explosion of commentary since the initial episode, I've seen a few discussions based on the assumption that a male scientist would never be insulted for asking about compensation for his work. I also wonder if even a white woman would have been labeled "whore"… but that is an outrage for another day.

What bothered me (and others) even more than the initial show of disrespect was that the community in power (*Scientific American*'s blog site) circled the wagons by pulling the blogger's next blog post. They suppressed her account of the incident as not being "science related," in order not to expose the behavior of the other editor for what it is: harassment. In other words, the immediate reaction of the powerful in the community was to silence the victim and attempt to delegitimize her experience by suggesting that her experience had nothing to with science. In fact, outrages like this one have everything to do with being a (Black) woman in science!

While it is true that, in the end, *Scientific American*'s blog site made a public apology[1] for their actions and the offending editor (a new hire) at the other blog site was eventually fired,[2] one is left to wonder how important the negative publicity was in forcing those in power to do the right thing. Would the reaction of the powerful have been more muted if there had only been a few scattered protests or if the editor had been of higher stature within his organization?

In my local astronomical circle, the incident sparked a middling amount of discussion about sexism and bias in STEM: bullying, stereotype threat, and harassment, sexual and otherwise. Some of the stories were truly horrifying. A few were first-hand accounts, but many were second- or third-hand. All were highly depressing, not only because these incidents continue to happen, but even more that they are more common than one wants to believe.

I shared a situation that I know of: those in power in a university department quietly made a harassment situation "go away" by recommending the harasser for a new job elsewhere. At that point another woman in the discussion group said, "I think I know who you mean." I was surprised at this since I was pretty sure she was too new to the field and had not been in the area I was talking about at the time of the incident that I was referring to. After the larger meeting ended, we were chatting, and I asked who she thought I meant. She was reluctant to say so I named the person I was referring to… no not that person… I named someone else (at the same institution)… no not that person. Someone else in the group chimed in that they thought they knew who she meant. And that is how I discovered that yet another prominent astronomer is a serial harasser… this one with a covert touching MO. Probably some of you even already know who I mean… or maybe you think you do, but in fact, you are thinking of someone else!

It has gotten to the point where, about once a year, I find out that one more prominent astronomer is a serial harasser. While I am thankful not to learn these things first hand, I am dismayed at the persistence of this kind of behavior in

Fed Up with Sexual Harassment
continued

astronomy. What is more disturbing is the number of times I have mentioned my newfound knowledge to other prominent astronomers who acknowledge that they already knew about this person. The collective silence that keeps these kinds of harassing activities under wraps is one of the most troubling things about our field. It is not only the harassment that is damaging to the field but also the culture of silence that allows it to persist unabated.

Certainly I understand the difficulty that anyone who has experienced harassment would find in bringing this information to the attention of the powerful in our community. Departments and universities cover up the problem and, worse, pass it along to someone else! Active researchers give appalling and shocking excuses for sheltering these harassers, such as, "I don't immediately see a conflict between formulating [astronomy] mentoring policies and the moral failings of any member of the advisory group… I think discretion should be a priority in this matter." In this case, the "moral failing" was *documented* sexual harassment of a student. I have even heard female astronomers deny that a particular (prestigious enough) researcher could have engaged in these behaviors, in spite of hearing it directly from a colleague who has been a victim. These women are otherwise engaged in combating discrimination and bias in our field. Like implicit bias, the influence of this "culture of silence" on harassment in our community is pervasive and insidious. In this climate where harassers are protected and their behaviors are denied at so many levels within the field, there certainly seems to be little that the victims can do to find help in protecting themselves or others. The harassed are relegated to silence and denial of their experiences, if not outright blamed for the actions of others.

So what can the community of astronomers who are fed up with this culture of silence do? How can we combat the frequent occurrences of harassment in our field? We need to speak out in the ways that we can. And, let's face it, those ways depend on our status in the profession. Unfortunately for the harassed, all evidence suggests that, in the immediate future, the only recourse that doesn't put them in danger is to maintain the "underground" network of information about persistent harassers. Information can be powerful. At least, someone who is informed of the risks of working with a particular astronomer may be able to avoid being blindsided by behaviors that seem benign at first but then turn bad.

Is this recommendation satisfying or just? Certainly not. Unfortunately, it is the only practical thing to do at this time. Until those with power and influence in the community take action or the number of people fed up with these behaviors reaches a critical mass, the culture is not going to change.

Therefore, I challenge those with power to work towards change in our community. How? First, by not ignoring so-called "rumors" about continual problem people. Too many of us are not willing to get involved because it is "not our problem." The truth is that the bad actions of a few *are* our problems because they have consequences for the growth, the reputation, and ultimately the livelihood of our field. Upcoming scientists want (and have options) to work for organizations that ensure fair treatment of their workforce and hold people accountable for harassing behavior. Ultimately a workplace where harassment is allowed to continue and a culture of silence is the norm will be less productive, creative and successful than an environment where all are treated equally with respect.

Secondly, people need to be confronted about their poor behavior. This would most effectively be done by someone of equal or greater stature than the perpetrator. Harassment is about power. Serial harassers have a problem and should be encouraged to seek help.

I am not suggesting that changing this culture will be easy. Despite years of education about the general situation of harassment in our field and the acknowledgement even by some in power, harassment continues! What we need to improve on is eliminating this culture of silence that lulls harassers into thinking that their behavior is acceptable. Although for some, dismissal may not be possible, there can be other incentives for reform. I am convinced that eventually a majority of people will be unwilling to let these behaviors go unchallenged. And I hope that for the sake of future academic daughters and sons, it will be sooner rather than later.

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[1] http://blogs.scientificamerican.com/at-scientific-american/2013/10/13/a-message-from-mariette-dichristina-editor-in-chief/

[2] http://abcnews.go.com/US/biology-online-fires-editor-called-scientist-urban-whore/story?id=20564772