

# Women Scientists Conference

## Discussions on gender, race, nationality

BY PAUL NERENBERG, PHOTOS BY ANH DÀO KOLBE

On Saturday, April 30, a group of women scientists from across the country came together to discuss the state of affairs for women in science and engineering. The conference, “Women Scientists on Gender, Race, and Nationality”, was hosted by MIT’s Program in Women Studies and coordinated by Dr. Abha Sur, a senior lecturer in the program. Fourteen women spoke during the day-long event, including three panel discussions featuring women scientists (almost all professors) in physics, engineering, and biology.

### Shocking Figures

The first speaker of the day, Dr. Donna J. Nelson, associate professor of chemistry at the University of Oklahoma, presented her groundbreaking and highly influential research into female and minority representation at all levels of science and engineering, from bachelor’s degrees to professors. Dr. Nelson combined the readily available data from the National Science Foundation concerning Ph.D. attainment, along with a survey she personally conducted of the NSF-ranked “Top 50” departments in 14 different scientific and engineering disciplines.

The numbers from Dr. Nelson’s survey speak strongly for



*Dr. Nai-Chang Yeh, professor of physics at CalTech, and an MIT graduate alum discusses her experiences over lunch.*

themselves. Table 1 presents Ph.D. attainment by women over the course of the past two decades: 1983-1992 and 1993-2002. There have been significant increases in the numbers of women obtaining doctoral degrees over time. However, many of these numbers contrast sharply with the percentages seen for bachelor’s degrees. In many fields, the drop-off between bachelor’s and doctoral degrees is striking – chemistry and math see some of the largest decreases, while physics and engineering fields have the lowest overall numbers, consistent with what is seen for bachelor’s degrees.

Discipline	1983-1992	1993-2002
Chemistry	22.8 %	31.3 %
Math	20.5 %	27.2 %
Comp. Sci.	17.9 %	20.5 %
Astronomy	12.7 %	20.6 %
Physics	9.0 %	13.3 %
Chem. Eng.	14.4 %	22.3 %
Civil Eng.	10.2 %	18.7 %
Elec. Eng.	6.4 %	11.5 %
Mech. Eng.	6.0 %	10.4 %
Economics	22.4 %	29.3 %
Poli. Sci.	31.0 %	36.6 %
Sociology	51.1 %	58.9 %
Psychology	55.0 %	66.1 %
Bio. Sciences	36.4 %	44.7 %

**Table 1** - Ph.D. attainment by women over two decades: 1983-1992 and 1993-2002.

Dr. Nelson and many of the other conference panelists felt that the lack of female role models among faculty undoubtedly contributes to the “attrition” of women at higher levels in academia. Table 2, which shows the percentage of women at every rank of faculty, reveals this lack of female faculty role models. An interesting trend is that the percentage of female assistant professors corresponds quite well to the percentage of women receiving PhDs in physics, astronomy, and engineering, while there are significant drop-offs in fields with much higher percentages of women receiving Ph.D.s, such as biological sciences and psychology. In all fields, there is a rapid and disturbing decline in the percentage of women progressing through the tenure track – the percentage of female full professors is below 10% in most fields, and not above 20% in any field.

For Dr. Nelson’s full report and figures, especially concerning minorities in science, please see: <http://cheminfo.chem.ou.edu/~djn/diversity/briefings/Diversity%20Report%20Final.pdf>

## Physicists, Engineers, and Biologists: Different Disciplines, Similar Stories

Dr. Nelson's introductory presentation, which touched only briefly on the issues of race and nationality, was followed by a panel discussion on physics. Two of the participants, Dr. Lisa Dyson, now with the Boston Consulting Group, and Dr. Nai-Chang Yeh, professor of physics at the California Institute of Technology, were in fact graduate students at MIT. Dr. Dyson related her feelings of isolation and the difficulties of being the only African-American woman in her field of choice, string theory. Dr. Yeh's comments were intriguing; born and raised in Taiwan, she experienced little in the way of sexism and was strongly encouraged to excel in science. Calling herself "very lucky", she eventually earned a tenured position at CalTech. Only after becoming a full professor did she encounter gender discrimination, although not from her colleagues at CalTech, but rather from physicists at other institutions, one of whom went so far as to launch a bogus academic misconduct inquiry into her research. Another physicist, Dr. Talat Rahman, professor at Kansas State University, emphasized that diversity is not only important for the people who are from "diverse" backgrounds, but also for the field as a whole.



*The author speaks with Dr. Donna Nelson, whose diversity survey has generated statistics of unprecedented detail about women and minorities in science.*

gender as the stronger factor in discrimination they faced. Both agreed that minorities (and women) could be encouraged to continue in science and engineering through more and better networking opportunities, such as internships and visits, like our Converge program at MIT, better faculty mentoring, and departments doing more to make minorities feel welcome.

The final panel of the day examined similar issues facing women scientists in biology. Dr. Shuk-Mei Ho, professor of cell biology at UMass Medical School, advocated the institution of "blind" grant submissions with the removal of all identifying information to ensure gender, racial, and institutional neutrality in the review process. The roots of persistent and yet differing discrimination faced by women scientists were explained by Dr. Frances Chew, professor of biology at Tufts University. She examined the myth of the "model minority", just one of many such myths that are influential in establishing and maintaining the differential expectations of students and scientists of minority races and/or foreign origins.

Dr. Sur concluded the conference with her own remarks, noting the differences in the experiences and perceptions of the women scientists that emerged in the conference, which she felt were largely due to the fact that during their formative years, the international women scientists did not encounter the racism which is still prevalent in American society. In her opinion, to build solidarity across ethnicity and nationalities, we must understand and overcome the "graded hierarchies of race and gender that science itself has created and perpetuated".

Discipline	Asst. Profs.	Assoc. Profs.	Full Profs.	All Ranks
Chemistry	21.5 %	20.5 %	7.6 %	12.1 %
Math	19.6 %	13.2 %	4.6 %	8.3 %
Comp. Sci.	10.8 %	14.4 %	8.3 %	10.6 %
Astronomy	22.0 %	16.5 %	9.5 %	12.6 %
Physics	11.2 %	9.8 %	4.6 %	6.6 %
Chem. Eng.	21.4 %	19.2 %	4.4 %	10.5 %
Civil Eng.	22.3 %	11.5 %	3.5 %	9.8 %
Elec. Eng.	10.9 %	9.8 %	3.8 %	6.5 %
Mech. Eng.	15.7 %	8.9 %	3.2 %	6.7 %
Economics	19.0 %	16.3 %	7.2 %	11.5 %
Poli. Sci.	36.5 %	28.6 %	13.9 %	23.5 %
Sociology	52.3 %	42.7 %	13.9 %	35.8 %
Psychology	45.4 %	40.1 %	13.9 %	33.5 %
Bio. Sciences	30.2 %	24.9 %	14.8 %	20.2 %

**Table 2** - Percentage of women at each rank of faculty.

The engineering panel included Dr. Kristala Jones Prather, assistant professor of chemical engineering here at MIT. Together with her friend and colleague Dr. Gilda Barabino, professor of chemical engineering at Northeastern, Dr. Jones Prather recounted experiences in academia unique to being a woman, as well as unique to being an African American. In the opinion of these women, race trumped

## The Woman Behind the Conference

After the conference, GSN sat down with Dr. Sur to ask her about the conference, the status of women in science, and her own background.

**GSN: What was the motivation behind organizing this conference? With the climate in academia as it is, many people would point to the statistics and say that they're improving – there are more women and more minorities reaching higher levels in academia. Why have this conference now?**

**AS:** The conference had been brewing for a while...of course, [Harvard president] Larry Summers galvanized it in some sense....There is a tendency for people to think about people of color as a homogeneous entity...it was important to think through the ways in which the response and reception to science is different for different minorities.

**GSN: Was there a certain message you hoped would come across in the conference? If you didn't have one before, was there one that you saw come out of the discussions?**

**AS:** I was struck by the different perspectives and experiences in science that emerged between international women – those who received their undergraduate degrees in other countries – and the underrepresented minorities in the United States. The former expressed concerns about issues of under-recognition, about scientific collaboration, whereas for the latter, the overwhelming issues were intellectual and social isolation in the academy and high rates of attrition from high schools among minority youth....We need to understand where these [differences] stem from and how we might address them.

**GSN: We see a clearly higher percentage of women entering biology, psychology, and sociology. Why have those fields been so successful in getting women involved and staying involved?**

**AS:** There are no simple answers. Some of the disciplines have taken a long time to admit that there are gender and racial biases and are still not very hospitable to women and minorities....Lack of minority and female role models is another factor. Not only are there differential rates of progress amongst different disciplines in science, but there are cross-cultural differences as well. If I remember the figures correctly, there used to be a significant difference in the percentages of women physicists in the United States and India a decade or so ago – 6% women physicists in the United States, versus 16% in India.

**GSN: On the subject of affirmative action, how do you feel departments can encourage diversity in**



*MIT's own Dr. Kristala Jones Prather and Dr. Gilda Barabino, professor of chemical engineering at Northeastern, recount their own stories about being minority women in engineering.*

**both gender and nationality without making women and minorities feel that they are patronized?**

**AS:** I think that the framework which pits affirmative action against merit has to be actively resisted. It is a false dichotomy that survives mainly because of the racism and sexism in our society. We also need to move away from the language of “special consideration” and see access to education at all levels as a right and not a privilege.

**GSN: Do you have any plans to do a conference like this again in the next few years? What is going to continue this dialog?**

**AS:** This time, almost all of our invitees were successful scientists....In our next conference, we would like to focus on women with graduate degrees in science and engineering who have either opted out of science altogether or have had to accept positions incommensurate with their qualifications. Their story is yet to be told.

**GSN: Finally, how did you get involved in women studies? You had mentioned previously that you were trained as a scientist – how did you become interested in this field?**

**AS:** My Ph.D. is in physical chemistry. I did research in laser spectroscopy for a number of years. Feminism had a huge impact on me. Over time I became interested in the history and philosophy of science, and issues of gender in science. I now work on the history of modern science in India with due emphasis on how gender, caste, and class mediate science and scientific institutions.

**GSN: Thank you for spending some time with us to talk about this issue, which is particularly relevant to students here at MIT.**

GSN