

## UNDERREPRESENTATION OF WOMEN AND MINORITY AWARDEES IN GEOSCIENCE SOCIETIES



Sam Mukasa

### Observations

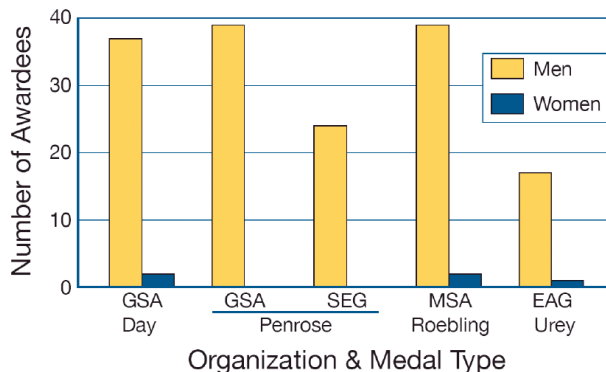
Few who have given even a cursory look at lists of geoscience society award winners would quibble with the observation that such recognitions remain very much a male bastion. It is true to some extent that the proportion of women and minorities participating in the geosciences is on the upswing and therefore that, in time, we might expect increased representation of these groups among the people nominated for awards. However, close examination of the evolving demographics indicates that this is not the whole story. There is ample evidence that even before the current

upswing in interest among these underrepresented groups, women in particular have been making significant contributions to the geosciences with little or no recognition. Taking the Geochemical Society as an example—an organization for which I am currently Vice-President and incoming President—of the 38 Goldschmidt Medalists through 2009, only one is a woman, and only two men have ethnicities of non-European origins. Of the 23 Treibs Medalists through 2008, there have been no women and no men whose names suggest an ethnicity other than European. The same is true for the 10 Patterson Medalists through 2008. We have done better with the Clarke Medal, which through 2009 has had 37 recipients of whom 7 were women, though all of European ancestry. Of 125 Geochemistry Fellows through 2009, only 12 are women, and again all are of European ancestry.

A survey of awards given out by other geoscience organizations (FIG. 1) shows that female underrepresentation on the lists of medalists is not unique to the Geochemical Society. Of the 18 recipients of the Urey Medal from the European Association for Geochemistry (EAG) through 2008, only one is a woman. Of the 39 individuals recognized with the Penrose Medal by the Geological Society of America (GSA) through 2008, not a single one is a woman. The identically named medal of the Society of Economic Geologists (SEG), which has been awarded 24 times, has never gone to a woman either. The Day Medal of GSA has been awarded 39 times, but only twice has it gone to a woman, and among the 37 men, only twice has it gone to someone of non-European ancestry. Finally, the Roebling Medal of the Mineralogical Society of America (MSA) has been awarded 69 times, only twice to a woman and only four times to men of non-European ancestry.

### How It Happens

I have heard it said that the statistics summarized above can be explained by the fact that women and minorities have only recently become well represented among academic Earth scientists, and therefore a more proportional or equitable distribution of gender and race among the awardees will emerge in time. While this might indeed be the case—judging from the promising gender distribution among the young scientists awarded the Clarke Medal in recent years—such a utopian outcome should not be taken for granted. It is instructive to examine the prestigious NIH Pioneer Award, inasmuch as the biological sciences have enjoyed gender parity for several decades. National Science Foundation data show that women currently receive 45% of the PhDs in the biological sciences and make up approximately 30% of full-time faculty at U.S. academic medical centers. They account for 20% of the prestigious Howard Hughes Medical Investigator Awards, an impressive 50% of the MacArthur Fellowships (the so-called “genius awards”), and successfully compete for 23% of NIH grants. Carnes et al. (2005) argued that if the NIH grantees represent the cohort of eligible applicants for the NIH Pioneer Award, then close to 25% of the applicant pool of candidates should be comprised of women. It turns out that the debut Pioneer Award pool (in 2004) was 20% women, not an unreasonable number considering the well-known distaste for self-promotion among women (e.g. Hogue and Yoder 2003 and references therein). However, not a single woman received the Pioneer Award that year. Carnes et al.



**FIGURE 1** – Awards received by men and women from various geological organizations within the past 69 years. GSA = Geological Society of America; SEG = Society of Economic Geologists; MSA = Mineralogical Society of America; EAG = European Association for Geochemistry

(2005) demonstrated statistically that given this “gender distribution of active scientists and acknowledged innovators, it seems unlikely that none of the nine awardees would be a woman unless some aspect of the solicitation, evaluation, or selection process was carried out in such a way that advantaged men.” Indeed 60 of the 64 judges were men, and the outcome of their deliberations (9 men awardees and no women) served as a wake-up call to overhaul the process, such that women have fared much better in subsequent years (e.g. Barres 2006).

The surprising outcome of the Pioneer Award competition in 2004, and many others, demonstrably originate in what experts in the fields of cognitive and social psychology have termed gender schemas (e.g. Valian 1998). Schemas are expectations, nonconscious hypotheses, or stereotypes associated with members of a group that guide our perceptions and behaviors, even if often inaccurate. They are widely culturally shared, with both men and women holding such perceptions about gender and both whites and people of color holding them about race (Fiske 2002). People are often not aware of their prejudices, and they are most likely to be applied under circumstances of ambiguity (including lack of clearly differentiating information), stress from competing tasks, time pressures, and lack of diversity in the decision-making body (*ibid.*).

A number of fascinating experiments have been performed in the area of evaluation to illustrate the insidiousness of gender schemas, and a few are worth reviewing here as they are relevant to the processes we undertake as scientific organizations to identify award recipients. The most poignant of these studies, at least according to this writer, are blind auditions, evaluations of curricula vitae (CVs), and forensics on letters of recommendation. Goldin and Rouse (2000) provide details on a study based on audition and roster records of over 14,000 individuals from 18 major U.S. symphony orchestras over a 26-year period, from 1970 to 1996. The data show that use of a screen so that evaluators could not see the performer increased the probability that a woman would advance from the preliminary rounds by 50%. Could it be that a figurative screen applied to a female geoscientist’s performance record would change the outcome in award competitions? Steinpreis et al. (1999) conducted a study of CVs that comes closest to answering this question. A single CV was adapted so that in one case it belonged to “Karen” and in the other to “Brian.” By a 2:1 margin, both male and female psychology professors preferred to hire “Brian” over “Karen” because they perceived his record to be better than hers. In this very magazine, Stipp (2007) reviewed cases of evaluations fraught with gender bias, pointing out that a number of studies show unequivocally that women are often as hard on other women as men are.

Another recent study examined letters of recommendation for the successful male and female candidates for faculty positions in a university unit and discovered some disturbing differences related to the gender of the candidate (Trix and Psenka 2003). Letters for men were longer and made more reference to their work, publications, etc., while letters for women were shorter, made reference to their personal life, and had “doubt

raisers" or hedges, faint praise, and irrelevancies. Could it be that letters of similar construction follow a woman's career in our field such that her contributions are undervalued and, in the eyes of many, relegated to the pile of those who do not deserve to be nominated for awards?

Our currency as academic researchers—the presumptive criteria used in evaluations for awards—is productivity and impact combined. Hirsch (2005) parameterized the two variables into the Hirsch index or Hirsch number (h-factor), yielding a formulation that takes into account the number of publications and the number of citations per publication. FIGURE 2 illustrates the distribution in h-index for Goldschmidt Medal awardees over the past 20 years for which the mean is ~45. When earlier awardees are considered, the mean drops slightly to ~42, which may be a reflection of difficulties with retrieving old publications by the leading Internet citation databases, as well as a smaller scholarship base. A casual scan of the membership for senior women scholars has yielded a few with h-index values around or above the mean of ~45. A larger group of women falls in the range immediately below the mean for the awardees over the past 20 years. It is important not to lose sight of the fact that men with such records have won the award. Moreover, studies of gender schemas suggest that evaluation biases will infiltrate every evaluative step taken during a woman's career, including funding, publication, and even the rate of citation of her work upon which the h-index depends. Therefore, to use the identical criterion for women and minorities will require them to achieve the same outcomes as white men, despite repeated biased judgments along the way. If the Goldschmidt Medal and other awards from geoscience societies are to be based on a meritocracy, then I submit to you that we have quantitative evidence for several women deserving at least to be nominated. Therefore, the lack of nominations of women cannot be blamed on the absence of qualified, deserving individuals.

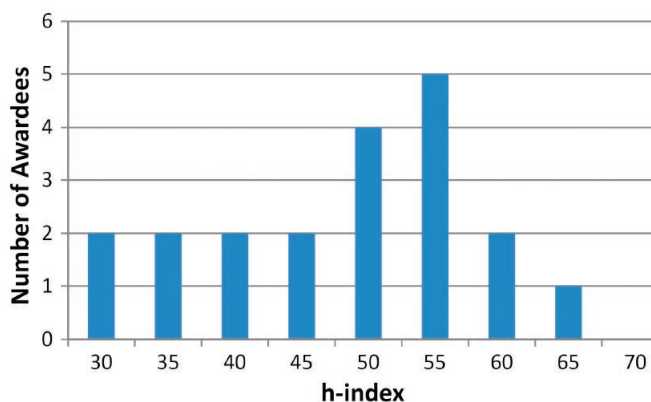


FIGURE 2 – h-index values for Goldschmidt Medal awardees over the past 20 years

## Suggested Way Forward

Subtle changes in our approach could help us overcome tendencies to employ gender biases—exercised by both men and women—in award nominations. Academic recognition for a job well done has three components to it: nomination, evaluation, and selection. While the evaluation and selection processes may continue to harbor gender biases, my observation serving on the Goldschmidt Award Committee for three years was that the nomination step is a far greater barrier. An immediate step we need to take is to internationalize and gender-balance the award committees. These committees should then be urged to actively solicit nominations for both qualified men and women, instead of passively waiting for the nominations to trickle in. Committee members will have to be mindful of the need to identify nominators who are concerned with the issue of broad representation of women and minorities in the pool. To those who immediately cry foul and assert that this is calling for the lowering of standards, I say that you need to review the data presented above, which indicate that a number of women scholars in geochemistry have built research records comparable, or in some cases even superior, to those of men who have already won the Goldschmidt Medal. It is heartening to see these issues becoming urgent items of discussion in a number of scientific communities, including our own. I challenge the members of all geoscience societies to put this increased awareness into action.

**Sam Mukasa**, University of Michigan  
mukasa@umich.edu

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## FROM THE EDITORS (Cont'd from page 76)



**TERRY PLANK** is a professor of Earth and environmental science at Columbia University and Lamont-Doherty Earth Observatory. Her research interests include magma generation during subduction and rifting; geochemical cycles at subduction

zones; the origin and evolution of the continental crust; and the water content of magmas. She received her AB from Dartmouth College and her PhD from Columbia University. After postdoctoral work at Cornell University, she held faculty positions at the University of Kansas and Boston University before moving to Columbia University in 2008. She is a Fellow of the American Geophysical Union and the Geological Society of America.



**XAVIER QUEROL** is a research professor at the Institute of Environmental Assessment and Water Research of the Spanish Research Council (CSIC). Recipient of a doctorate in geology from the University of Barcelona, he carries out research

in two main fields: (1) the geochemistry of atmospheric aerosols, particularly atmospheric reactions, source identification, and origins; and (2) the geochemistry and mineralogy of combustion by-products, especially environmental characterization and utilization. He is a member of the Spanish National Commission on Geology and a member of the Expert Working Group on Particulate Matter of UN-ECE, and he advises the Ministry of the Environment of Spain on topics of atmospheric pollution.



**MEENAKSHI WADHWA** is a professor in the School of Earth and Space Exploration and the director of the Center for Meteorite Studies at Arizona State University. She is a cosmochemist interested in deciphering the origin and evolution

of the solar system and planetary bodies through geochemical and isotopic means. She uses high-precision mass spectrometric techniques to investigate a wide range of solar system materials, including meteorites of asteroidal and Martian origin, lunar samples, and other samples returned by spacecraft missions. Her research focuses on understanding the processes and timescales of the formation of these materials.