



WHAT CAN DIVERSITY BRING TO ENGINEERING?

BY MICHAEL MASTROMATTEO

Strategies to encourage more women to take up engineering are being adapted to reach out to other under-represented groups. Making engineering more inviting to a diverse pool of future practitioners holds tremendous promise for a profession dedicated to the public interest.

The recent *Towards Fairness* study commissioned by PEO concludes that efforts to promote the values of equity and diversity within the engineering regulator could be a first step in extending similar ideals throughout the wider engineering community.

Spearheaded by PEO's Equity and Diversity Committee (EDC), the *Towards Fairness* report recommends the regulator show a clear commit-

ment to the principles of equity and diversity, "and that it promote, encourage and involve women, the First Nations community, and other under-represented groups in the engineering profession."

Building on the study, PEO is now drafting an equity and diversity policy for its own operations and governance structures. Although action is initially directed inward, the EDC is fully

aware of the potential for expanding the principles of equity and diversity throughout the profession. In fact, the question, "Why is diversity good for the engineering profession?" informs much of the recent EDC work.

There is no doubt a renewed emphasis on diversity reflects—some would suggest belatedly—the changing demographic of engineering in Canada, and especially Ontario. While female engi-

neers still represent only about 10 per cent of membership in most Canadian jurisdictions, there has been significant growth in membership from international engineering graduates, particularly in larger urban centres. In some ways, this indicates how the evolving demographic of engineering practitioners is coming to reflect the changing Canadian population.

This has already been recognized as a boon to the profession's talent pool, but has also created additional pressure on regulators to streamline their assessment of internationally acquired qualifications.

Some immigrant advocacy groups point to media reports of international engineering graduates driving taxis as evidence the licensing and registration system is at fault. These worst-case scenarios often force PEO and other regulators to defend their licensing and registration requirements and practices, on the grounds they aren't in the business of relaxing standards for the sake of equity and diversity ideals.

At the same time, however, PEO and other engineering stakeholders, such as the faculties of engineering, fully understand there is much to be gained by making engineering more attractive to talented, qualified people with varied life experiences. In the long term, such goals might be addressed through a combination of changing the way science and technical subjects are taught in school and on a focused campaign to extol the contributions the profession makes to an improved standard of living.

Yet such efforts to "market" engineering to a new generation of students underscore the tension inherent in working toward diversity in a profession already committed to licensing all who qualify.

Respect social equality

Much of the initial interest in equity and diversity in engineering stemmed from efforts to attract more women to the fold. As PEO President Pat Quinn, P.Eng., noted almost 15 years ago, "...Women must be encouraged to enter engineering because it must be shown that engineers respect social and economic equality and because it is an opportunity to which they

are entitled. No major profession can be satisfied with our low percentage of women, a fact which may question our status as a major profession."

Quinn was cited in the 1992 *More than Just Numbers* report, prepared by the Canadian Council on Women in Engineering. Chaired by former PEO Councillor Monique Frize, P.Eng., the council was one of the first of several subsequent task forces to identify the lack of women, both in engineering schools and in the workplace, as a significant concern for the engineering community.

PEO Councillor Márta Ecsedi, P.Eng., chair of the EDC, says that in the years since, there have been gains on the diversity front. "I believe the climate for female engineers has improved over the last 20 years, but there are still some lingering problems that need to be overcome," she said.

Ecsedi is especially concerned that women, Native Canadians and members of other visible minorities are not even applying for enrolment in engineering programs at university. In many cases, she believes, members of these groups aren't being encouraged to consider engineering, or they become turned off by poor guidance in high school.

Ecsedi has suggested that some of the strategies used to recruit and welcome female engineers could be adapted to reach out to other under-represented groups, including First Nations communities.

Other female engineers active in equity and diversity programs have voiced similar sentiments.

Cynthia Dunning, P.Eng., assistant professor of mechanical and materials engineering, University of Western Ontario, and a member of the Ontario Network of Women in Engineering (ONWIE) suggests a mean-

ingful commitment to diversity in engineering should involve outreach to as many groups as possible. "By definition, engineering is the application of science to solving practical problems," she says. "However, different people will define or interpret the same problem in many ways. By encouraging diversity in our profession, we are encouraging looking at problems from different viewpoints. That should ultimately lead to an improved solution."

However, at least one observer suggests caution in making engineering more open to women and, by extension, other less represented groups. Sumitra Rajagopalan, adjunct professor of mechanical engineering, McGill University, Montreal, told *Engineering Dimensions* that women interested in engineering careers might do well to put up with minority status—and all that this entails—as an opportunity to gain a valuable competitive edge in a male-dominated profession.

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UNIVERSITY OF WESTERN ONTARIO, AND
ONWIE MEMBER

“The most effective method could come through educating the younger generation. Not only do we encourage kids at a young age to get involved but also teach them that engineers are ordinary people. I suggest outreach programs to have engineers of various age groups, ethnicity or gender visit schools, and not only talk about their professional lives but also of their personal lives, hobbies and interests.”

**LEILA KHERADPIR, P.ENG.,
MISSIONS SYSTEMS ENGINEER,
MDA CORPORATION**

Diversity of ideas

Rajagopalan, who frequently contributes science-related articles to Canadian newspapers and the CBC, supports “diversity of ideas” as a benefit to the engineering profession, but believes individual excellence, ability, dedication, and perseverance should be the criteria for professional prominence.

“There is no discrimination against talented women in science and engineering in academia,” Rajagopalan posited in a recent article. “This is a world where good ideas are king and, with the right mix of skills and grit, you will make it. There may not be many of your kind, but you will still be among the best, having gone that extra mile to

stake a claim in this exciting, male-dominated milieu.”

Rajagopalan discounts a need for high-achieving female engineers to act as role models to “lure” young women and girls into an engineering career. Instead, she argues, promotion of quality education in math and sciences would, in effect, support the quest for diversity by allowing all students, regardless of gender, ethnicity or other persuasions, to glimpse the potential of an engineering career.

Such a view is at odds with the observers who argue that despite diversity gains in academe, the workplace itself continues to lag behind in the participation of women and other under-represented segments of the population.

Valerie Davidson, P.Eng., Natural Sciences and Engineering Research Council (NSERC)/Hewlett Packard (Canada) Chair for Women in Science and Engineering in Ontario, believes a full picture of women’s success in engineering is difficult to obtain. “There are many examples of female engineers who have been or are successful in senior technical and management positions,” Davidson says. “However, there are many women who have left engineering to pursue careers in other areas. Unfortunately, there is limited gender-based analysis of Canadian Council of Professional Engineers (CCPE) and PEO [now Ontario Society of Professional Engineers] salary and employment surveys because of the low number of female respondents. As a result, statistics are limited.”

Despite the hazy picture, Davidson, a professor of engineering at the University of Guelph, agrees there have been general improvements in diversity

over the last decade. “Women certainly stand out as a visible minority, so increases in the number of women do signal obvious improvements in diversity,” she says. “I think the questions that have been raised in terms of female participation in the profession have led to initiatives that promote engineering and dispel narrow stereotypes about engineering. I think this will bring broader diversity to the profession.”

Nevertheless, some engineers active in diversity committees continue to believe in the importance of role models and “image makeover” strategies to attract women and other minorities into engineering.

Leila Kheradpir, P.Eng., a missions systems engineer at MDA Corporation in Brampton, believes putting a personal touch on outreach efforts would prove successful in luring a more diverse group of practitioners to the profession.

“The most effective method could come through educating the younger generation,” she said. “Not only do we encourage kids at a young age to get involved but also teach them that engineers are ordinary people. I suggest outreach programs to have engineers of various age groups, ethnicity or gender visit schools, and not only talk about their professional lives but also of their personal lives, hobbies and interests.”

Wai-Lyn Wong, P.Eng., a performance analyst at Pratt and Whitney Canada, has followed the diversity in engineering situation since her undergraduate days at the University of Toronto, through her involvement as director of Women in Science and Engineering (WISE) U of T, and later as an executive of WISE Toronto.

“I would like to see more elementary and high schools hold engineering and science career intro seminars,” Wong says. “I have been an engineering ambassador and a science mentor in elementary schools for the past few years, and it leaves a huge effect on the students when someone from real life visits them in their school and introduces them to the field of engineering. They get to see first hand that a young, female, Chinese girl who likes to dance, run,

bike, and play on the beach, can also be an engineer who works on designing jet engines.”

Career challenges

Wong agrees women face less discrimination at engineering schools or entry-level employment than in previous decades. “From my personal experience, women are treated equal to men, and I have not seen any discrimination in the hiring or treatment of men/women at the entry level.” She speculated, however, on the under-representation of women in senior level engineering employment. “Through WISE, I have met many fantastic women engineers, CEOs, VPs, executives, junior engineers,

in females just as easily as in males, and that we are just waiting for the new generation of female engineers to get promoted.”

In some ways, the progress of female engineers can serve as a yardstick in measuring the overall progress of equity and diversity in the profession. At the same time, making the profession more welcoming of visible minorities and First Nations practitioners has gained greater urgency for PEO’s diversity committee, even as the situation for women continues to unfold.

Meanwhile, engineers in Canada and the United States have taken matters into their own hands by setting up associations pro-

played some part in efforts to reach out to other groups that have traditionally shied away from the profession.

“As with efforts to encourage more women’s involvement, any outreach to the Native population represents a tremendous potential pool of talent and ability for

“Usually, when groups of people have no family champions or other role models, there is little reason for them to have any interest at all in a field like engineering. What we are trying to do with the program is to connect these young people with those who can show the relevance and excitement of the P.Eng. designation.”

CORINNE JETTE, RETIRED PROFESSOR OF ENGINEERING AND COMPUTER SCIENCE,
CONCORDIA UNIVERSITY

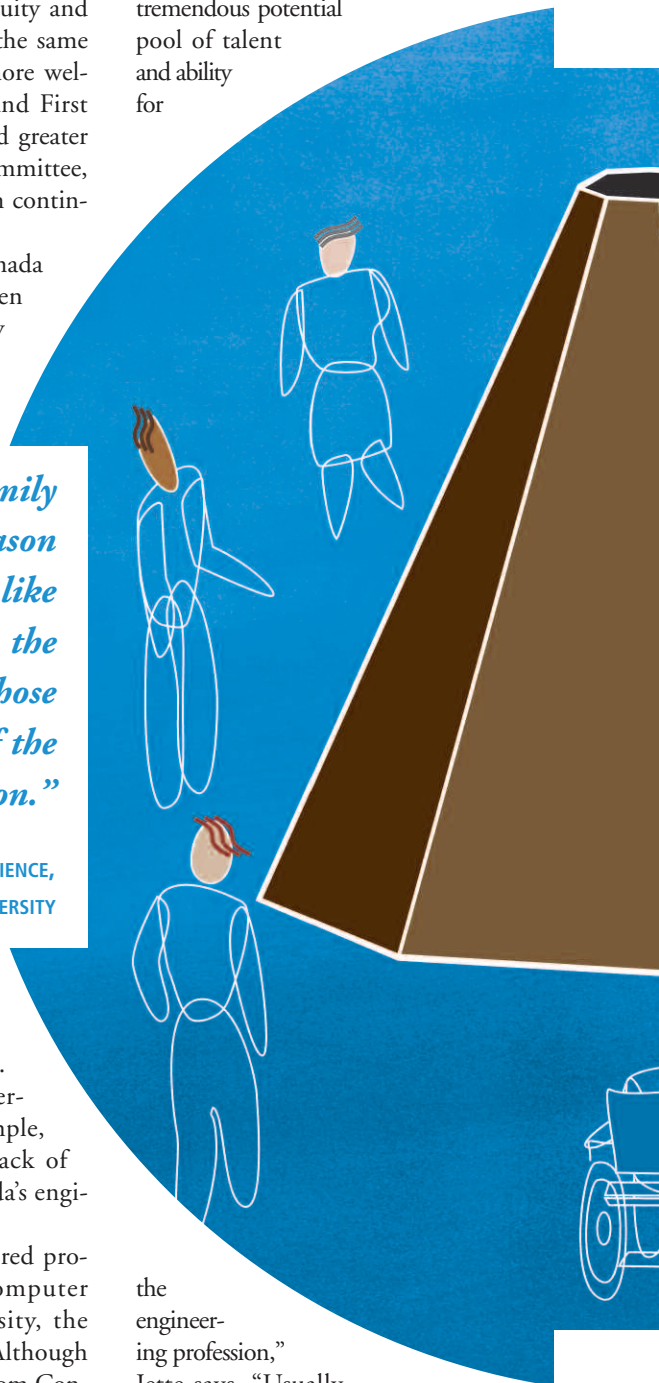
and some still looking for work. Although my observations can only be based on the men and women I have met and the media articles I’ve read, I get the impression that while some of the more aggressive women have made it to the top, there are many ‘competent-and-ambitious-but-nice’ ones languishing in the lower ranks. Do women need to over-prove their worth before getting a promotion? When it comes down to choosing between a man and a woman, are women having to work uphill against the ingrained image of a strong male leader? Hopefully, there is no such image [and] companies recognize ambitious, enthusiastic leaders

motivating engineering to different ethnic or socioeconomic groups. The Native Access to Engineering Program (NAEP), for example, is aimed at overcoming the lack of Native representation in Canada’s engineering ranks.

Led by Corinne Jette, a retired professor of engineering and computer science at Concordia University, the NAEP was founded in 1993. Although it now operates independently from Concordia, it has attracted a nation-wide network of supporters.

Jette, herself a status Indian from the Tuscorora Nation, admits the push for better representation for women in engineering

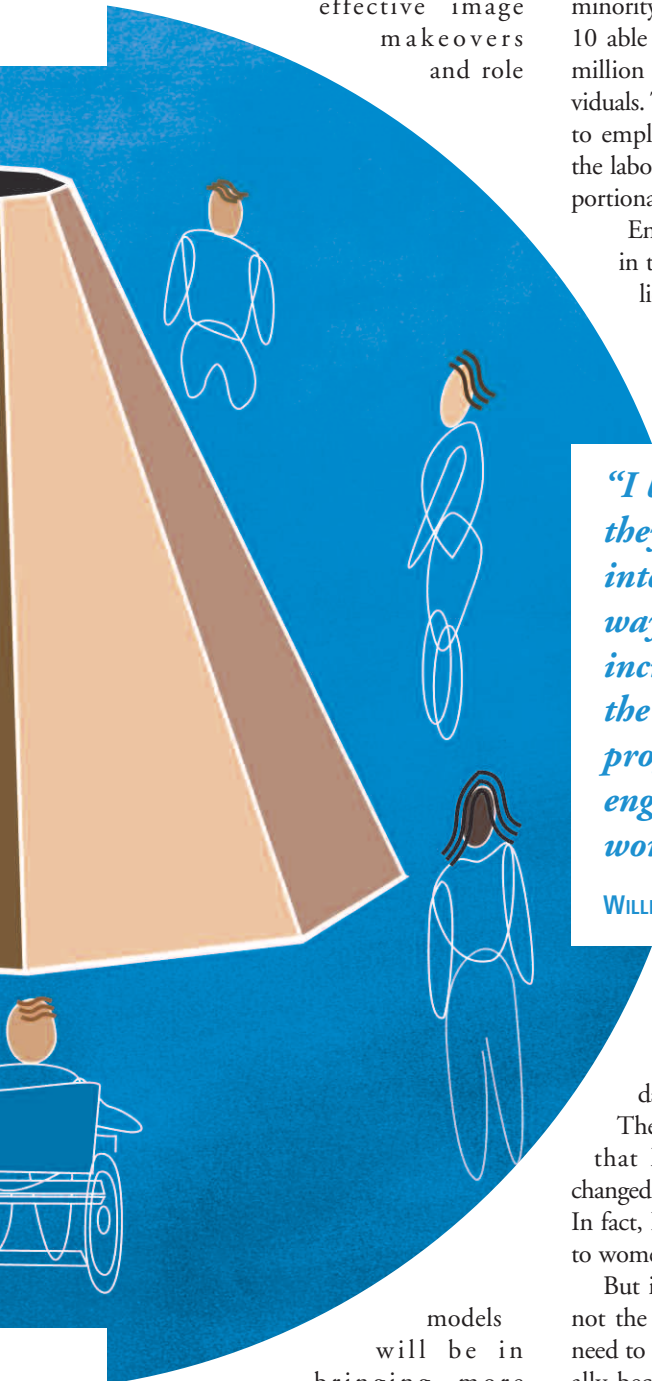
the engineering profession,” Jette says. “Usually, when groups of people have no family champions or other role models, there is little reason for them to have any interest at all in a field like engineering. What we are trying to do with the program is to con-



nect these young people with those who can show the relevance and excitement of the P.Eng. designation.”

Time for more action

It remains to be seen how effective image makeovers and role



models will be in bringing more diversity to what is generally regarded as a conservative profession. Yet, despite some differences of opinion on how equity in engineering should be realized, there is general

unanimity that diversity is a notion whose time has come.

In making the case for diversity, PEO's *Towards Fairness* report observed, "In Canada, women, aboriginal peoples, people with disabilities and members of visible minority groups make up six out of every 10 able Canadians, or approximately 10 million out of 16.5 million skilled individuals. These groups face artificial barriers to employment and upward mobility in the labour market and represent a disproportionately wasted human resource."

Engineers can take some consolation in the knowledge that admission and licensing procedures are rarely identified as the roadblocks on the road to diversity. As Valerie Davidson

young practitioners, more people from all backgrounds will consider the profession.

Engineer William Wulf, president of the US-based National Academy of Engineering, is one advocate who is not shy about using the profession's best selling points to make a case for greater access and diversity. Wulf told *Engineering Dimensions* that programs that sensitize the public to the different strengths and talents that women and under-represented minorities bring to the engineering workforce is one way to increase diversity in the profession.

"Engineering is not offered to young women as a career opportunity and, if it is, it is often accompanied by an incorrect, dull image that must be overcome, not only by the aspiring engineer, but also by all those whose

"I believe more women will enter engineering when they begin to recognize engineering as a creative, interesting, rewarding career, when they see it as a way to improve people's lives. College programs that increase the numbers of available role models and the numbers and effectiveness of mentors and programs that show the creative, diverse side of engineering will open engineering up to more women and under-represented minorities."

WILLIAM WULF, PRESIDENT, NATIONAL ACADEMY OF ENGINEERING

noted, "There are no differences in admission or assessment standards for male and female students.

There has never been any suggestion that licensing standards should be changed to increase the number of women. In fact, I know that this is not the barrier to women's participation in engineering."

But if qualifications and standards are not the enemy of diversity, other factors need to be taken into account. It is generally becoming accepted that access and diversity can be encouraged by extolling the value and importance of professional engineering in the public interest. By celebrating engineers' accomplishments by way of the stories of an attractive breed of

image of an engineer does not include young women," Wulf said. "Changing this image is a significant challenge. But by correcting the image of engineering, engineering will also be more open to women, under-represented minorities, and persons with disabilities.

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