

# Guest Editorial

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## WOMEN IN ENGINEERING: BEYOND THE STATS

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Over the past few decades it has repeatedly been reported that women form a small minority of both engineering students and practising engineers in most Western contexts. Many projects have also been described that have sought to increase the participation of women in engineering. This special edition of *IJEE* aims to provide a perspective that goes beyond statistical analyses and descriptions of projects that have generally characterised the articles in engineering education publications to date. Although the latter have undoubtedly been valuable in raising awareness, we would argue that it is now time to move beyond descriptions of the status quo in order to understand why this situation persists despite the enormous investment of time and money in a large number of projects both at a national and local level.

In soliciting papers for this issue, special effort was made to obtain articles that extend the field in the ways just indicated, that is, we looked for papers that explain the relationship between gender and the technological professions rather than just describe it. This bore fruit and the first section of this special issue contains a collection of articles which we feel make a significant contribution to helping provide a theoretical framework for understanding the complexities of the issues at hand.

From the submissions we received it was clear that feminist perspectives have much to offer in providing an explanation of women's experiences in engineering and the resistance of the status quo to substantial change. These perspectives may be new to many engineering educators but have been highly influential in gender-focused social science research and scholarly work in recent times, and are used productively by many of the authors in this issue. Feminist theories place emphasis on the ways in which scientific knowledge is culturally constituted and therefore a reflection of social structures and ways of thinking. In the engineering context this has led to the recognition of a particular 'culture of engineering' that is closely tied to the society's general view on gender. The articles in the second section of this issue provide graphic details of how this culture manifests itself in terms of the experiences of women in the engineering industry.

Using these perspectives to understand how this culture of engineering sustains itself has provided researchers with new ways of thinking about how we might go about trying to promote and sustain the participation of women in engineering. Instead of the traditional activities which try to persuade women that they should try engineering and then help them fit into the culture, these researchers suggest that we need to create a new engineering culture. The papers in the final section of this issue present examples of initiatives that focus on aspects of this culture as it is seen in the undergraduate curriculum. Given that any sort of educational change is very difficult to achieve, it is hardly surprising that these initiatives have shown limited and hard-won gains. Nonetheless we look forward to seeing reports of further work in this area.

In the call for papers for this issue effort was made to encourage contributions from contexts outside the West European, North American and Australasian set of countries in an attempt to reflect as diverse a range of contexts as possible. We were less successful in this aim, receiving very few contributions from researchers outside of this set of countries. Clearly there are many voices that are not being heard on this issue and we would urge that efforts be made to support and encourage research and writing throughout Africa, Asia, South America, the Middle East and Eastern Europe. Is the discussion and debate highlighted in the pages of this journal, and many like it, ignoring particular cultural and socio-political contexts of countries in these regions? Zengin-Arslan in her article on Turkey suggests that the higher proportions of women in engineering in Turkey relative to most Western countries is rooted in the particular social history of her country. How does one explain the high proportion of women studying engineering in Kuwait, or the increasing numbers of young African women in South Africa enrolling to study engineering since the end of racial restrictions and the birth of the new democracy with its emphasis on gender equality? Are these likely to lead to new 'cultures of engineering' emerging in those contexts? These are questions begging to be answered and we look forward to seeing these questions taken forward in future issues of *IJEE*.

**Editors of Special Issue on Women in Engineering**

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**Review Panel for Special Issue on Women in Engineering**

Liz Godfrey—Associate Dean for Undergraduate Students, School of Engineering, University of Auckland, New Zealand

Delia Marshall—Department of Physics, University of the Western Cape, South Africa

Pam Roberts—Senior Lecturer, Centre for Educational Development and Academic Methods, Australian National University, Australia

Caroline Baillie—Deputy Director, UK Centre for Materials Education, Materials Science and Engineering, University of Liverpool, UK

Carol B. Muller—Founder & Executive Director, MentorNet, San Jose, California, USA