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Australia**  
Gender and Diversity

Respect, recognition and reward

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# Women in STEM in Australia

What is the current state of play, what are the key issues and why does it matter?



Professionals Australia Women in STEM position paper



**Professional  
Scientists  
Australia**



**IT  
Professionals  
Australia**



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Australia**

*Professional Scientists Australia, IT Professionals Australia and Association of Professional Engineers Australia are Divisions of Professionals Australia.*



# ABOUT PROFESSIONALS AUSTRALIA

Professionals Australia is an organisation registered under the Fair Work Act 2009 representing over 25,000 professionals including professional engineers, scientists and information technology professionals (formerly the Association of Professional Engineers, Scientists and Managers, Australia). Our members work in a broad range of STEM settings and specialist areas across Australia. Professionals Australia is the only industrial association representing exclusively the industrial and professional interests of these groups

Professionals Australia promotes the views of their STEM members on a wide range of policy issues to government, industry and the community.

# WOMEN IN STEM IN AUSTRALIA

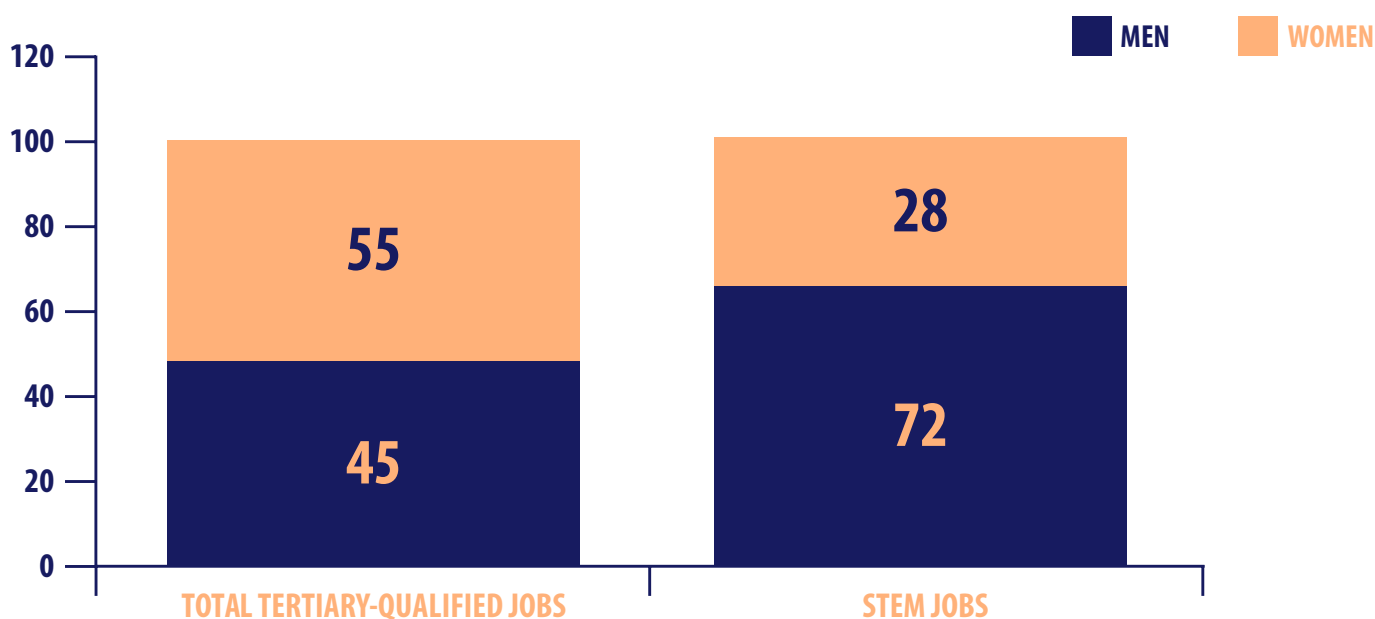
## *Contents*

<b>What is the current state of play?</b>	<b>4</b>
Relative participation in STEM workforce	4
STEM undergraduate degree completions	4
Gender pay gap	4
<b>What are the key issues?</b>	<b>5</b>
Occupational segregation	5
Industry segregation	5
Cultural stereotypes	5
Career breaks	5
Working part-time	5
Women leaving the profession	6
Lack of women in leadership roles in STEM fields	6
Discriminatory practices within the workplace	6
<b>Why does it matter?</b>	<b>6</b>
<b>Our commitment</b>	<b>6</b>
<b>Comments and feedback</b>	<b>7</b>

# RELATIVE PARTICIPATION IN STEM WORKFORCE

Only 28 per cent of employed STEM-qualified Australian workforce aged 15 years and over were female in 2011 compared to 55 per cent for all fields in the tertiary qualified population. This figure stood at 14 and 86 per cent for females and males respectively in Engineering and related technologies, and 25 and 75 per cent for females and males in Information technology. There was least disparity in the Natural and physical sciences where females comprised 47 per cent of the workforce compared with 53 males.

Figure 1 - Total tertiary-qualified jobs and STEM jobs by gender, 2011



## STEM UNDERGRADUATE DEGREE COMPLETIONS

Women also hold a relatively low share of STEM undergraduate degrees in Australia. In Australia, the completion rate is slightly higher than the OECD average of 30 per cent - in 2011, 33 per cent of tertiary qualifications were awarded to women in STEM fields.

## GENDER PAY GAP

ABS data shows the pay gap in the Professional, scientific and technical services industry stood at 30.1 per cent in 2013, up 3 points from 27.1 in 2012.

1. STEM - Science, Technology, Engineering and Mathematics
2. Healy, J., Mavromaras, K. and Zhu, R. (2013) The STEM Labour Market in Australia. Contributing consultant report to 'STEM: Country Comparisons' project. National Institute of Labour Studies, Flinders University, on behalf of ACOLA. Australian Office for the Chief Scientist: Canberra.
3. Healy et al., 2013
4. STEM qualifications defined as Bachelor degree level or higher in the Natural and physical Sciences, Information technology or Engineering and related technologies. Definitions from Contributing consultant report to 'STEM: Country Comparisons' project. National Institute of Labour Studies, Flinders University, on behalf of ACOLA. Australian Office for the Chief Scientist: Canberra.. Available at <http://www.acola.org.au/PDF/SAF02Consultants/Consultant%20Report%20Australian%20Labour%20Market.pdf>
5. Roberts, K. (2014). Engaging more women and girls in mathematics and STEM fields: the international evidence, Australian Mathematical Sciences Institute, p.5. Available at <http://amsi.org.au/wp-content/uploads/2014/08/RobertsGenderSTEMreport2014.pdf>.
6. Australian Bureau of Statistics Average Weekly Earnings (Cat. No. 6302) 15 August 2013.

# WHAT ARE THE KEY ISSUES?



*Effective coordinated policy solutions are required to address the multiple and interrelated issues that lead to women's underrepresentation in STEM fields.*

## **OCCUPATIONAL SEGREGATION**

STEM education has a clear role in addressing occupational segregation – defined as the over representation of women in low-paying occupations. Graduate Careers Australia found that implementing education campaigns and programs that would encourage the participation of women in occupations that are often traditionally thought of as 'male' roles - for example by encouraging their participation in STEM during secondary schooling - could result in the aggregate wage gap in favour of males reduced for future generations. There is much evidence to show that there is a concentration of males in STEM occupations particularly in the hard sciences such as physics, engineering and IT.

## **INDUSTRY SEGREGATION**

Addressing the issue of industry segregation (defined as the concentration of women in particular industries) would involve addressing the relative value placed on work done in female and male-dominated industries. The Fair Work Commission recently found in a work value case that those in the female-dominated social and community services industry were underpaid in comparison to those in comparable state and local government employment and that gender was a factor that had inhibited salary growth in the industry.

## **CULTURAL STEREOTYPES**

Cultural stereotypes about what a science career entails and a lack of understanding and encouragement from teachers and parents has an impact on the subject choices of girls in secondary school. Research shows that in Australia, 18.6 per cent of boys undertook STEM subjects in their final year compared with 13.8 per cent of girls. Increasing the participation

of girls in STEM subjects into their final year is critical. There is evidence of generational change in this area. Gender researcher Kate White has found a significant generational change between the Baby Boomers, the current science leaders, and Gen Xs and Gen Ys. Younger women and men, she says, are rejecting the traditional model of a successful scientist - a single male for whom science is like a religious vocation. Instead, they support new professional models that support work-life balance. Providing role models and mentoring is also critical.

## **CAREER BREAKS**

Research shows that women experience a financial penalty when they return to full-time work after a career break for child rearing. Research shows that women returning from maternity leave can expect reduced earnings growth and the penalty increases with longer periods of maternity leave.

7. Graduate Careers Australia (2014). An analysis of the gender wage gap in the Australian graduate labour market, 2013, p.12. Available at <http://www.graduatematters.com.au/wp-content/uploads/2014/06/GCA%20Gender%20Wage%20Gap%20Paper%20-%202013%20GDS%20-%2017%20June%202014%20FINAL.pdf>.
8. White, K. (2014). Keeping Women in Science, Random House Books.
9. Australian Municipal, Administrative, Clerical and Services Union and others, Equal Remuneration Case (2012). FWAFB5184. Available at <https://www.fwc.gov.au/documents/decisionsigned/html/2012fwafb5184.htm>.
10. Marginson, S.M., Tytler, R., Freeman, B. and Roberts, K. (2013). STEM: Country comparisons. Report for PMSEIC and the Office for the Chief Scientist, ACOLA, Melbourne. Available online at [http://www.acola.org.au/PDF/SAF02STEM\\_%20FINAL.pdf](http://www.acola.org.au/PDF/SAF02STEM_%20FINAL.pdf).
11. White, K. (2014).
12. Baker, D. (2012). The wage-penalty effect. The hidden cost of maternity leave, The Australia Institute.

# WOMEN IN STEM IN AUSTRALIA, KEY ISSUES CONTINUED ...

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## WORKING PART-TIME

*The gender pay gap is not attributable to women working part-time.*

The gender pay gap is calculated by looking at the difference between women and men's average weekly full-time equivalent earnings expressed as a percentage of men's earnings. Research shows a "wage scarring" effect when a woman returns to full-time employment after a period of part-time work. Better quality part-time work allowing women to continue to improve their earnings and career potential, and encouraging men to access part-time work to assist with family responsibilities would help address the "scarring" effect. Access to Continuing Professional Development for those in non-standard work arrangements is also fundamental to ensuring ongoing learning, opportunity and advancement.

## WOMEN LEAVING THE PROFESSION

Women scientists leave the profession in greater proportions than men. This has been largely attributed to the difficulties women experience balancing family and career responsibilities. New models of flexibility to allow women and men to better combine science research careers with family responsibilities are needed. The Australian Government's Innovation Agenda notes that the nation cannot afford to invest in educating women to PhD level and then see them leave the profession because of barriers to balancing family and career responsibilities.

## LACK OF WOMEN IN LEADERSHIP ROLES IN STEM FIELDS

Women scientists are underrepresented in leadership roles. The smaller pool from which to draw leaders accounts in part for the underrepresentation. Implicit biases and discrimination, family obligations and the lack of role models or mentors also act as barriers to women's participation in leadership roles.

## DISCRIMINATORY PRACTICES WITHIN THE WORKPLACE

Unconscious bias contributes to discriminatory practices in the workplace. Hiring practices which disadvantage women, the underrating of female employees' contribution in assessments for promotion, greater recognition of transactional than transformational leadership styles and cultural norms around negotiating behaviour can all impact advancement and equitable treatment in the workplace.

13 Chalmers, J. and Hill, T. (2007). Marginalising Women in the Labour Market: "Wage-scarring" effects of part-time work, Australian Bulletin of Labour, 33(2): 180-201.  
14 McCullough, L. (2011). Women's Leadership in Science, Technology, Engineering and Mathematics: Barriers to participation, p.8.  
15 Transactional styles of leadership involve keeping people in line, giving direction, praising and punishing while transformational leadership involves inspiring workers, promoting innovation, serving as a role model and building.

# WHY DOES IT MATTER?

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Addressing these issues is not only a matter of justice and equity but one of economic imperative in terms of labour market supply and improving the bottom line. Boosting the labour force and widening the talent pool from which professional engineers, scientists and IT professionals are drawn is critical to improving the quality, diversity and output of STEM research and our STEM workforce, and in turn ensuring engineering, science, technology and research and development (R&D) remain central to the nation's innovation and productivity improvement strategy.

## OUR COMMITMENT

Professionals Australia is committed to working toward solutions at the structural and enterprise levels to help address the underrepresentation of women in STEM fields. Broadranging initiatives including the following will together encourage the changes needed:

- providing STEM role models at the primary and secondary school levels;
- increasing the number of girls undertaking STEM subjects in their final years at secondary school;
- helping address unconscious bias at the level of workplace recruitment and in promotion practices;
- providing workplace flexibility to support balancing work and family responsibilities;
- addressing workforce cultures issues which may tolerate discrimination, sexual harassment and bullying;
- ensuring access to continuing professional development (CPD) regardless of employment status;
- reviewing the value attached to occupations and industries which have a high proportion of females;
- providing positive role models for women and change champions in management and leadership positions;
- reward and recognition strategies and career pathways which address both career aspirations and the need for flexibility for those working in STEM fields.

Our particular focus is on workplace-related and CPD initiatives.

## COMMENTS AND FEEDBACK

We welcome your comments and feedback.

Email [gender&diversity@professionalsaustralia.org.au](mailto:gender&diversity@professionalsaustralia.org.au).