

## Opinion – Breaking Boundaries to Reimagine Space is Crucial

Written by Sarah Furman and Elise Stephenson

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<https://www.e-ir.info/2023/08/05/opinion-breaking-boundaries-to-reimagine-space-is-crucial/>

SARAH FURMAN AND ELISE STEPHENSON, AUG 5 2023

The Deputy Head of NASA, Pam Melroy, was clear in telling her Australian audience in early 2023 that *space* is for all. This message is reinforced by Airbus Aerospace Engineer John Chinner's recent statement that the UK space sector "need[s] people from a broad background of education, skills and experience", and that 'being cool' is not enough to meet humanity's ambitions in space. Yet the perception that the space sector is only for those with Science, Technology, Engineering and Maths (STEM) skills remains pervasive – not just in the rapidly growing space sector in Australia or the UK, but globally. It is also misguided. Whilst there is a genuine need for STEM skills in the space sector, inclusion of doctors, lawyers, artists, poets, designers, marketers, and experts from all kinds of fields that do not strictly require STEM is vital for the space sector to thrive. The sector's messaging therefore needs to shift.

'Space 2.0' is heralded as a new era in which space is no longer just about government-run exploration, but also commercial business operations. This transformation is increasing access to and activities in space. Following the opportunities presented by 'Space 2.0' for everything from climate change mitigation and observation to commercial space flight, many countries have sought to bolster the growth of the space sector. In Australia, the government has set the target of creating 20,000 jobs in the space sector over the next decade – largely to contribute to the nation's economic growth as well as to maximise the unique strategic benefits offered by Australian launch capabilities. The UK's national space strategy has similar aims, aspiring to become "one of the most innovative and attractive space economies in the world". Achieving this goal requires significant workforce growth.

However, of the 319 skills identified as being utilised in the space industry in Australia, a report by the National Science and Technology Council reveals that all but nine of these skills are experiencing some shortage. To produce 20,000 new space-related jobs by 2030, roughly 300 new qualified scientists and 900 engineers, as well as 800 non-STEM graduates, will need to be trained every year for a decade. These workforce trends are not unique to Australia either.

Indeed, a 2023 report by the consultancy firm McKinsey and Company finds that the Aerospace and Defence industries face "intense competition" for talent, requiring a radical response from the industry. They highlight several pathways, including improving the talent acquisition experience, increasing transparency around career options and progression, improving their communications to be "compelling and engaging", building in hybrid and flexible work options, considering career optionality and the ability to stack careers and improving diversity, inclusion and sustainability track records. Their report highlights the need for collaboration across the public and private sector, as well as a drastic re-imagining of the space sector – in both experiences and opportunities, as well as communications and pathways.

The space sector's struggle to foster a workforce with diverse skills is indicative of the broader challenge to attract workers from diverse backgrounds. The narrative that space is exclusive to STEM-trained individuals is problematic not only because it discourages people from non-STEM disciplines from even considering a career in the space sector, but because it perpetuates historically patriarchal and colonial values. Globally, only one in five workers in the space sector are women, a number that has remained steady for the past 30 years. Women in male-dominated

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workplaces are found to experience higher rates of gender discrimination and sexual harassment in the US, which has alarming implications for the male-dominated STEM and space industries. Underrepresentation of diverse groups, including gender diverse people, First Nations communities, ethnic minorities, and people with a disability, is even more stark. Here, these groups lack the necessary opportunities, information, and support to break into the space sector. Even where people from traditionally marginalised backgrounds have successfully entered the space workforce, they are not necessarily made to feel welcome and accepted. This puts space sector companies around the world at risk of poor staff retention, organisational under-performance, and stifled innovation.

Research highlights messaging as one of the key problems hampering the development of a diverse and inclusive space workforce. Whereas other technology-based industries are providing bridging and conversion courses to attract people from diverse backgrounds, space sector job advertisements still expect applicants to have space-specific qualifications and experience in the field. This deters women and underrepresented groups from applying, with women six times less likely to apply to a job than men as they feel they do not meet the criteria. If the messaging does not change, current struggles to create a global, innovative, inclusive space industry will only be exacerbated.

Beyond the 'business case', diversity and inclusion are important for moral and ethical reasons. We cannot achieve diversity, equity, inclusion and belonging for marginalised groups if these values are not embedded structurally into our social systems and experienced first-hand through an adaptation of practices. Space and space technologies affect everyone across the globe and are integral to our communication, education, economies, health systems, and security, as well as many aspects of our day-to-day lives. It is therefore critical that broader society is reflected in the space sector through the inclusion of diverse perspectives. Moreover, space is becoming increasingly associated with environmental harm and space tourism in what can be termed 'brand toxification'. This perpetuation of patriarchal and elitist connotations is contributing to perceptions among young people, and particularly young women and individuals from underrepresented backgrounds, that space creates problems rather than solves them; despite the salience of space technologies to our everyday lives. Consequently, this jeopardises the potential diversity of the future global space workforce and entrenches gender and societal inequalities.

These themes were among the key insights to emerge at the pioneering *Diversity at the Frontier: Gender Equality in Space Conference* held in Canberra in April 2023 and hosted by the Global Institute for Women's Leadership (GIWL) at the Australian National University. This need for the space sector to 'rebrand' itself was seen as important not just to meet workforce shortages and help the industry argue for its place and value in society, but also to attract diverse talent and disrupt the patriarchal, colonial connotations associated with the industry globally. Surveys conducted at the conference further emphasised this point. In response to the question 'if you could do one thing to change diversity in the space sector, what would it be?', common answers included removing barriers, shifting the perception that you must study STEM fields to enter the space sector, and the need for structural and cultural change. In addition, the conference explored the importance of addressing gaps and challenges facing women, LGBTIQ+ individuals, culturally and linguistically diverse groups, First Nations communities, and people with disabilities through research, policy, and practice. The moral and ethical impetus for striving for greater diversity emerged as a key theme of discussions, and participants identified inclusivity, equity, and respect as core values they would like to see fostered in the space sector.

So how do we achieve this shift and broaden the horizons of what is considered part of the space sector? Greater promotion of potential pathways to a career in the space sector would be a start and is something that can be taken up by schools, tertiary institutions, private sector organisations, and government legislators. To attract and retain a more diverse workforce, networks, mentoring, paid internships, procurement policies, bridging/upskilling courses, and data collection could all be leveraged. The messaging of job advertisements could emphasise skills rather than qualifications and appoint on potential rather than past performance. In addition to technical and operational roles, skills beyond STEM should be recognised for their critical contribution to achieving the space sector's goals. Employees in HR, communications, marketing, legal affairs and more deserve to be valued and to experience a workforce that is inclusive, fair and safe.

Ultimately, achieving sustainable change requires addressing deeply rooted patriarchal and colonial biases prevalent in the space sector so that people from a diverse range of backgrounds can develop a true sense of belonging and

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inclusion. This is not just critical to attract the 'next generation' of the space workforce, but essential to fulfilling many countries' space ambitions and workforce shortages.

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