

**DIVERSITY IN STUDENT SPACE ACTIVITIES IN THE UNITED KINGDOM.** A. C. O'Brien<sup>1,2</sup>, A. R. Damale<sup>1</sup>, L. J. Lappin<sup>1</sup>, R. J. Garner<sup>1</sup> and J. N. Dudley<sup>1</sup> <sup>1</sup>UK Students for Exploration and Development of Space, 27/29 South Lambeth Road London, aine.obrien@ukseds.org, <sup>2</sup>School of Geographical and Earth Sciences, University of Glasgow, UK, a.obrien.1@research.gla.ac.uk

**Introduction:** The space sector in the UK is expanding rapidly. The UK Space Agency's aim is for the UK to make up 10% of the global sector by 2030 [1]. To meet this goal, a larger and more diverse workforce is needed [2]. It is also widely acknowledged that diverse workforces in industry lead to more innovation and productivity [2]. This abstract summarises the diversity and inclusion statistics of UK Students for the Exploration and Development of Space (UKSEDS) events and activities, and how we as an organisation are continuing to take steps to ensure that our approaches to diversity are intersectional and inclusive.

**UKSEDS and our Activities:** UKSEDS is the UK's national student space society: we aim to represent and advocate the role of students and young people within the space sector. A summary of some of our recent flagship activities is below:

*SpaceCareers.uk:* SpaceCareers.uk is a careers website for early career job seekers looking for employment and experience in the space sector in the UK and abroad. It hosts a space jobs board and careers advice, including job profiles, interviews with space professionals, and application tips.

*Careers Launch:* In 2018, UKSEDS hosted Careers Launch at the Reinventing Space Conference, an annual one day conference for students to hear from space industry professionals.

*Diversity in Space Careers (DISC):* DISC was a one day conference held at the Royal Astronomical Society. Introduced in 2018, this event championed diversity and inclusion in UK space sector and was attended by students (42%), academics (8%), space industry representatives (19%), people not in work (17%) and retirees (3%), with a broad range in the age of delegates attending.

*Lunar Rover Competition (LRC):* The LRC was an annual competition (2016 - 18) held for university students to experience an analogue mission, from conceptual design to testing. This is a technically challenging group project, aimed to upskill students and prepare them for technical jobs in the sector. Most teams were made up of undergraduate engineering students.

*National Student Space Conference (NSSC):* This annual 2-day conference sees over 300 students, predominantly in physics and engineering, hear talks, panel discussions and meet employers from all elements of the UK space sector.

**Diversity Surveys:** Over the years, UKSEDS has monitored a number of diversity and inclusivity indicators in our membership and our event attendees through surveys. Examples of some of the diversity information we have asked for from members and/or delegates include gender identity, age, and career stage.

The data displayed in Figures 1 & 3 below come from surveys given to participants at UKSEDS events. All surveys are anonymous and optional. Figure 2 displays data from the wider Astronomy, Higher Education, Engineering and Physics communities in the UK.

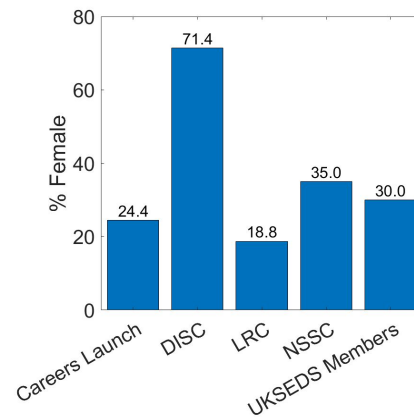


Fig. 1 The percentage of female attendees at 4 UKSEDS events in 2018 (Careers Launch n = 45, DISC n = 37, LRC finals n = 48 and NSSC n = 331) are displayed alongside the percentage of female UKSEDS members who joined in the period 2016-2018 (n = 925).

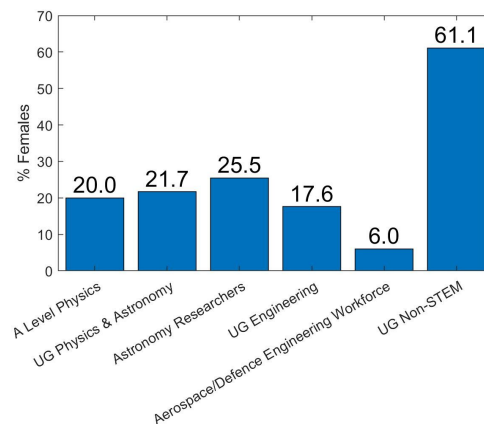


Fig. 2 Percentage of women and girls taking part in Physics, Astronomy, Engineering and non-STEM activities in the UK. Data acquired from [2, 3 & 4]

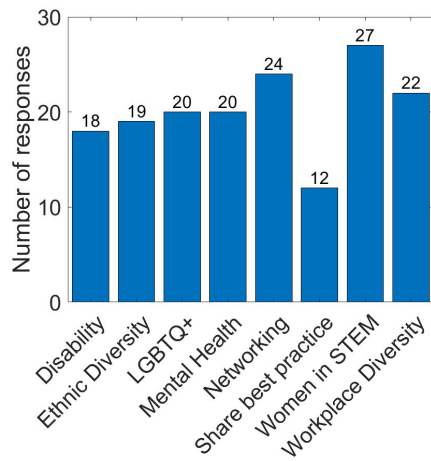


Fig. 3 Motivations for attending DISC. 37 conference delegates responded to the question: ‘What were your main motivations for attending DISC? (tick as many as appropriate)’

**Discussion and Further Work:** Whilst the proportion of women in most UKSEDS activities is low, particularly in the Lunar Rover Competition, comparing these figures to industry/cohort data (Figure 2) shows us that the engagement of women in UKSEDS is higher than the broader sector.

LRC teams are primarily made up of undergraduate engineers. Comparing the national statistics for undergraduate engineers to physicists, this may explain why the LRC does not have the same diversity as the UKSEDS membership. More data is needed on the makeup of UKSEDS’ audience to investigate this further.

Although the proportion of women studying engineering is higher than the workforce, only 47.4 % of female engineering graduates in 2011 went on to work in engineering and technology [5]. This figure was much higher (66.2 %) for male engineering graduates. This issue, whereby women are increasingly under-represented at each successive career stage, often referred to as the ‘leaky pipeline’ is also observed in other areas of STEM [6]. If we are to fill the skills gap in the space sector [1, 2] we must determine and remove the barriers causing women to leave the field.

70% of attendees at DISC identified as female and 3% as non-binary - however, only 30% of our membership identify as female (and no 2016-2018 members identified as non-binary). This is suggestive of the fact that more needs to be done to engage male members and stakeholders in the diversity discourse.

Figure 3 displays the reasons given by DISC delegates for attending the event. It is clear that those informed on the issue of diversity in the space sector are concerned with a broad range of intersectional

inclusion issues, as opposed to only the issue of representation of women. Data from the RAS demographic survey [3] demonstrates the importance of an intersectional approach: only 6 respondents to the survey of 358 permanent staff reported they have a disability, whilst no permanent staff and only 4 postgraduate students in Astronomy and Geophysics reported they were black/of African/Caribbean origin. 95% of the British respondents to the RAS demographic survey were white, and this is a significantly higher proportion than that of the population as a whole, (87.1% of respondents identified as white, according to the 2011 census) [3]. These data show that more must be done to remove barriers to mobility for under-represented minorities in the space sector.

Up until the advent of DISC, we collected anonymised data on gender, university/course and career stage. We now aim to collect similar voluntary, anonymised data on ethnicity, disability, sexual orientation, background (first in family to go to university etc.), so that we may identify additional areas where people from minority backgrounds are under represented in UKSEDS.

Furthermore, in order to make our events and activities as inclusive as possible, we have implemented inclusive initiatives to make space accessible to all. Three such initiatives are outlined below:

1. Colour communication stickers: a traffic light system of stickers that indicate communication preferences [7].
2. Gender pronoun badges: Including delegates gender pronouns on their name badges.
3. Code of Conduct. a code of conduct outlining expectations both at events and on related social media.

It is hoped that by improving the inclusivity and accessibility of student space events activities, barriers to mobility will be removed and fewer minorities will be deterred from the sector.

**References:** [1] UK Space Agency (2015) National Space Policy Report [2] Institute of Engineering and Technology (2017) Skills Survey [3] S. McWhinnie (2017), The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2016, Royal Astronomical Society. [4] Higher Education Statistics Agency (2018) HE student enrolments by subject area and sex 2012/13 to 2016/17 [5] Women’s Engineering Society (2011) Diversity in Engineering [6] UNESCO Science Report (2015) Towards 2030 [7] Autistic Self Advocacy Network (2014) Color Communication badges