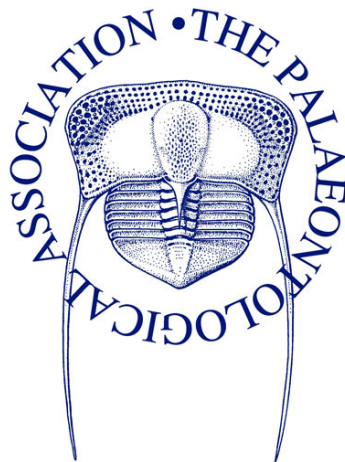


# Palaeontological Association Diversity Study 2018

Parigen Limited  
Leeds, UK

Directed by the Council Diversity Group, led by Dr Fiona Gill



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## **Executive Summary**

This document presents an executive summary of the Diversity Study conducted between October 2017 and May 2018, and presents key findings and recommendations on taking forward the diversity agenda within the Palaeontological Association.

### **Aims of the Diversity Study and data collection**

The Diversity Study aimed i) to determine the current diversity of Palaeontological Association membership and a wider group of palaeontologists beyond the membership; ii) to identify any under-represented groups, iii) to explore factors that promote or impede diversity within the discipline, and iv) to provide an evidence base to inform the Association's activities, policy and practice. Diversity consultants Parigen Limited were appointed to assist the process and to produce the report. The data in the report comes from 575 responses to an online survey, 18 telephone interviews, three focus groups and informal discussions at the 2017 Annual Meeting. The project has been directed by the Council Diversity Group, led by Dr Fiona Gill.

### **Key findings**

The Diversity Study was warmly welcomed by the vast majority of contributors, who agreed with Council that considerations of diversity are an important aspect of promoting palaeontology. Benchmarking was however problematic as approaches to other palaeontological/geological associations found that they are not currently in possession of detailed diversity data. Diversity data from the British Ecological Society, HESA and other sources have been quoted to assist with benchmarking. The report contains a large of findings, but key amongst them are:

- A strong feeling from contributors of a need for outreach to promote palaeontology to currently under-represented groups – in particular people from ethnic minorities and poorer backgrounds
- A need to ensure that the Annual Meeting is as inclusive as possible
- Many observations about the attrition of women and the promotion of gender equality
- A need for career advice and support for those at early career stage
- A need to review the Association's prizes and awards and the associated peer review systems to tackle inherent bias, increase transparency, create more diverse role models, to increase diversity of recipients and to build the confidence of the community
- A desire from palaeontologists to promote their discipline as being diverse, exciting, relevant, and welcoming to everyone, with a huge breadth of sub-disciplines and different ways of contributing.

### **Next steps and recommendations to Council**

A significant opportunity now exists for a fresh look at the Association's activities ensuring that they promote palaeontology and its allied sciences in the most inclusive, relevant and effective ways.

Contributors and the consultants have provided a large number of practical suggestions of actions that they consider would help to achieve this, but they present some strategic questions about the remit and scope of PalAss for Council to debate. In response, Council may wish to review and refocus existing activities as well as considering new initiatives. It is suggested that Council appoint a Diversity Officer to lead this area of work and that an Equality and Diversity Strategy and an action plan be drawn up. The study report provides a useful 'snapshot' of the diversity of PalAss membership at December 2017, but it is suggested that PalAss embed its own diversity monitoring systems, asking new or renewing members about their protected characteristics, so that the Association has access to 'live' diversity data in the future and can track the Association's progress over time.

# Palaeontological Association Diversity Study 2018

## 1. Introduction

This report presents quantitative and qualitative data collected from Palaeontological Association (PalAss) members and other palaeontologists as part of the Association's Diversity Study, which was carried out between December 2017 and April 2018 by the diversity consultancy Parigen Limited.

## 2. The aims of the Palaeontological Association Diversity Study

The study aimed to determine the current diversity of PalAss membership, and, if possible, of a wider group of palaeontologists beyond the membership. The intention was to highlight any under-represented groups and to explore factors that promote or impede diversity in the discipline. It is intended that the findings will serve as an evidence base to inform the Association's activities, policy and practice.

## 3. Why is diversity important?

Discrimination that arises because of people's individual characteristics and circumstances is not only unlawful, but also a denial of opportunity and a waste of talent. Organisations have much to gain in removing barriers to participation enabling them to attract and retain the best talent and science has much to gain from an increased diversity of contributions and ideas. Clearly, there is an onus on membership organisations to ensure that all their members have access to their services and activities and that none are excluded or marginalised. Not least, happy, fully engaged members lead to lively, well-attended events, and thus an assured future for the Association.

*'Diversity is central to generating debate and keeping palaeontology in the spotlight as a relevant discipline in the modern world'*

A PalAss survey respondent

## 4. Methods

The Council Diversity Group and Parigen worked together to develop a set of monitoring questions for a survey. The questions aimed to explore characteristics that are legally protected under UK law and other aspects of respondents' backgrounds and identities, namely employment sector, career stage, caring responsibilities, and socio-economic status. The survey asked whether respondents were members of PalAss, whether they had recently participated in the Annual Meeting and/or Progressive Palaeontology and how strongly they agreed or disagreed with three statements about inclusivity, fairness and equal opportunities in palaeontology. The survey also included an open question that encouraged respondents to write freely about their experiences, and to make comments and suggestions as to how PalAss could become a more inclusive organisation and

promote diversity in palaeontology. Once the questions were agreed the consultants sourced some suitable software and created an online survey, which was piloted using a group of about 40 members. Through the pilot a number of corrections and improvements were identified and, once these had been made, the survey was launched through email communications with members and a link on the PalAss website. Members were asked to respond themselves to the survey, but also to pass the link on to non-members. The consultants supplied suggestions of text promoting the survey and the Diversity Study that could be used for dissemination purposes.

As well as the open survey question, qualitative data was also collected through:

- 18 telephone interviews with palaeontologists and former palaeontologists at a wide range of career levels
- three focus groups which were conducted at the 2017 Annual Meeting
- informal discussions with delegates at the 2017 Annual Meeting during lunchtimes and coffee breaks

In each section of the report that focuses on survey data there has been an attempt to provide context through some kind of benchmark. The benchmarking data used varies according to availability and comes from a wide variety of sources. The published equality data of the British Ecological Society (BES) has been inserted where this is available, together with data from the Higher Education Statistics Agency (HESA) gathered from UK universities. Contact was made with a number of other palaeontological and geological learned societies to suggest data sharing for the purposes of benchmarking. Some expressed interest in working towards such co-operation in the future, but none were in the position to share data at the time of writing.

## **5. Survey Response Rate**

585 full responses to the survey were received, 463 (79.15%) of these were from PalAss members, giving a membership response rate of 40.90%. 122 respondents were not members of PalAss, although 28 of these had been PalAss members in the past.

204 responses were given to the open question in the survey, 113 from men, 87 from women and 4 from people of other gender identities.

It should be noted that in the quantitative analysis, although every effort has been made to achieve accuracy and consistency, there are some small anomalies caused, for example, by respondents giving more than answer or skipping questions, or perhaps misunderstanding the nature of the question.

## **6. Respondent's Country of Residence**

Respondents lived in 39 countries around the world but were mainly concentrated in Europe and the USA, with very low representation from Africa (5) and Asia (7), the Middle East (3) and South America (10). (The survey link was not directly sent by PalAss to members in a number of countries where homosexuality is illegal, so as not to encourage potentially problematic disclosure). 12 respondents did not supply a country of residence. The biggest groups of members were in the UK

(289, 50.09%), USA (109, 19.02%), Germany (30, 5.24%), France (18, 3.14%), Australia (14, 2.44%), Canada (11, 1.92%), and Ireland (11, 1.92%), with 1-10 respondents from:

- Argentina
- Belgium
- Brazil
- Czech Republic
- Croatia
- Denmark
- Estonia
- Finland
- Greece
- Hong Kong
- India
- Italy
- Japan
- Lithuania
- Madagascar
- Netherlands
- New Zealand
- Norway
- Panama
- Peru
- Poland
- Portugal
- Russia
- Slovakia
- South Africa
- Spain
- Sweden
- Switzerland
- Thailand
- United Arab Emirates
- Venezuela
- Zambia

Two respondents described themselves as being Scottish (not UK), one from Cataluña (rather than Spain), and three as living in more than one country. No one selected 'prefer not to say' but 12 respondents did not give an answer to this question.

The majority of the comments provided on diversity in palaeontology focused on the UK and the US and these have been used throughout this report. However, a few survey respondents from other places gave interesting perspectives on diversity in the discipline in their own countries, for example:

*'Here in Germany, people not employed by the official bureaucracies... are banned from all palaeontological research. Collectors are criminals, the collections have mostly been declared illegal and new specimens will not be accepted for scientific research. This excludes those who want to participate in research and help save specimens from destruction.'*

*'In my home institution [in Greece] ... diversity is limited because (1) PhD students are not remunerated (2) all classes are in Greek (no foreign professors) (3) very few researcher positions.'*

*'Although palaeontology research started in Peru in the late 19<sup>th</sup> century it is still a novice science. Inclusiveness should embrace people from the interior provinces and not only be visible in the big cities where it is concentrated in universities and big museums.'*

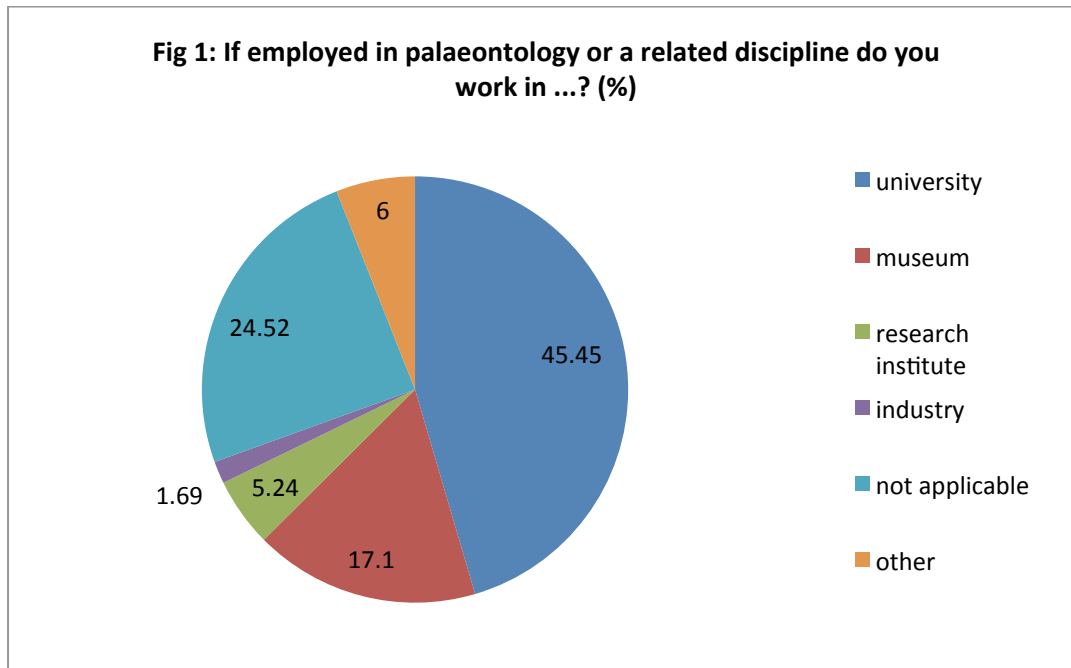
*'I completed my PhD and postdoc in South Africa where previously disadvantaged race groups (primarily Black Africans) were restricted from choosing a career in palaeontology because a) primary and high school education is very weak in maths and science and most students could not gain university entrance to a science degree and b) because those black individuals who do gain entrance to university prefer to study a traditionally highly paid profession (such as mining engineer, lawyer...) instead of becoming an academic.'*



## 7. Sector in which respondents were employed

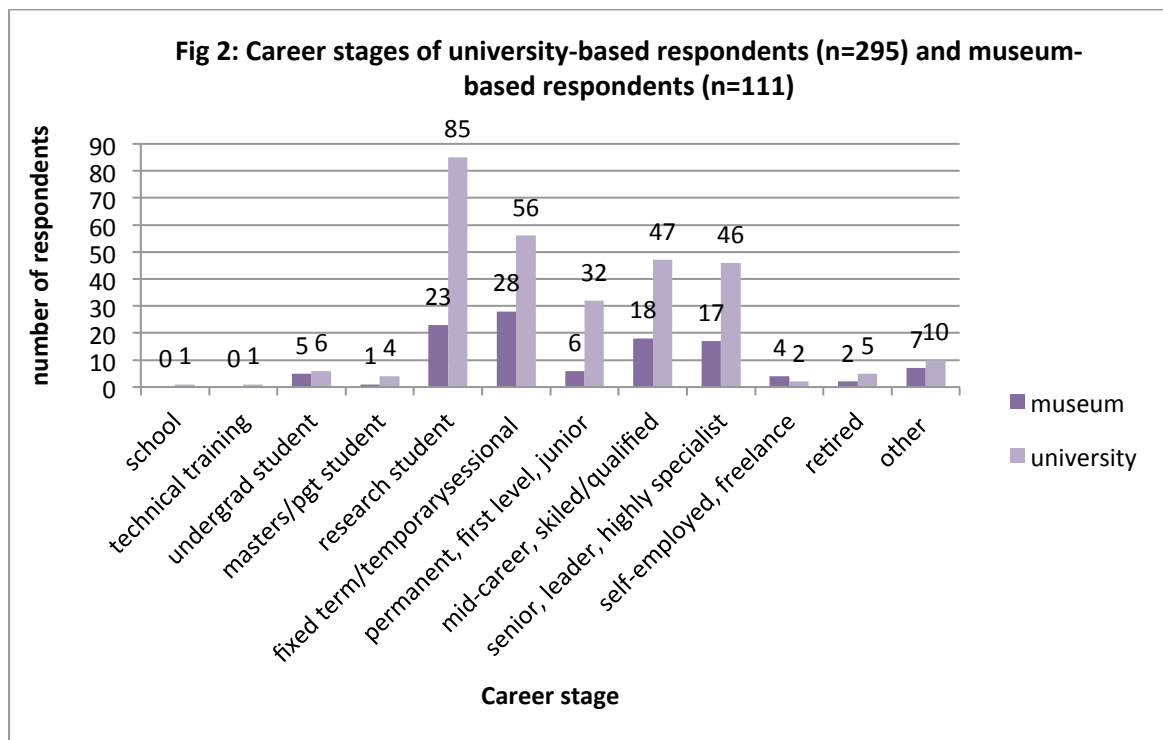
444 respondents (75.90%) stated that they were currently carrying out paid work in palaeontology or in a related discipline, whilst the remaining 141 (24.10%) were not. 40 of this latter group were retired. About half (51.13%) of those who were not currently working in palaeontology at the time of writing hoped to do so at some point in the future.

Just under half of the respondents (45.45%) worked in the university sector and 17.10% worked in museums. The full distribution is as follows:



64 respondents selected more than one answer to this question, e.g. both museum and university, or both not applicable and other. 10 'other' responses were from people who were retired, 4 of whom explained that they were still working but on an unpaid basis. 6 'others' were freelancers, 2 were in journalism and 4 worked for a government organisation. Women were proportionately more likely than men to be employed in museums (21.7% vs 14.6%) and universities (49.57% vs 43.07%), but only 2 women were employed in industry, compared to 9 men. Respondents from outside the UK and EU were more likely to work in universities (57.78%), slightly more likely to work in research institutes (8.89%), and slightly less likely to work in museums (15.56%).

Figure 2 shows the two largest sectors – universities and museums - broken down by career stage:



N.B. The full breakdown of the career stages of respondents is given in the career stage section (section 9a, Table 6, page 22).

## 8. The Protected Characteristics of Respondents

The 2010 UK Equality Act aims to eliminate discrimination against people with nine listed protected characteristics. These protected characteristics are: age, disability, gender reassignment (formerly known as transgender), marriage and civil partnership, pregnancy and maternity, race/ethnicity, religion or belief, sex or gender, and sexual orientation. In order to be proactive in removing any potentially discriminating policies or practices, organisations in the UK and in other parts of the world where anti-discrimination laws exist, are encouraged to monitor the protected characteristics of their stakeholders and to use this monitoring data to inform their planning and decision-making. The PalAss survey therefore invited respondents to disclose their protected characteristics but, being mindful of members’ rights to withhold this personal information, a ‘prefer not to say’ option was provided in each case.

### 8a) Gender

The Diversity Group was interested in the relative participation of men and women in palaeontology and how this compares to other physical/geological sciences. According to the Women in the STEM Workforce 2016 benchmarking data published by the WISE Campaign<sup>i</sup>, 41% of science professionals across the STEM workforce in the UK are female. Higher Education Statistics Agency (HESA) data for 2014/15 show 33.6% of staff in biological, mathematical & physical sciences in UK universities are female<sup>ii</sup>.

In the US the Office of the Chief Economist published data in 2017 to show that 24% of STEM jobs are held by women<sup>iii</sup>. Worldwide, the UNESCO Institute for Statistics found that 28% of people working in research and experimental development around the globe are female<sup>iv</sup>.

In the PalAss survey 371 (63.42%) respondents were male and 206 (35.21%) were female, 3 preferred not to reveal their gender and 4 gave other, non-binary gender identities, such as pangender. One respondent gave a description that did not refer to sex or gender.

For comparison, the 2017 diversity figures from the British Ecological Society (which had 4772 members) show that their membership is 53% male and 47% female.

The male dominance of palaeontology was visible to many – though not all – survey respondents. A large number of male and female respondents mentioned a visible gender imbalance, especially at senior levels. Despite this, many people were encouraged to see that the gender balance was improving over time and PalAss was congratulated for encouraging women onto its Council:

*'I have just been to the AGM. I could see that they really wanted some young people and some women on Council. It was really encouraging.'*

Some were taking their own steps to promote gender balance, such as this male respondent:

*'I am aware of efforts to increase the visibility of women in the field and have implemented some in my own projects, e.g. striving for equal gender split when inviting contributions to books.'*

It was hoped that PalAss would continue to be proactive in promoting gender balance and many of the suggestions that were made around this topic are included later in this report.

## **8b) Gender Identity**

Accurate benchmarking data on the number of transgender people in the world is very hard to come by, not least because transgender is not an officially recognised characteristic in many countries and is officially monitored by very few. Even in those parts of the world where transgender is recognised and protected by law – such as the UK – the interpretation of the word 'transgender' and the associated concepts continue to develop and change and laws and policies quickly become outdated. A House of Commons Women and Equalities Committee report 2015-16 quoted data that suggested there were approximately 650,000 'gender incongruent' people in the UK at that time<sup>v</sup>. This represented roughly 0.1% of the population. A report published in 2016 by The Williams Institute at UCLA suggested that 0.8% of the US population is transgender<sup>vi</sup>.

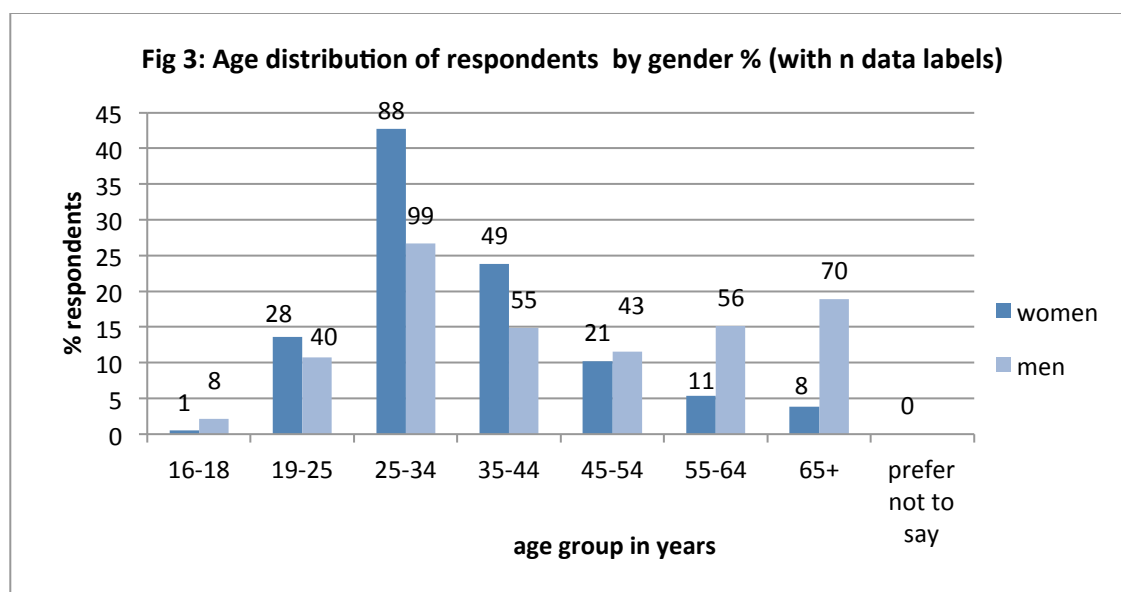
574 (98.12%) of respondents to the PalAss survey said that their gender identity was the same as that assigned to them at birth, whilst 8 (1.36%) respondents now had a different gender identity from that originally assigned to them. 3 preferred not to comment.

A non-binary delegate at the Annual Meeting was delighted that they had been able to register in a non-gendered manner and wished that other organisations would be so welcoming. They hoped that at future events PalAss would ensure that gender-neutral toilets were available, as they found using gendered toilets embarrassing and uncomfortable.

### 8c) Age

According to research by Catalyst, in the UK and across the EU the STEM workforce is ageing<sup>vii</sup>. According to Eurostat data, in 2013 58% of STEM professionals across the EU were in the 45-64 age group. In the UK, the HESA Staff Record<sup>viii</sup> found that in 2013/14 the average age of full-time academic staff working for Higher Education Providers in the UK was 43.1. 41.7% of academic staff were aged 46 and over and 12.6% were aged between 51 and 55.

All respondents to the survey disclosed their age group. The biggest group of respondents (189) were aged 25-34. The full age distribution of male and female respondents is shown in Figure 3.



About a third (126, 33.94%) of male respondents were aged 55 and above, whilst only 9.22% (19) of female respondents were in this age bracket. Conversely, 56.80% (117) of female respondents were aged 35 or younger, compared to 39.62% (147) of male respondents.

Looking at the whole sample, 45.64% of respondents were below the age of 35, 29.06% were between 35 and 54 and 25.3% were 55 or over.

BES reports the date of birth by decade of its members in its Annual Equality and Diversity Report<sup>ix</sup>. Comparing the BES 2017 figures with the PalAss sample shows a similar weighting towards younger members, but smaller proportions of older members:

**Table 1: The Age Profile of BES members 2017**

Decade of birth	1990s	1980s	1970s	1960s	1950s	1940s	1930s
% of members	33%	38%	17%	7%	4%	1%	<1%

The age profile of women and men in the PalAss sample echoes a similar pattern with respect to career stage (paragraph 8a) with the sample containing proportionately more female students and employees on fixed-term contracts, but a higher percentage of male senior leaders and retirees.

Several retired palaeontologists in the 65+ age group said how much they appreciated the reduced membership fee for retired people – meaning that they can keep in touch with the discipline that has been their life’s work:

*‘I am able to retain my membership now because of the reduced fee to retired members, whereas I have given up all my other memberships. I do find that attendance at meetings is too expensive, but I can catch up with all the excellent circulars provided.’*

### 8d) Disability

According to data published by the Papworth Trust in 2016<sup>x</sup>, around 1 in 5 people in the UK are disabled. This includes 16% of adults of working age. Restriction on mobility is the most commonly reported disability. In January 2016, the UK employment rate among working-age disabled people was 46.5%, compared to 84% of non-disabled people. Across the EU approximately 28% of people aged 15-64 report a disability with a varying picture from country to country (e.g. 14% in Greece and Ireland to over 50% in France and Finland)<sup>xi</sup>.

A Royal Society study found that disabled people are under-represented in the UK scientific workforce as a whole, but they are no more under-represented in the scientific workforce than in other occupations<sup>xii</sup>.

According to HESA data in 2016-17, 13.69% of Higher Education students in the UK had a ‘known disability’<sup>xiii</sup>. However very few academic staff in UK Higher Education Institutions declare a disability, as shown in table 2 below.

**Table 2: All academic staff (excluding atypical and Teaching Only) at UK HEIs 2015-16**

	No known disability		Disability declared		Unknown	
	N	%	N	%	N	%
Academic leadership	4,210	93.6%	155	3.4%	135	3.0%
Professor	18,340	93.3%	555	2.8%	760	3.9%
Senior Lecturer (pre 92), Principal Lecturer (post 92)	23,660	93.0%	940	3.7%	855	3.4%
Lecturer B (pre 92), Senior Lecturer (post 92)	41,190	92.2%	1,785	4.0%	1,695	3.8%
Lecturer A (pre-92), Lecturer (post-92)	35,455	92.8%	1,125	2.9%	1,635	4.3%

Research Assistant	12,635	91.7%	485	3.5%	655	4.8%
Administrative	1,250	93.4%	60	4.5%	30	2.1%

In comparison with the HESA figures, 497 (84.96%) PalAss survey respondents reported no disability, 79 (13.50%) said they had a disability, long-term illness or health condition, and 9 (1.54%) preferred not to disclose. The percentage identifying as disabled rose to 16.56% of the over-55 age group and dropped to 11.24% of the under-35s. 48 respondents opted to reveal more about their disability. The survey invited them to give more details if they wished, as this information *'may help the Association to be more inclusive when planning its activities.'*

Ten said they suffered from depression and/or anxiety and 5 named a range of mental illnesses or conditions such as bipolar disorder and memory loss. Ten listed a range of chronic illnesses or conditions such as leukaemia or sciatica, and 8 explicitly mentioned reduced mobility. Five were dyslexic and 4 mentioned dyspraxia. Five were on the autistic spectrum, 3 had impaired sight and 3 had impaired hearing with one being profoundly deaf. Three respondents were diabetic. Several respondents explicitly stated that their disability/illness/condition made participating in meetings problematic. For example, an autistic respondent commented:

*'I sometimes find group social events at meetings to be quite overwhelming.'*

and someone with coeliac disease observed:

*'There is usually nothing safe to eat at any convention or outing.'*

Several participants in the Diversity Study talked about the inability of learning providers to support students with mental health issues, and cited this as an insurmountable obstacle for some:

*'I have known excellent students to drop out due to lack of support and understanding (from individual lecturers and institutions) over mental health issues, and I'd like to see some action in this area.'*

An interviewee who had suffered from mental health issues for most of his adult life said that he would like to see PalAss undertake some awareness raising about mental health issues.

The mental health charity Mind conservatively estimates that 1 in 4 people in the UK will report a mental health problem each year<sup>xiv</sup>. The World Health Organisation (WHO) reports a similar incidence of mental health issues in Europe<sup>xv</sup>. A YouGov poll in 2016 found about a quarter of university students report mental health issues. Such issues are more commonly reported by females than males (34% versus 19%) and by LGBT students more often than their heterosexual counterparts (45% versus 22%).<sup>xvi</sup>

A number of survey respondents were concerned that disabled people struggle to participate in palaeontology. However, someone pointed out that some disabled role models do exist:

*'As a highly physical field, I am concerned that people with some disabilities are less represented. However, we can point to several people with low eyesight and low mobility who have done well.'*

Several suggestions were made to support disabled palaeontologists including using technology (e.g. drones, 3D printing, virtual reality apps) to create virtual fieldtrips, sponsoring groups that support disabled palaeontologists, and highlighting valuable ways of being a palaeontologist without fieldwork.

Benchmarking against BES shows a higher proportion of palaeontologists declaring a disability than ecologists. This difference could be attributable in part to the higher age profile of the PalAss sample, or because the two surveys used different definitions of disability.

**Table 3: Comparing proportions of disabled members of BES with those in the PalAss survey declaring a disability.**

Disability/health condition	Yes	No	Prefer not to say
Palaeontologists	13%	85%	2%
Ecologists	4%	93%	3%

### 8e) Race/Ethnicity

The ONS does not publish data on ethnicity in the UK, but the 2011 census showed that 86% of people in England and Wales identified themselves as being from a white ethnic group<sup>xvii</sup> (down from 94% in 1991), in Scotland the figure is close to 95%<sup>xviii</sup>. In the US 2016 data revealed that 76.9% of the population classify themselves as white<sup>xix</sup>.

Most people employed in UK universities are white – but proportions are not dissimilar to the census data quoted above. HESA figures from 2015-16 showed that approximately 84% of professors and 90% of all academic leaders are white.

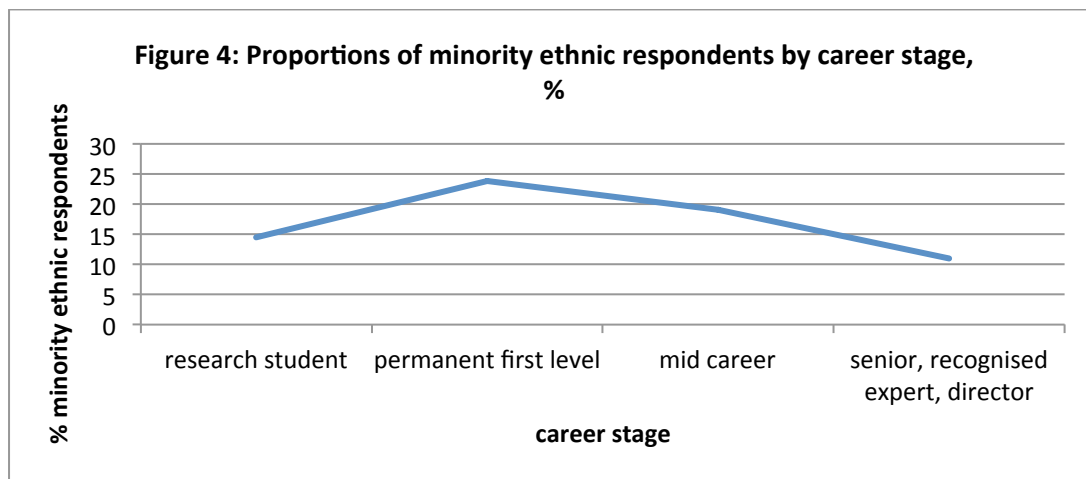
By far the biggest group of survey respondents (501, 85.64%) was white, with the next biggest group (24, 4.10%) being Hispanic/Latinx<sup>1</sup>. 22 (3.76%) were from mixed/multiple ethnic groups, and 17 (2.91%) were Asian. 13 preferred not to reveal their ethnicity (one saying that they did not believe that ethnic groups really exist). Two respondents were Arab and just one was Black.

Of the 414 respondents who resided in UK or Europe 90.1% (373) were white. Of the 109 respondents who lived in the US 82.57% (90) were white. The ‘whiteness’ of palaeontology was highlighted by many of the interviewees and survey respondents.

Doing a simple comparison of the ethnic mix of four increasingly senior career stages –i) research students, ii) those in permanent positions at first career level, iii) those at mid-career level and iv) those in the senior leader/well recognised expert categories - suggests that BME respondents are relatively successful in obtaining a first permanent position after their PhD, but then become less likely than their white colleagues to progress to mid-career and senior levels.

<sup>1</sup> Latinx is a recently introduced non-gendered word for Latino/Latina.

<sup>2</sup> The most selective universities are defined by the DfE as the top third of HE providers when ranked by mean



It was explained by several interviewees that most professional palaeontologists pass through the more selective universities (in the UK this would be The Russell Group of institutions), so the paucity of BME students at selective universities is one block to their participation in palaeontology. In the UK the proportion of undergraduates from minority ethnic backgrounds is rising and in England BME students were 29 per cent of all entrants to full-time first degrees in 2015-16, despite these groups making up just 18 per cent of the 15-year-old population in the 2011 census in England<sup>xx</sup>. However, some analysis published by the Russell Group found that in 2015 only 16% of 18-year old UK domiciled Black students applying to higher education with three or more A levels had grades AAB or better compared to 32% of white applicants. It was suggested that this attainment gap plus the type of A-level subjects chosen contributed to the under-representation of black students in Russell Group Universities.<sup>xxi</sup> Socio-economic factors, e.g. being first generation in Higher Education and living in an inner city, were also regularly cited by interviewees and survey respondents as barriers to ethnic minority groups and it was suggested by many that PalAss should do targeted outreach in inner cities and with disadvantaged communities. It was also suggested that PalAss could ensure that its committees are as diverse as possible, proactively promote the research of BME researchers through public channels to create diverse role models and provide conference grants and invitations for individuals from under-represented countries to facilitate more ethnically diverse discussions and interactions. PalAss could consider holding a seminar focusing on an under represented part of the world on the first day of the conference with an invited speaker from that region:

*'I would welcome palaeontological associations in general provide funds for speakers to attend from developing countries – it remains somewhat rare for fossil finds from such countries to be presented by someone based there.'*

It was pointed out by an individual who had worked in an African country that his students could not compete against their European and American counterparts for grants and awards as they had not benefited from the same well-resourced educational infrastructure. He would like to see some compensation or flexibility in applying selection criteria to acknowledge the lower level of opportunities experienced by applicants from less developed countries.

Benchmarking against BES membership in 2017 shows that the ecologists are rather more ethnically mixed than the palaeontologists:



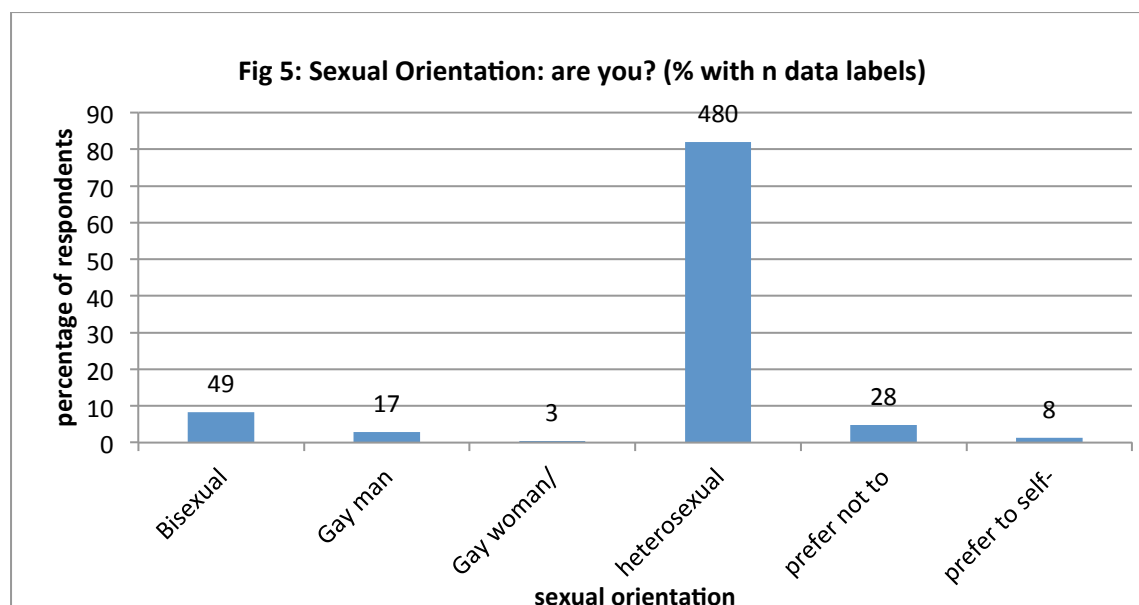
**Table 4: Comparing the ethnic groups of BES members in 2017 with PalAss survey respondents**

	White	Asian	Latinx	Black/African/ Caribbean	Mixed or multiple	Prefer not to say	other
Palaeontologists	86%	3%	4%	<1%	4%	2%	1%
Ecologists	73%	8%	5%	6%	4%	4%	1%

### 8f) Sexual Orientation

Asking people to disclose their sexual orientation is thought to be good practice in the UK, US and Europe where people’s rights are protected, but can be problematic elsewhere. In large parts of the world (72 states) homosexuality is criminalised. In some places it is punishable by death (8 states mostly in the Middle East) or long sentences including life imprisonment (14 states including India, Malaysia and Ethiopia)<sup>xxii</sup>.

82.05% (480) of respondents were heterosexual, with the second biggest group (49, 8.38%) being bisexual. The smallest group (3 respondents) was gay woman/lesbian. Most of the self-describers were asexual.



28 (4.79%) respondents preferred not to disclose their sexual orientation (which was the second highest level of non-disclosure to any question in the survey next to religion and belief) and 3 self-describers gave answers that indicated either non-cooperation with, or misunderstanding of, the question.

The Williams Institute report of 2011 found that 3.5% of people in the US identify as lesbian, gay or bisexual<sup>xxiii</sup> and data published in 2017 by Public Health England<sup>xxiv</sup> suggests that the figure for the English population is between 2.5-5.9%.

By comparison the sexual orientation figures of BES for 2017 are set out in the table below:

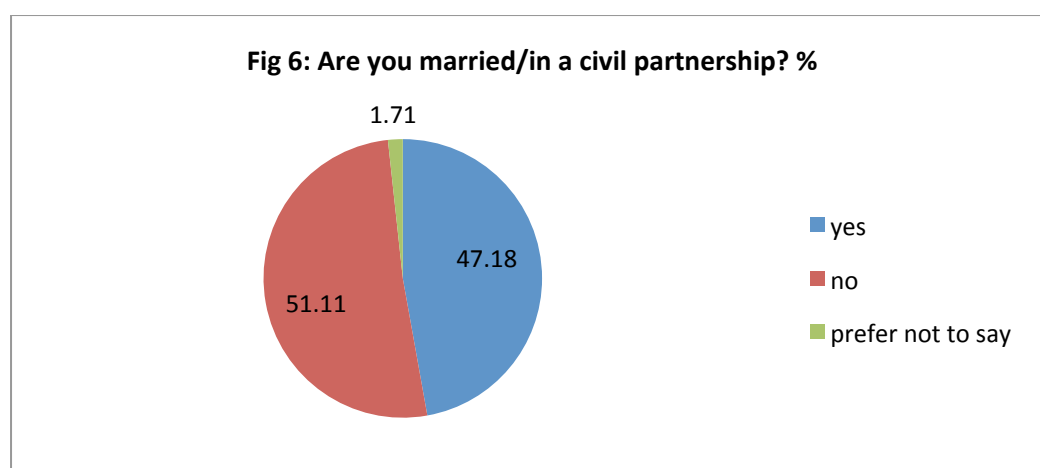
**Table 5: Comparing the sexual orientation of BES members 2017 with the PalAss sample**

	Bisexual	Gay man	Gay woman/ lesbian	Heterosexual	Prefer not to say	other
Palaeontologists	8%	3%	1%	82%	5%	1%
Ecologists	5%	2%	1%	81%	10%	1%

BES had a noticeably higher proportion of non-disclosers than the PalAss survey.

### 8g) Marriage/Civil Partnership

The survey text explained that in the UK a civil partnership is a legally recognised union of two people of the same sex which gives them the same or similar rights as a couple who are married. Similar arrangements exist in some other parts of the world, including some European countries, Australia and some US states. However reliable, recent, and useful benchmarking data is difficult to find. In 2014, 51.5% of people aged 16 and over in England and Wales were married or civil partnered<sup>xxv</sup>.



Just under half of survey respondents (276, 47.18%) were either married or in a civil partnership, with 299 (51.11%) not being married/in a civil partnership and 10 preferring not to say. Overall, 52.83% (196) of male respondents were married or in a partnership compared to 36.89% (76) of female respondents. Only 19.48% (52) of those aged 34 and under were married or in a civil partnership, with this being slightly more likely for men (20.41%) than women (18.80%) in this age group. 65.38% (68) of the 35-44-year olds were married or in a civil partnership, with 67.35% of women of this age being married or in a partnership, compared to 63.64% of men.

Several survey respondents and two interviewees mentioned the difficulty of having to move around to get jobs once you are in a couple, as you effectively have to find two jobs within commuting distance of each other:

*'If you are in a partnership you can't find jobs for both partners in the one area. That's the problem.'*

One PhD student in a partnership was realistic about this prospect and felt quite optimistic about her prospects of finding a suitable postdoc position and starting a family in the near future:

*'I have a very supportive partner who will take on a share of the workload and we are both happy to move around for work.'*

## **8h) Pregnancy/maternity and parental leave**

Pregnancy and maternity are legally protected characteristics in the UK. The UK has one of the longest maternity leaves in the OECD countries.

Despite this, research published by BIS and the Equality and Human Rights Commission in 2015 found that 11% of mothers in England, Scotland and Wales were either dismissed, made redundant, or otherwise forced out of their employment and 20% had experienced harassment or negative comments related to their pregnancy or request for flexible work on returning from leave<sup>xxvi</sup>. Follow up research found that around 20% of mothers had experienced financial loss on returning to work due to missing promotions or bonuses, receiving cuts in pay or benefits, and other potentially discriminatory practices<sup>xxvii</sup>.

Gov.UK reports that in 2015 the average age of a mother having her first baby in England and Wales was 28.6 years<sup>xxviii</sup>. The average age of a first-time mother in the US in 2014 was 26.3.<sup>xxix</sup> When considering a traditional academic career, this age bracket falls into 'the postdoc years'.

In April 2011 a new option to enable parents to share parental leave (SPL) was introduced in the UK. According to ACAS:

*'Shared Parental Leave can give parents more flexibility in how they share the care of their child in the first year following birth or adoption. Parents are able to share a pot of leave. They can decide to be off work at the same time and/or take it in turns to have periods of leave to look after the child.'*

However low awareness and problems understanding the rather complicated SPL system have meant that take up of SPL in the UK is extremely low, prompting the launch of a Department of Business campaign to promote it<sup>xxx</sup> in February 2018. This arrangement is much more common in some of the Nordic countries where it originated.

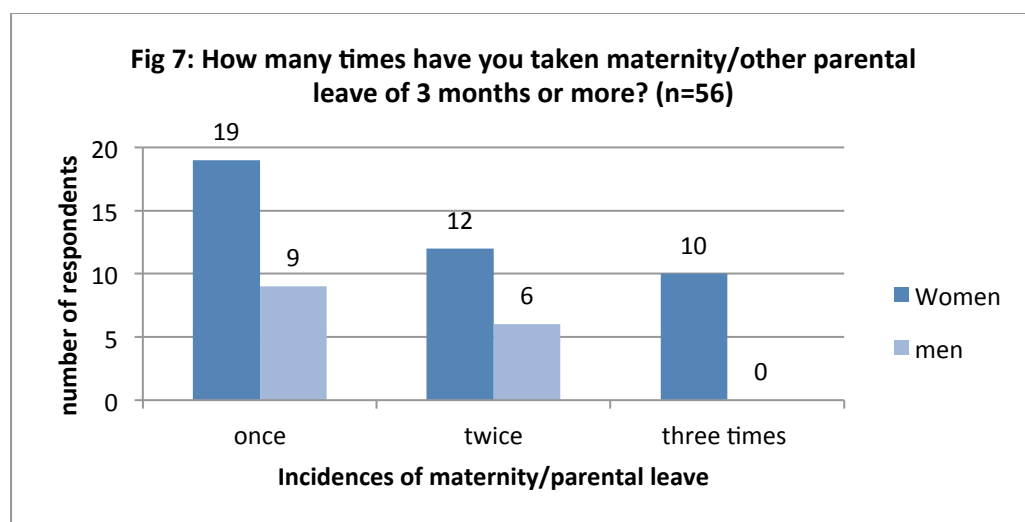
Only 3 survey respondents were pregnant, 2 were on maternity leave and 6 more (5 of whom were men) were on adoption/paternity/shared parental leave at the time of responding.

The World Health Organisation recommends that mothers exclusively breastfeed their child for the first 6 months of life and then continue to breastfeed as complementary feeding up to the age of 2 or beyond. This practice has enormous developmental benefits for the child so many mothers are keen to follow this guidance if possible. This can make returning to work very difficult and mothers need special support and facilities to maintain their production of breast milk. Some choose to or need to bring a breastfeeding child with them to conferences and sometimes bring a partner and other children. Best practice, to avoid excluding breastfeeding mothers from conferences, would be to ensure that all meeting and event venues have a clean, private space set aside for breastfeeding or for expressing milk and if possible a video-linked 'family area' where partners can sit with children. Access to a fridge means that the breastmilk can be stored safely. Registration forms for

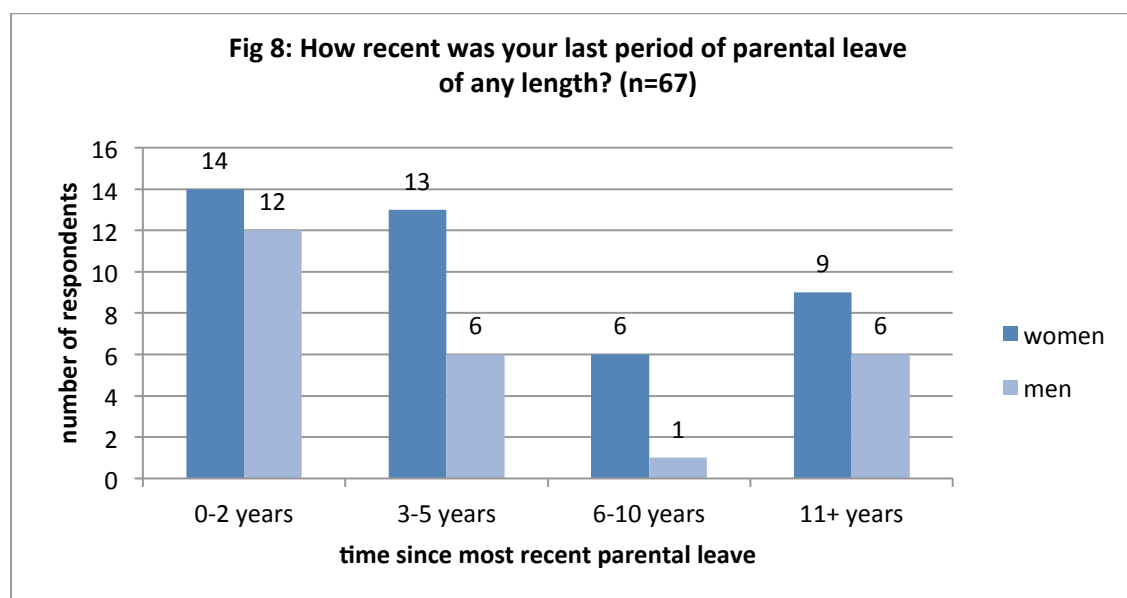
meetings and events could collect data about women’s needs so organisers can make the appropriate arrangements. All this best practice could be part of an inclusive meetings policy and publicised on the PalAss website.

The Diversity Group was also interested to know what proportion of respondents had taken parental leave of 3 months or more, due to the widely discussed impact that this has on career progression<sup>xxx</sup>

67 respondents had taken parental leave, but only 56 of those had taken leave of three months or more (4.04% of male respondents and 19.42% of female respondents). This latter group is disaggregated by gender below:



Of all those who had taken a period of maternity/parental leave of any length (67) the biggest group (26, 40.29%) had done so in the last two years.



The impact of taking parental leave and the challenges of being a working parent/carer featured heavily in the interviews and in survey responses from females. It was rarely mentioned by male survey respondents other than as being a barrier for women.

There was an interesting divergence between the assessments of most of the younger women who looked ahead at the prospect of being a working parent with trepidation, and the experience of the more senior women in the sample who were working parents.

Comments from senior mothers pointed to what was possible, especially the huge advantage of access to flexible work:

*'I am struggling to think of any women beyond a certain age who haven't got children. In many ways an academic career is much more flexible than working in the private sector.'*

*'Flexible working is the way forward for working parents. I know couples where both parents have switched to flexible working. Role models might be a problem. There are high fliers ... – but perhaps people don't know that [they have] children.'*

Whereas many women at an earlier career stage were more likely to look ahead and be unable to see how combining a career in palaeontology and a family was possible:

*'The few post-doctoral positions available will go to those who are willing to sacrifice their personal life to obtain them and, making sweeping generalisations, those are the white men with fewer responsibilities.'*

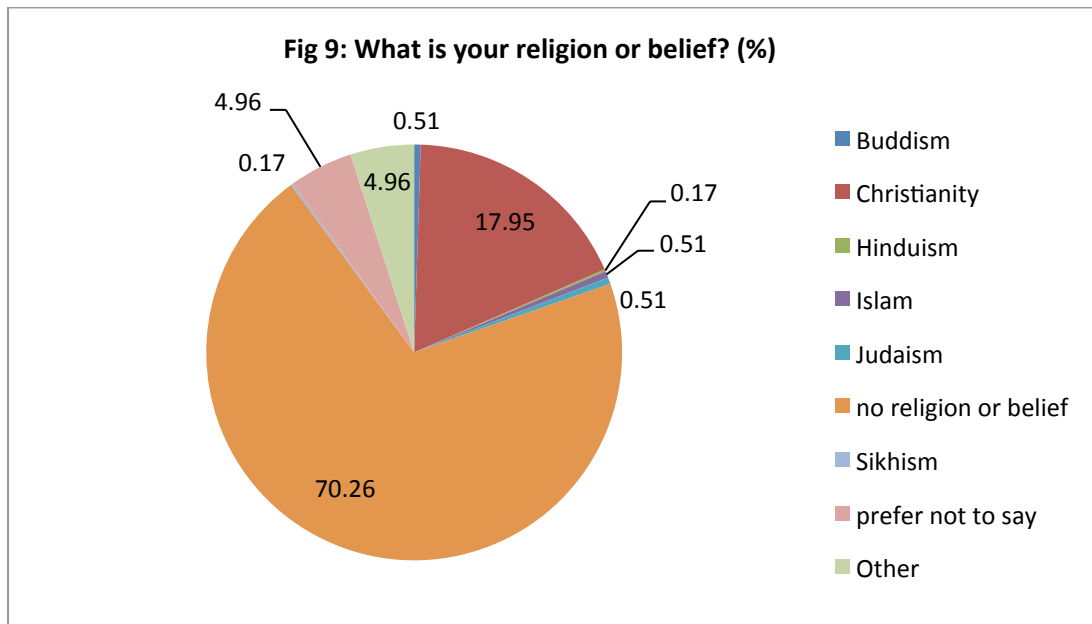
*'I will complete my PhD and then I will leave palaeontology. The first stages of a palaeontology career involve an endless series of short-term positions. This is not compatible with having a family.'*

It was suggested that more visible role models and mentoring would help women to develop the confidence and the strategies needed to combine family and career successfully. It was also suggested by a number of people that PalAss should consider 'returner grants' to help research-active palaeontologists return to their career after a break (possibly for both parental leave and extended sick leave). A small grant (perhaps match-funded by the employer) could help buy out teaching and administration time so the returner could focus on rebooting their research as well as funding a conference trip with childcare costs included if required.

## **8i) Religion and Belief**

By far the biggest group of respondents (411, 70.26%) described themselves as having no religion or belief, with a few commenting that that they did have belief in something – but not an organised religion.

*'My belief is unique as I have combined faith with science and so cannot be labelled by a specific religion.'*



The second biggest group was Christian (105, 17.95%) and third biggest group preferred not to say. This was the biggest area of non-disclosure in this study, at 4.96% (29).

Being in the UK, being in Europe, and being in a less developed country had virtually no impact on the religion/belief data, but the under 35s were rather more likely to have no religion or belief (76.78%, 205) and less likely to be Christian (10.86%, 29).

These findings contrast somewhat with those of the 34th British Social Attitudes survey in 2017<sup>xxxii</sup>, which found that half the sample did not regard themselves as belonging to a particular religion. Gallop surveys in the US found that 79% of American citizens believe in God and 10% are not sure<sup>xxxiii</sup>. In contrast, only 19% of the PalAss survey 109 PalAss respondents based in the US had any religious affiliation. (Note: it is not known how many of these respondents grew up in the US and identify as American citizens.)

## 9. Other Characteristics of Respondents

As well as the characteristics that are protected in UK law listed in section 8 above, the Diversity Group wished to explore career stage, caring responsibilities and socio-economic status.

### 9a) Career stage

The survey asked people to choose the descriptor from Table 1 overleaf that most closely matched their career stage.

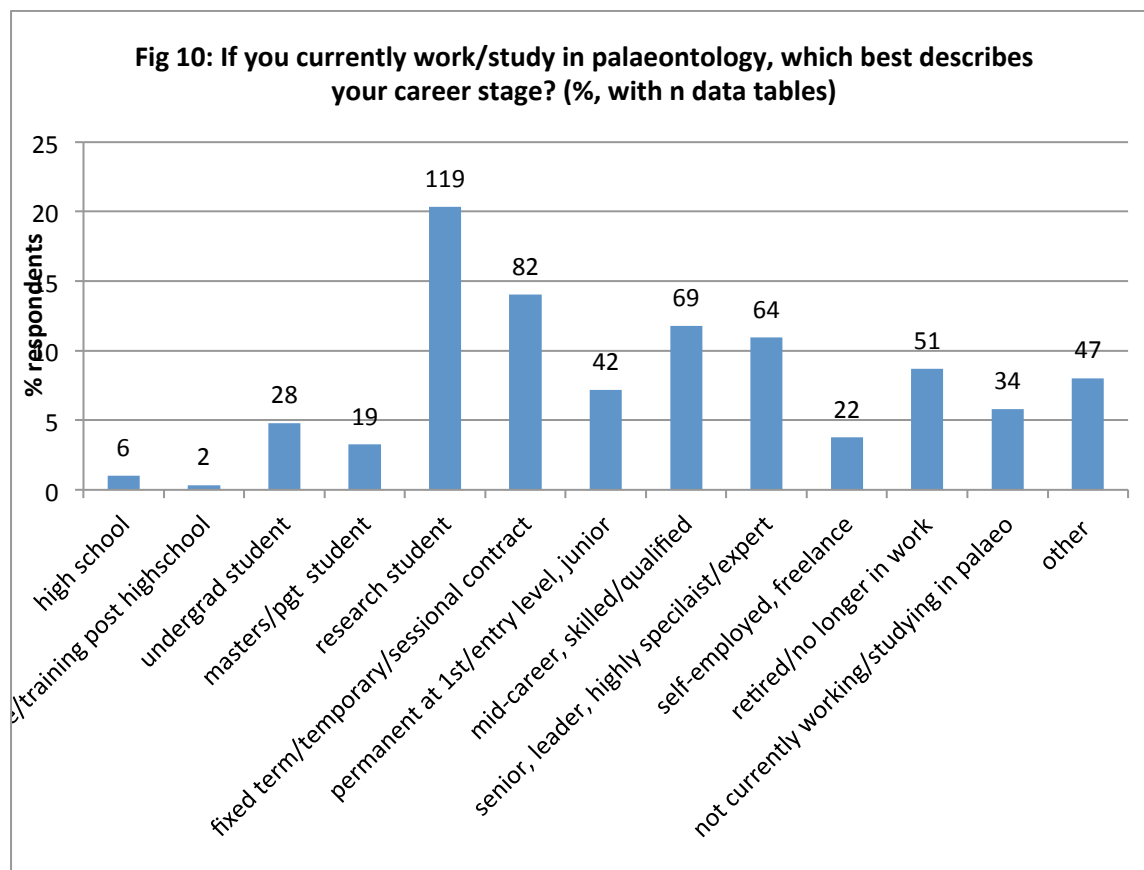
**Table 6: If you currently work/study in palaeontology which of the following best describes your career stage?**

	Men number	Men as percentage of male sample	Women number	Women as percentage of female sample
High school	6	1.62	0	0
Apprentice/post high school technical training	2	0.54	0	0
Undergraduate student	13	3.50	15	7.28
Masters student	5	1.35	13	6.31
PhD/research student	63	16.98	55	26.70
Fixed term contract researcher/sessional or temporary project worker	40	10.78	42	20.39
Permanent worker at first organisational level, junior or career entry position	23	6.20	18	8.74
Mid-career, established, skilled/qualified worker	49	13.21	20	9.71
Senior, leader, director, highly specialist/well recognised expert	47	12.67	15	7.28
Self-employed, freelance	18	4.85	3	1.46
Retired/no longer in work	47	12.67	4	1.94
I do not currently work/study in palaeontology	27	7.28	7	3.40
Other/I prefer to self-describe	31	8.35	14	6.79
Total	371	100	206	100

The largest group, just over a fifth, of respondents were PhD/research students (20.34%, 119). This group included 63 men (16.98% of male respondents) and 55 women (26.70% of female respondents). Those on fixed term, sessional or temporary contracts were the second largest group (14.02% overall; 82 = 40 men and 42 women). 69 respondents (49 men and 20 women) classed themselves as being mid-career/established, skilled/qualified workers and 62 (47 men and 15 women) as senior/leader/director, highly specialist/well recognised expert.

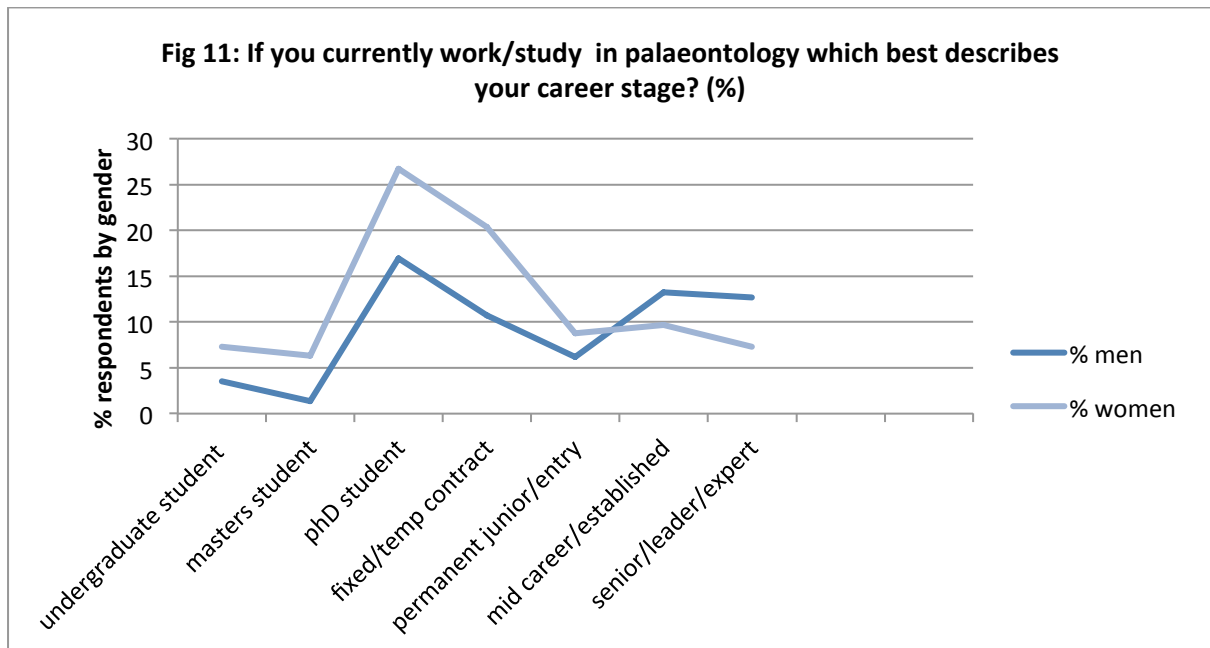
51 respondents (8.72%) selected 'retired/no longer in work', but 12 retirees selected 'other' and described themselves as being retired but still active in palaeontology – several specifying emeritus positions in universities.

Also in the 'prefer to self-describe' group were 6 amateur palaeontologists, 4 volunteers, 8 independent researchers and 2 people who were unemployed but actively seeking a job in palaeontology.



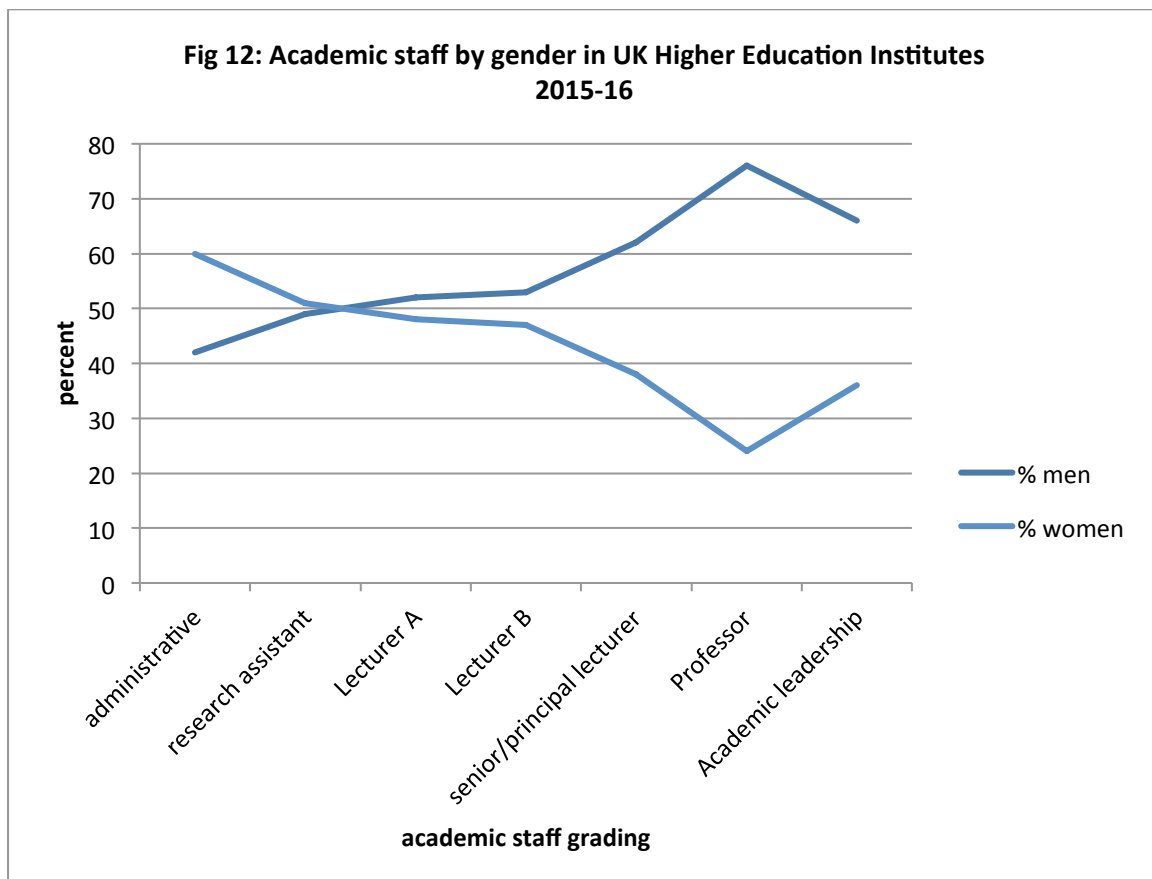
As previously noted, women were proportionately more likely to be found in the student categories (e.g. 26.7% of female respondents were research students compared to 16.98% of males) and proportionately more women than men were on fixed term or temporary contracts (20.39% versus 10.78%). Conversely women were less likely to appear at more senior and influential career stages, with 7.28% (15) women and 12.67% (47) men classifying themselves as senior/leader/director etc.





There were more male retirees than female retirees. Just six women (2.91%) were retired, with two still working on an unpaid basis, however 47 male respondents selected retired and 8 explained that they had emeritus status or were still active in the discipline in some way.

The pattern of females being more prevalent at junior career stages and males being more present at senior levels is evident in HESA data. The HESA staff record for 2015-16 shows this pattern with respect to academic staff in UK Higher Education Institutes (excluding atypical and teaching only staff).



Many respondents, male and female, acknowledged the attrition of women or the 'leaky pipeline' as it is sometimes called. Although they thought that numbers of women at junior levels were increasing, they could clearly see that men were much more likely to reach senior levels and the term 'boys club' was used repeatedly, for example with respect to the impacts of unconscious bias in promotions and recruitment, and preferences in networking and mentoring. One female PhD student had drawn some off-putting conclusions about the personal cost of rising to the top:

*'At PhD level there seems to be a fairly equal spread of diversity, however as you progress through the levels there is a clear bias towards older white men. There are few female and ethnic role models with permanent positions and those that exist do not seem to have achieved this position without huge personal sacrifices.'*

She thought there should be more 'atypical' paths through academia e.g. schemes to help people return from career breaks. She was not optimistic about her own ability to negotiate the hurdles ahead:

*'As a female PhD student facing a career of uncertainty, short term contracts, uncertain employment benefits, near-compulsory movement between countries to find a job and little prospect of making it to a permanent position I will probably be yet another statistic of a female that doesn't progress into academia.'*

Many people pointed out that this same pattern of female attrition can be seen across many, or even most disciplines and is a broad academic, or even societal issue, but a few compared palaeontology to other disciplines with respect to gender balance and thought perhaps it was falling behind. For example:

*'I do not see comparable changes that have happened in, for example, marine biology, including greater support for female students to move into permanent positions through the dark post doc years.'*

One interviewee thought that the challenges for women in academia were greater than elsewhere:

*'The problems are worse in academia – the Geological Survey is much more gender balanced. Senior academics have to be exceptional - excellent academics, confident people and hugely resilient – especially the women. They have to be better than the men.'*

Two senior female interviewees talked about the issue of confidence in the students and young scientists they see around them:

*'Men seem to be more willing to speak up, give an opinion, put themselves forward than women – regardless of scientific ability and potential.'*

*'Women are less willing to take a risk. They need to be sure before making an application and having a grant or a paper rejected can have a drastic effect on them.'*

Many people thought that mentoring was an important career support mechanism that could help overcome these issues.

Although the vast majority of survey respondents and most of the people who spoke directly to the researchers supported the Diversity Study and could explain fluently why a diverse environment was

needed for scientific endeavour, some unhelpful, unsupportive or uninformed attitudes were highlighted. For example, two attendees at the Annual Meeting, one male and one female, both mistakenly thought that the Athena SWAN Charter for gender equality was based on positive discrimination (which is illegal) rather than on awareness raising and positive action (which are both legal and good equalities practice). Some thought that open debates and discussions would help, but pockets of resistance were described:

*'Surprisingly, a lot of senior and established palaeontologists still come out with 'It's all about ability, not diversity' and 'there aren't any politics in science' and other damaging and naïve notions. Where colleagues have written about these issues publicly, comments from the community have been inflammatory and frankly insulting.'*

The 2016 Asset Survey undertaken in the UK by the Equality Challenge Unit aimed to assess the current state of the association between gender and experiences, expectations and perceptions of the workplace among STEM. It found that a significantly larger proportion of male respondents (59.7%) were encouraged or invited to apply for a promotion or post at a higher grade compared with female respondents (48.8%<sup>xxxiv</sup>).

## **9b) Caring responsibilities**

Balancing conflicting commitments at home and at work is a daily reality for most workers and the Diversity Group was interested to know what proportion of the sample was impacted in this way.

As well as childcare, people in work may find themselves responsible for elderly care, and ongoing commitments to ill or disabled relatives or friends. According to registered charity Employers For Carers (EFC), 1 in 9 working people in the UK are caring for someone who is older, disabled or seriously ill. EFC also predict that, because of the aging workforce the numbers of carers is set to grow from 6 million to 9 million over the next 30 years<sup>xxxv</sup>.

Almost three-quarters of PalAss respondents (429, 73.16%) – very similar proportions of men and women – did not have any caring responsibilities. 89.51% (239) of under-35s (with very little gender difference) had no caring responsibilities, but this dropped to 59.43% (189) for all over-35s. 64.95% of over-45s and 72.97% of over-55s also had no caring responsibilities.

One survey respondent, and some focus group members, talked about not being able to take on caring responsibilities until your career was established, with the result being that people were delaying starting a family until their employment status was more secure:

*'I would like to mention that the reason I do not have caring responsibilities is that my job insecurity and that of my partner, also a postdoc, have prevented us from having any children as yet. Depending on whether one or both of us gets a permanent position, we will either delay having children further, or seek employment outside of academia.'*

19.90% (41) of female respondents and 14.56% (54) of male respondents were primary carers of children under the age of 18.

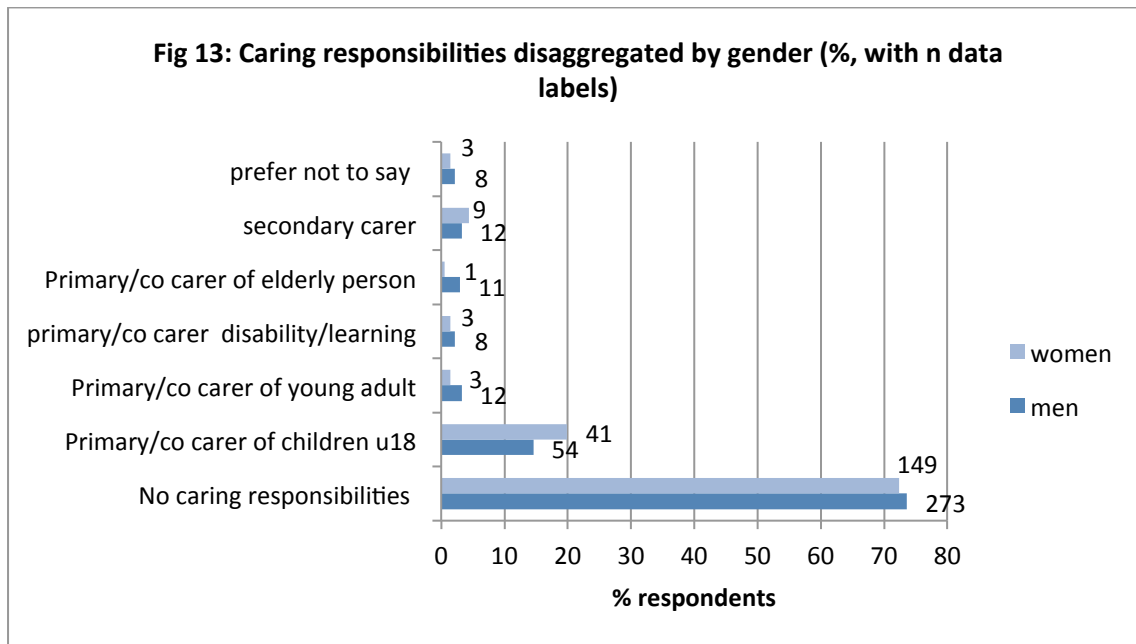
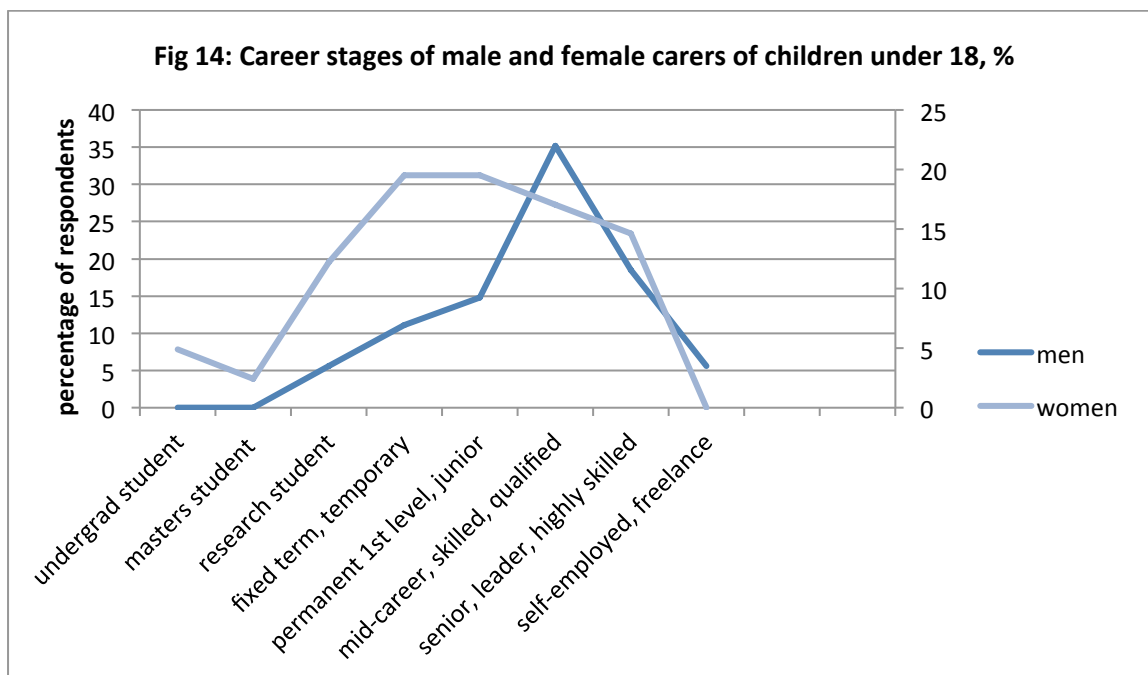


Fig 14 looks at the career stages of those describing themselves as primary carers or co-carers, of children under 18 – i.e. the largest group of carers in the PalAss sample – disaggregated by gender.



The chart shows that women caring for children under 18 tend to be at an earlier/less elevated career stage than their male counterparts, suggesting that men are more likely/able to wait until their employment position is secure before having children. Indeed, Eurostat data from 2017 finds that across the EU the gender employment gaps are widest for women in age groups associated with having caring responsibilities for children, and other dependent family members.<sup>xxxvi</sup>

Once a family is started mobility can be a problem, especially for those on a low income. As one postdoc explained:

*'I don't want to drag my family around from short-term position to short-term position and then have to move again for a permanent position. So I am looking in a geographically confined area. I have to find a vacancy in an area that has good schools and where I can afford to live.'*

Some survey respondents talked about the challenges for primary carers of young children with respect to doing fieldwork and attending conferences – both activities that impact on research productivity:

*'I don't do any fieldwork at the minute. I would love to, but it's very difficult with a family. You are away for several weeks. I am sitting it out at the moment in the hope I can go back to it in the future.'*

A couple of survey respondents mentioned the 'British problem' that childcare is seen as a female responsibility, rather than one that belongs equally to both parents:

*'The concept that women should remain the major childcare givers for such a long time after the birth is a massive systematic problem in Britain.'*

Finland and Sweden were given as examples of countries where parental leave, and therefore parenting, was more likely to be a shared responsibility and it was suggested that PalAss consider raising awareness of the possibility of shared parental leave to its members.

The UK think-tank, the Fatherhood Institute (FI)<sup>xxxvii</sup> produces a 'fairness index'<sup>xxxviii</sup> that compares the extent to which the policies and practices of different countries facilitate gender equality in terms of parenting contributions, women's participation in public life and the distribution of unpaid work. In 2016 they found the most equal countries in their rankings were Sweden, Denmark then Iceland. The UK was ranked number 12 (behind France and Italy) and the US was number 20. One block in the UK to equal distribution of unpaid work is doubtlessly that only 26% of part-time workers are male. On average over the 22 countries included in the FI sample, for every hour that woman spends on childcare a man spends 27.39 minutes.

The 2016 ECU Asset Survey (ref. xxxiii *op cit.*) found that, compared with male respondents, female respondents who had caring responsibilities were less likely to: (i) be able to relocate for a new post if needed; (ii) feel involved in the social life of their department; (iii) have their work successes celebrated in their department; (iv) feel supported by their partner or family.

### **9c) Socio-economic status**

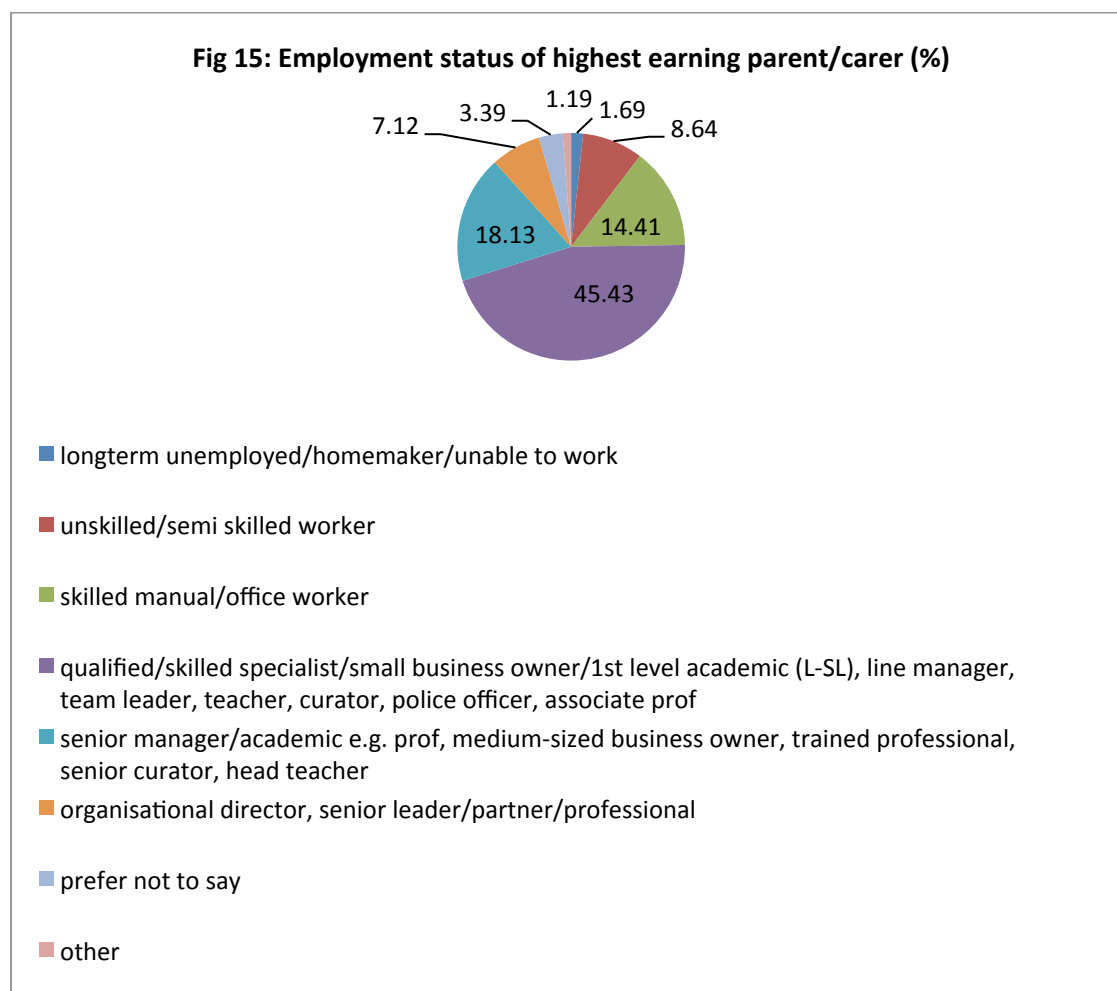
After much debate in the UK, socio-economic status (SES) was not included as a protected characteristic in the 2010 Equality Act, however many organisations are interested in the impact that SES has on the participation of their stakeholders.

The Diversity Group had to decide how to tackle this topic in light of the fact that many of the tried and tested methods of gauging SES are designed for more homogenous samples e.g. people who all live in one country or region (e.g. around a school) or people who are primarily at a similar career stage (e.g. applying to UCAS) or who belong to a similar age group. It was decided to include four questions in the survey exploring different factors related to SES.

**9ci) Employment status of highest earning parent/guardian.** Various existing frameworks for comparing parental employment status were examined in an attempt to find one that would be suitable for a multinational, multisector sample and an attempt was made to pull together a workable, easy-to-understand generic model.

20 respondents preferred not to disclose this information and 47 put comments or descriptions in the 'other' box, many of which enabled the consultants to re-categorize answers within the framework. 5 respondents provided more than one answer to the question.

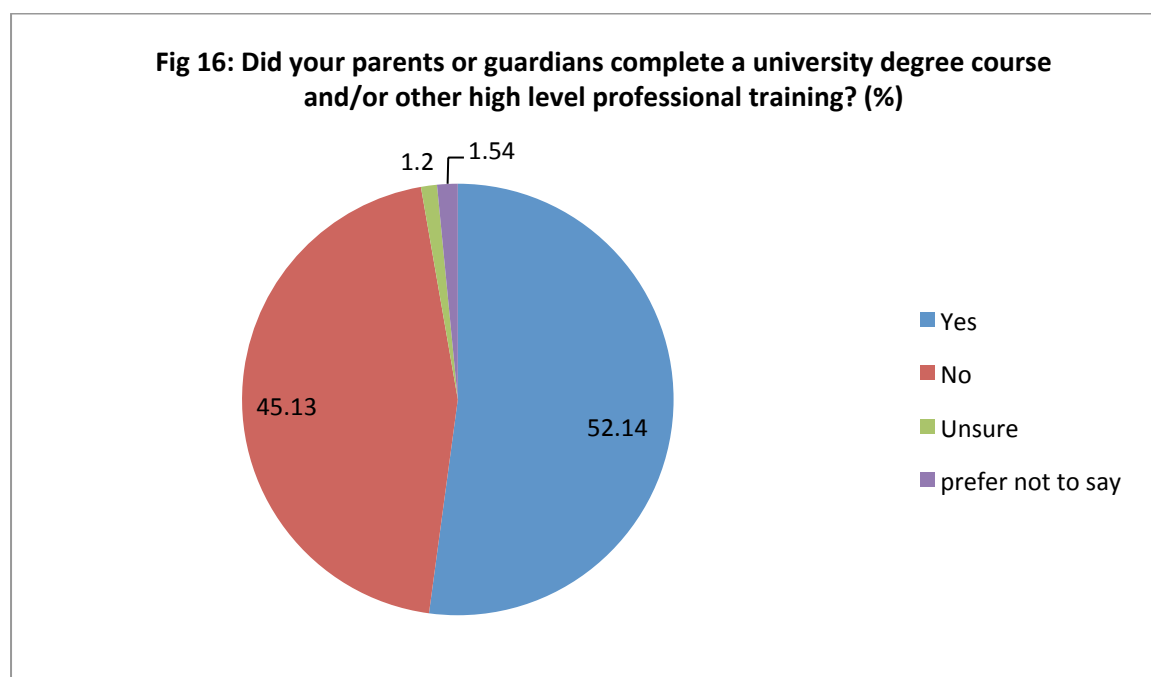
Overall, 70.60% (413) of respondents had a highest earning parent or carer from the qualified, managerial, professional, business-owning or leadership categories. About a quarter of respondents, (23.18% (53) of female respondents and 25.27% (86) of male respondents) had parents/carers in the unemployed/unskilled/manual worker groups.



Although researchers tend to agree that the socio-economic status of parents is influential on a range of outcomes for children, there does not appear to be agreement on the way in which outcomes for children are impacted. Some researchers suggest that impacts of the social origins/class of parents are complex, multifactorial and interdependent<sup>xxxix</sup>. Parents' educational attainment is possibly a more reliable indicator – see below.

**9cii) Qualification status of parents/carers.** Another socio-economic status-related question in the survey centred on whether respondents' parents/carers had obtained university degrees or other high-level professional qualifications (such as in teaching, banking, or engineering). This measure of social mobility has been a focus of UK higher education for many years where the number of first generation undergraduates has been increasing and now stands at about 50%<sup>xi</sup>. OECD analysis finds that parent's educational attainment is a strong predictor of an individual's educational attainment<sup>xii</sup>

In the PalAss survey, just over half of respondents (52.14%) declared that their parents had been educated to degree-level or equivalent. Female respondents were more likely to have an educated parent/carer (58.74%, 121) than males (48.53%, 180).



**9ciii) State-funded vs fee paying education.** The third question relating to socio-economic status centred on whether respondents had attended state-funded or fee-paying high schools. Statistics from the UK Department of Education show that 65% of private school pupils gaining A-levels or equivalent qualifications in England go to the most selective universities<sup>2</sup>, compared to 23% of those from state-funded schools<sup>xlii</sup>. The percentage for the proportion of private school children progressing to university in Scotland is 88%<sup>xliii</sup>. HESA data for 2015/16 show that, across the UK, 89.9% of undergraduates are from state schools.

**Table 7: HESA 2015/16 Percentage of UK undergraduates are from state schools**

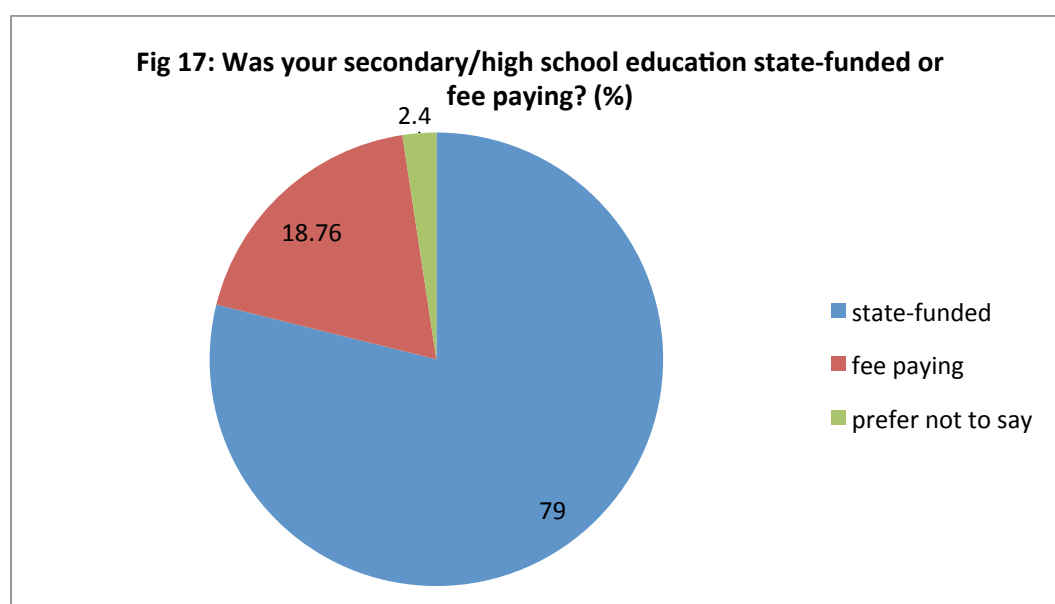
	UK	England	Wales	Scotland	Northern Ireland
2015/16	89.9	89.8	92.8	87.0	99.2

So, the picture for the UK is quite clear, but internationally the situation is much more complicated as some countries include in their private education sector statistics schools that are privately

<sup>2</sup> The most selective universities are defined by the DfE as the top third of HE providers when ranked by mean UCAS score from the top three A level grades of entrants.

managed but in receipt of government funding. For example, in India the private education sector includes 'low fee' private schools that target traditionally disadvantaged groups<sup>xliv</sup>. The proportion of children attending fee-paying schools varies considerably around the world. In the UK about 6-7% of children aged 11-16 are in private schools, although the figure rises to 18% for sixth form (i.e. years 12 and 13)<sup>xlv</sup>. In the USA<sup>xlvi</sup> about 10% of children are in private schools, but in New Zealand<sup>xlvii</sup> the figure is nearer 5%. The OECD average for children attending privately managed schools is 18%<sup>3</sup>.

79% of PalAss survey respondents went to state-funded schools (which is considerably lower than the HESA benchmark) and 18.76% had attended fee paying schools. 13 respondents (2.24%) selected prefer not to say and 4 gave no answer. Respondents who were resident outside the UK were slightly more likely to have gone to a fee-paying school (19.87%) than those who were resident in the UK (17.07%).



**9civ) Relative deprivation of the region in which respondents spent most of their school-age years.**

Every few years the governments of the UK calculate and publish local measures of deprivation, which enable the ranking of neighbourhoods from the most deprived to the least deprived. For the purposes of comparison, the rankings can be divided into 10 equal groups or deciles. The 1<sup>st</sup> decile contains the most deprived areas and the 10<sup>th</sup> decile the least deprived.

The survey's fourth attempt to explore socio-economic status was to map the Indices of Multiple Deprivation (IMD) rankings in deciles of neighbourhoods in which UK-domiciled respondents grew up.

The survey asked those respondents who grew up in the UK to provide, if possible, the full postcode of the neighbourhood where they had spent most of their school-age years. If they could not supply a postcode, respondents were asked for the name of the village/small town in which they grew up, or for the suburb plus the name of a larger town or city. 164 answers were given and all of these

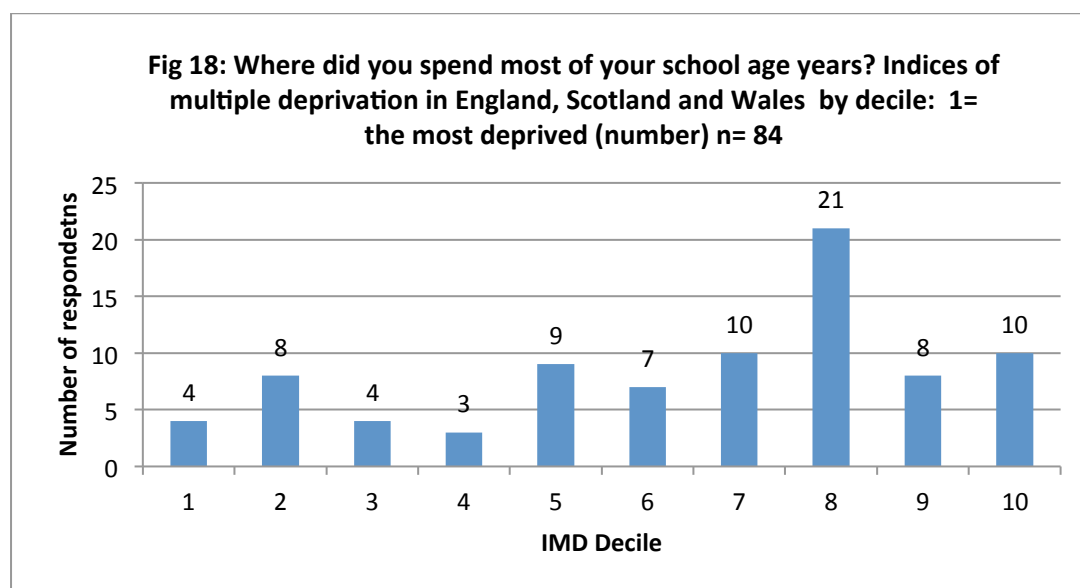
<sup>3</sup> In OECD terms, a privately managed school is one that is managed directly or indirectly by a non-government organisation; e.g. a church, charity, business, or other private institution.



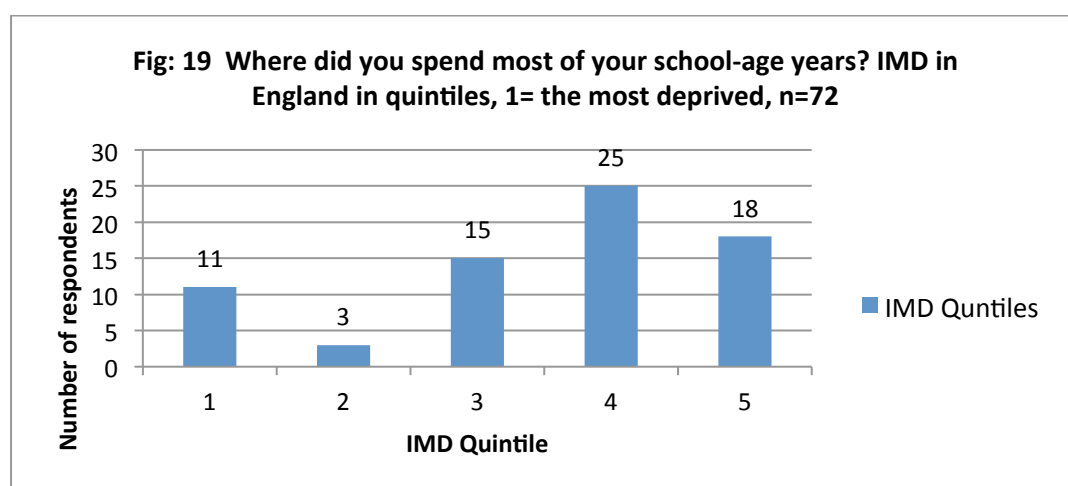
were fed into the IMD databases or interactive maps of England, Wales, Scotland and Northern Ireland. 84 answers (14.36% of total respondents) yielded an IMD decile. Most of the answers that did not produce a decile were not sufficiently specific (e.g. part of a postcode or a name of a city).

The vast majority (72) of the postcodes that were located were in England, 2 postcodes were in Wales and the remaining 10 in Scotland. In the PalAss sample the deciles revealed that most respondents had grown up in the least deprived parts of the UK:

- 66.67% (56) of the 84 deciles identified were in the top half of the least deprived neighbourhoods in the UK (i.e. deciles 6-10)
- 46.43% (39) of the 84 deciles identified were in the top 30% of the least deprived neighbourhoods in the UK (i.e. deciles 8,9 and 10)
- Just 19.05% (16) of the deciles identified were in the bottom 3 deciles (i.e. deciles 1,2 and 3)

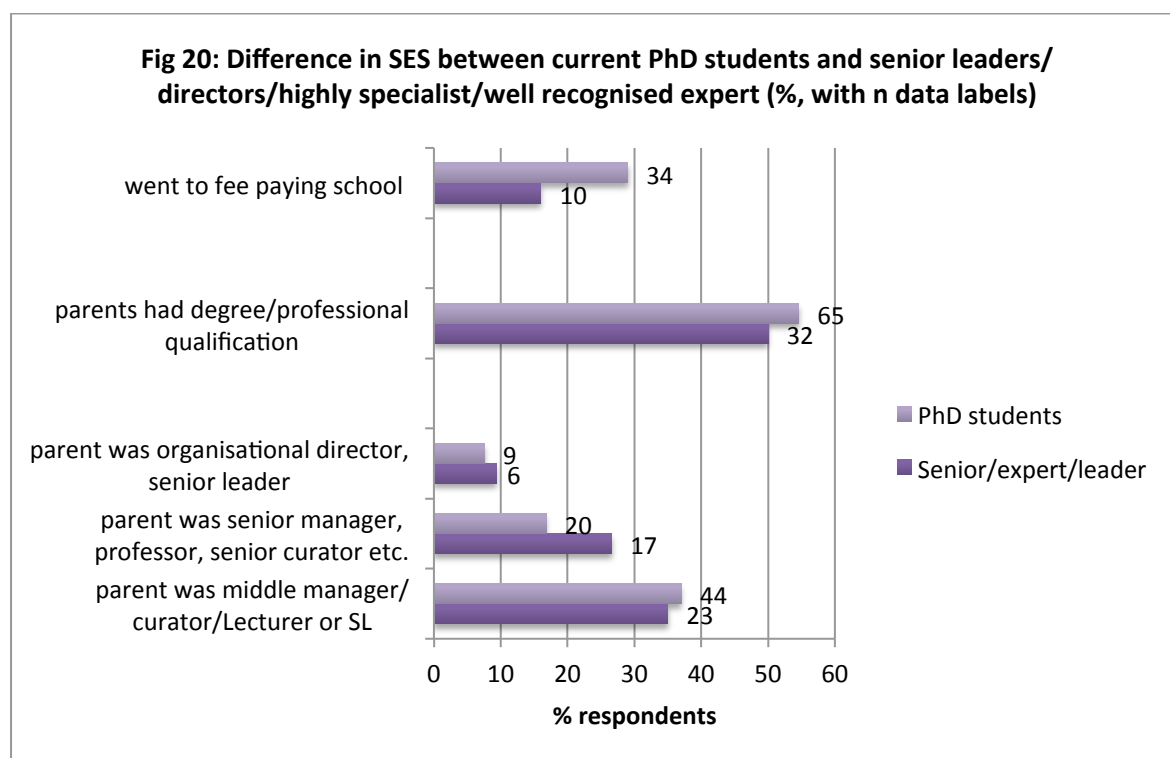


The English Index of Multiple Deprivation also works in quintiles across the scale. Fig 15/16 shows quintile chart for the English postcodes:



The Diversity Group wondered whether there had been any change in the socio-economic indicators over time and requested that the SES position of the most senior/expert palaeontologists (n=64) be compared with that of current research students (n=119). The results are presented in Figure 20

overleaf which compares 3 of the 4 SES indicators of these two groups. (It should be noted that some respondents preferred not to answer all the questions that feature in Fig 20.)



The biggest change is in the proportion attending fee-paying school (16% of senior leaders versus 28% of PhD students). This may be explained in part by an expansion in the private school sector over recent decades. According figures published by the Independent School Council (ISC) in 2017 the number of children at independent schools in the UK has grown year on year, despite changing demographics and the economic downturn<sup>xlviii</sup>. 474,203 children were at ISC schools in 1990 compared to 522,879 in 2017 – an increase of 10.26%.

There was also a slight shift in the employment status of parents, with proportionately more parents of current research students being in the middle manager/curator/Lecturer-Senior Lecturer/supervisor/small business owner category, rather than the more senior categories.

The impact of socio-economic status on people’s likelihood to study and work in palaeontology was a common theme raised by survey respondents. It was also discussed with most interviewees. It was widely recognised that people from poorer backgrounds, from inner cities, and/or first generation in Higher Education would be less likely to pursue studies and employment in palaeontology because it is insecure and not widely recognised as a career. Several interviewees suggested that people from poorer backgrounds are more likely to want to go into well-established, respectable careers, with status, guaranteed employment and secure earning potential:

*‘To that extent palaeontology is fluff! It’s a luxury. You are not going to become a millionaire and it is something that your family might not understand. Culturally you have to be used to people pursuing knowledge for its own sake.’*

A conference delegate explained his own parents’ bafflement when he became interested in a palaeontology career:

*'Neither of my parents went to university. They were very supportive but they said that palaeontology probably isn't something you can have a career in.'*

The connection between money and opportunity was pointed out by a survey respondent:

*'Money is very important in providing opportunities for enrichment, such as travel abroad, conferences and field trips, and it gives the financial security to be able to carry out volunteer work and internships.'*

Hardship and travel grants to students from poorer backgrounds were suggested and internships were thought to help to reach out to and engage students who might not otherwise have access to palaeontology. One interviewee had seen summer internships funded by the Nuffield Foundation achieve exactly this, and a PhD student at the Annual Meeting who had benefited from a work placement in a museum thought that this is something that PalAss should consider funding:

*'I had a work placement in a museum when I was at school. I just wrote to my local museum and they said yes come along. It was excellent. I learnt all about fossils. Work placements are a great way of opening up a profession.'*

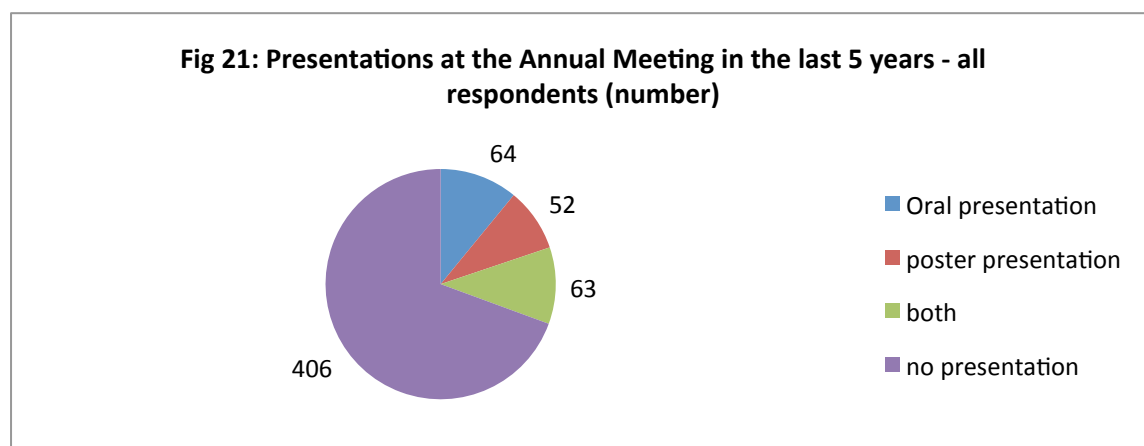
Grants for student research projects which involve mentoring support, and guides to research projects which are done in digital more than physical collections to keep travel costs to a minimum were also suggested.

## 10. Involvement at PalAss Events

### 10a) Annual Meeting

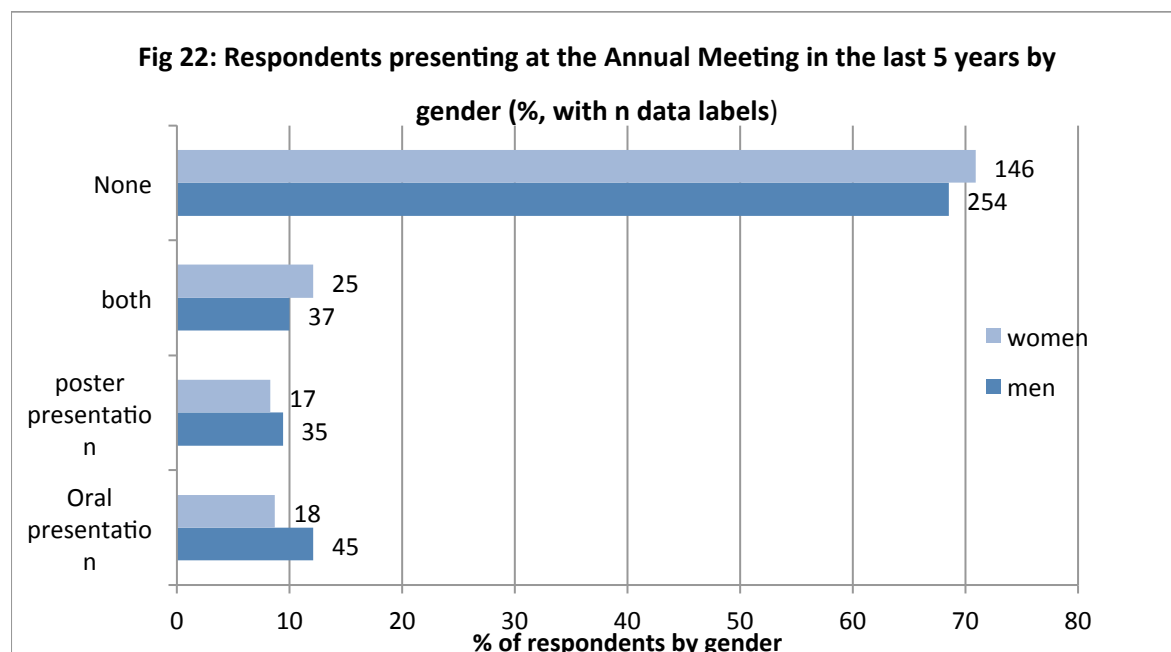
The Annual Meeting is a key service offered to PalAss members and is the reason many palaeontologists join the Association. The Diversity Group was interested to examine who has presented at the Annual Meeting over the last 5 years.

179 respondents (30.10%) had presented at the Annual Meeting during the last 5 years, as follows:



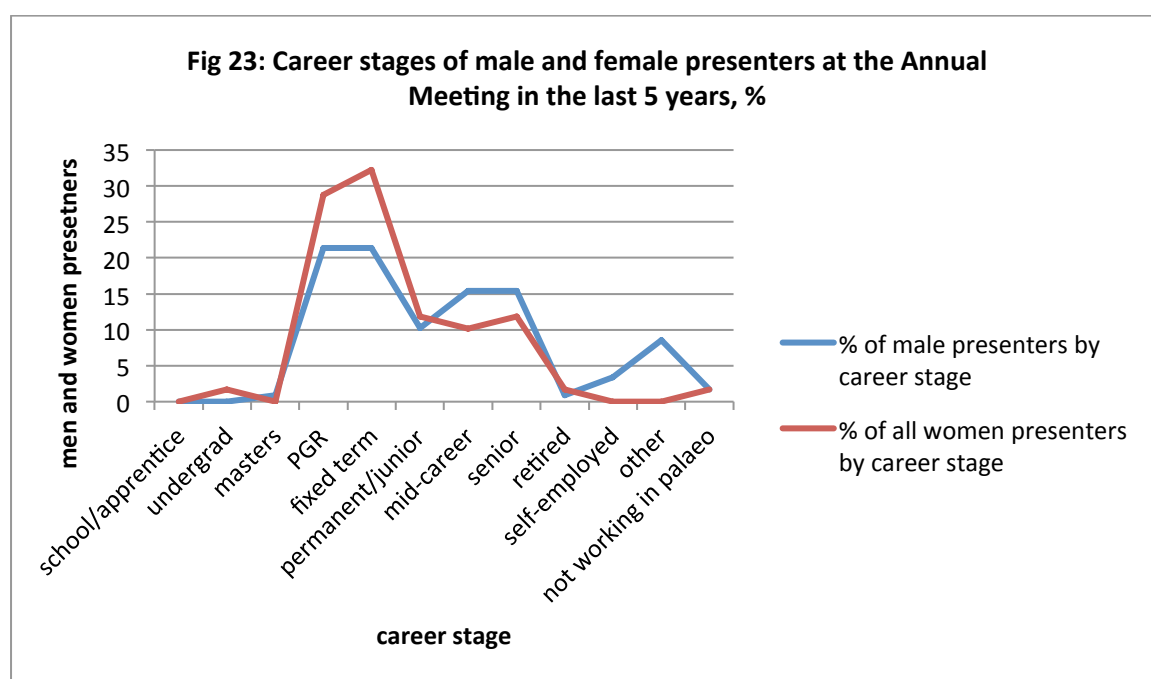
Respondents were less likely to have presented at the Annual Meeting if they were from outside the UK (25.9%, 74), and if they were over 45 (21.96%, 47) and more likely to have done so if they were under 35 (33.7%, 90).

The 179 presenters included 117 men, 60 women and 2 others. Overall, there was proportionately little difference in the likelihood of male and female respondents having presented at the Annual Meeting as shown in Fig 22.

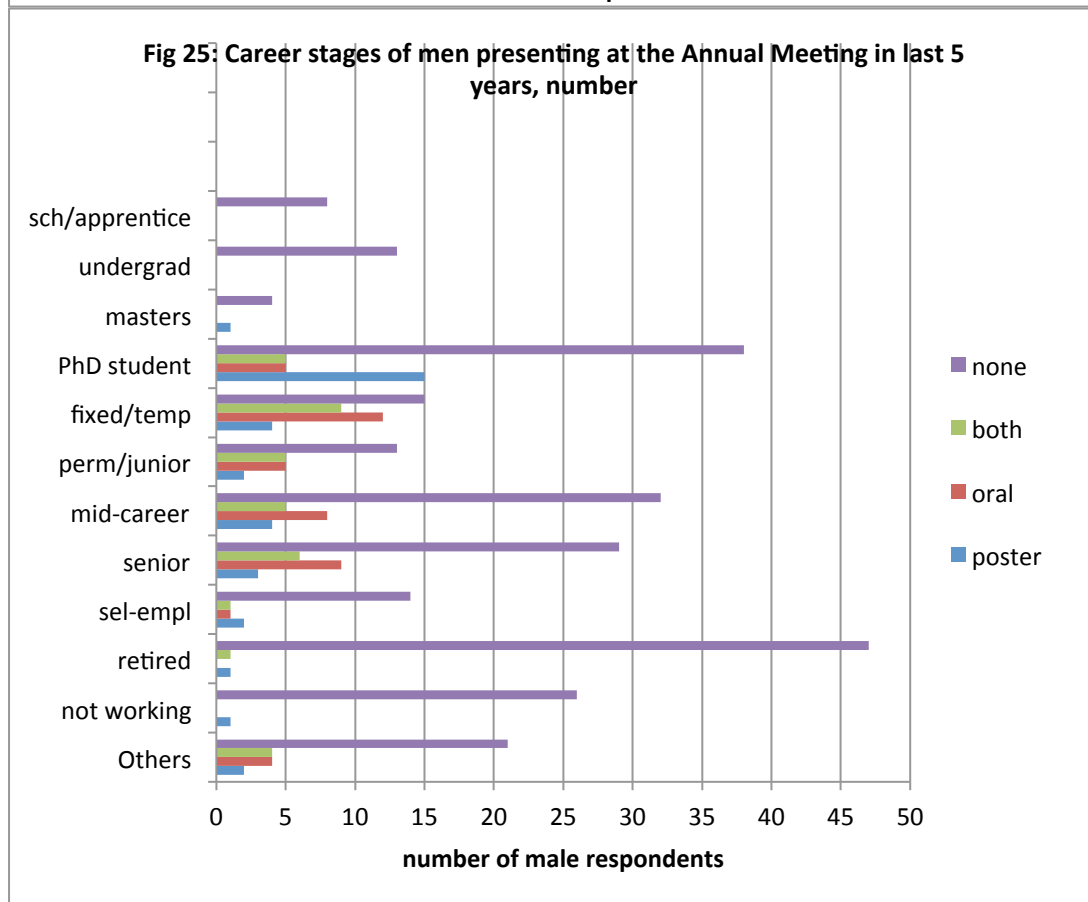
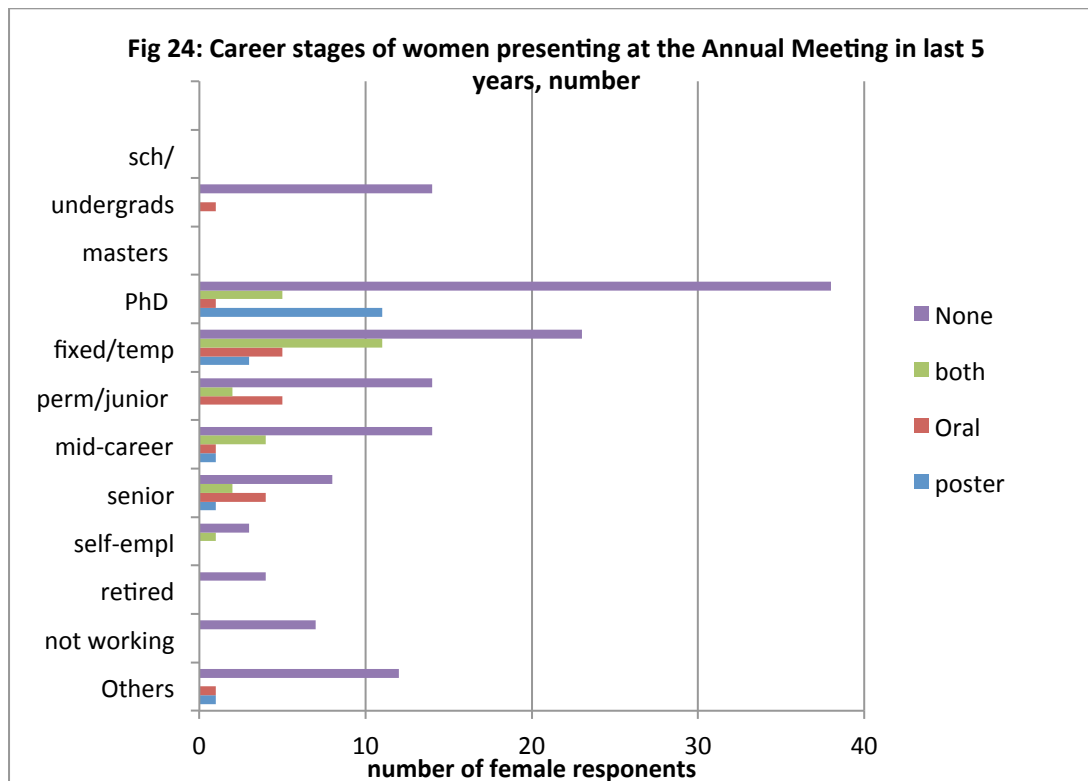


When comparing the career stages at which men and women presented at the Annual Meeting, it seemed that female presenters were largely concentrated in the research student and fixed term/temporary contracts groups, whereas male presenters were more likely than women to be from the mid-career, senior, self-employed and other career stages. The profile of presenters in terms of career stage broadly follows the career profile of the sample.

Figure 23 works in percentages and focuses just on the 238 presenters (taking out the non-presenters). This compares, proportionately, where female and male presenters are in their careers.



Figures 24 and 25 compare the numbers of men and women presenters at each career stage.



Participation at the Annual Meeting featured regularly in feedback given by survey respondents. Some were very positive about the friendly and inclusive atmosphere, and several welcomed the

increasing number of women in attendance. One female early career palaeontologist from overseas explained how valuable her participation at the Annual Meeting had been:

*'During my studies [outside the UK] I was used to sexism coming from faculty members and wasn't even aware that I might have the right to protest against it. PalAss meetings made me realise that this behaviour was not an inevitable part of my discipline and that it was not as widely accepted in other countries. I saw many young people and women in leading positions as lab heads, professors, medallists and grant recipients. PalAss has played a prominent role in my own development as a professional.'*

Some were also pleased to see increasing numbers of female speakers, but others suggested that male speakers still significantly outnumbered female speakers and felt that this should be addressed:

*'PalAss should address the significant minority of female speakers at the Annual Meeting. When I counted there were twice as many male speakers as female.'*

The Parigen consultants checked this observation from the 2017 Programme and found that speakers were indeed 67% male. It was suggested that PalAss should be aiming for a gender balanced programme as well as having gender balance in the organising committee. One female interviewee had noticed that at a conference she has been invited to this summer the majority of speakers are female. When she looked into it she found that the majority of organisers are also female:

*'This is the first time I have ever been in this situation – that's why I looked into it. ...I am uncomfortable talking about gender balance or quotas, but I think this is probably the way to go.'*

It was acknowledged by some that in persuading (younger) women to present, confidence can sometimes be an issue and it was suggested that contact with female role models can help with this:

*'My supervisor is male. It would be really nice to talk palaeo with some women for a change.'*

Some had experienced, or would welcome, conferences that included a women's networking session, or a gender balance workshop, or a career workshop that features female role models. Talks on imposter syndrome were also suggested. One person thought that if females submitted posters that were suitable for oral presentations the organising committee could be proactive in inviting them to 'upgrade'.

One respondent wanted to see more age diversity amongst the session chairs:

*'Use young people as session chairs. Why the same people ALL the time?'*

The Code of Conduct for the Annual Meeting was warmly welcomed and a few people wondered whether this could be extended or complemented by a general Code of Conduct for PalAss members to sign on joining the Association and/or renewing their membership.

Two people suggested that the timing of the Annual Meeting – just before Christmas – was unsuitable for parents (probably impacting women more than men). They speculated that this probably prevents some women from attending and/or presenting at this busy time of year. A

female interviewee with small children however said that for her this timing worked well as long as it was before the end of the school term.

A few survey respondents talked about the Annual Meeting being rather 'cliquey', although others did not agree with this assessment. Someone who described themselves as being shy found they were often excluded at networking sessions. One survey respondent found the growing size of the meeting a challenge:

*'When the Christmas meetings were circa 100 they were very inclusive and great fun. You could prop up the bar 'til 2 in the morning with the top UK palaeontologists. Now they are 300+ with people staying in hotels, they have become more cliquey – with groups going off to their own pubs and its difficult for outsiders to join in.'*

Several survey respondents (male and female) bemoaned the tendency of some participants to cross-examine presenters in a way that is not constructive:

*'Aggressive questions after talks, usually by older male colleagues, can be very intimidating. Session chairs should step in more than they do currently.'*

One young woman who had left palaeontology for another discipline talked about being traumatised at early career stage when she witnessed a young female speaker being 'torn apart' after her talk by a senior member of PalAss Council. This incident contributed to (but was not solely responsible for) her conclusion that palaeontology is a 'vicious' discipline into which she did not fit. She has found interactions with scientists in her new discipline to be much more constructive and collaborative.

It was suggested by several people that session chairs should be briefed or trained in how to handle aggressive questioning and how to encourage more questions from women and from Early Career Researchers (ECRs).

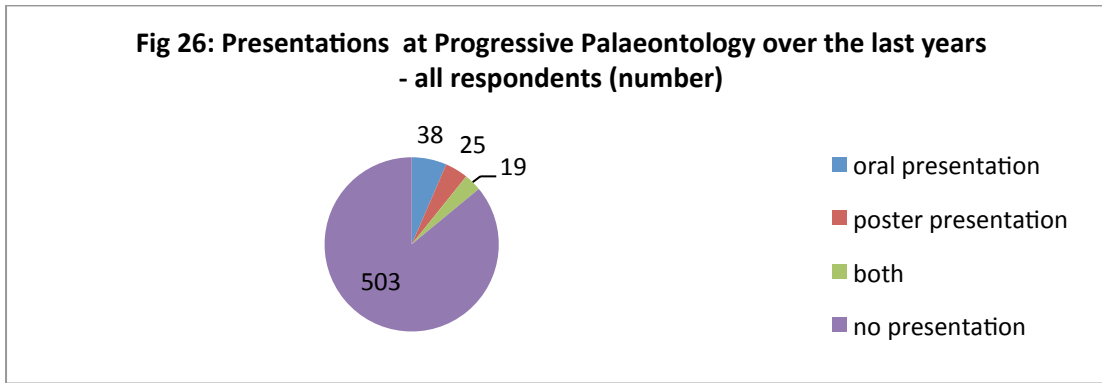
## **10b) Progressive Palaeontology**

Progressive Palaeontology (generally known as ProgPal) is an annual meeting for postgraduate research students and final year undergraduates.

Just 14% of respondents (82 people) said they had presented at ProgPal over the last 5 years, although those that had attended were very positive about it:

*'It's great training as you get to present your work and you get feedback.'*

*'I thought ProgPal was fantastic. You can network with others at your career stage and you don't have to worry about some big professor telling you that your data is wrong.'*



Proportionately more women (18.00%) than men (12.10%) had presented at ProgPal. This gender gap is probably explained by the different overall career stage profiles of male and female respondents in this sample (see 8a, page 17). The participation of the 82 male and female at Prog Pal is charted in Figure 27.

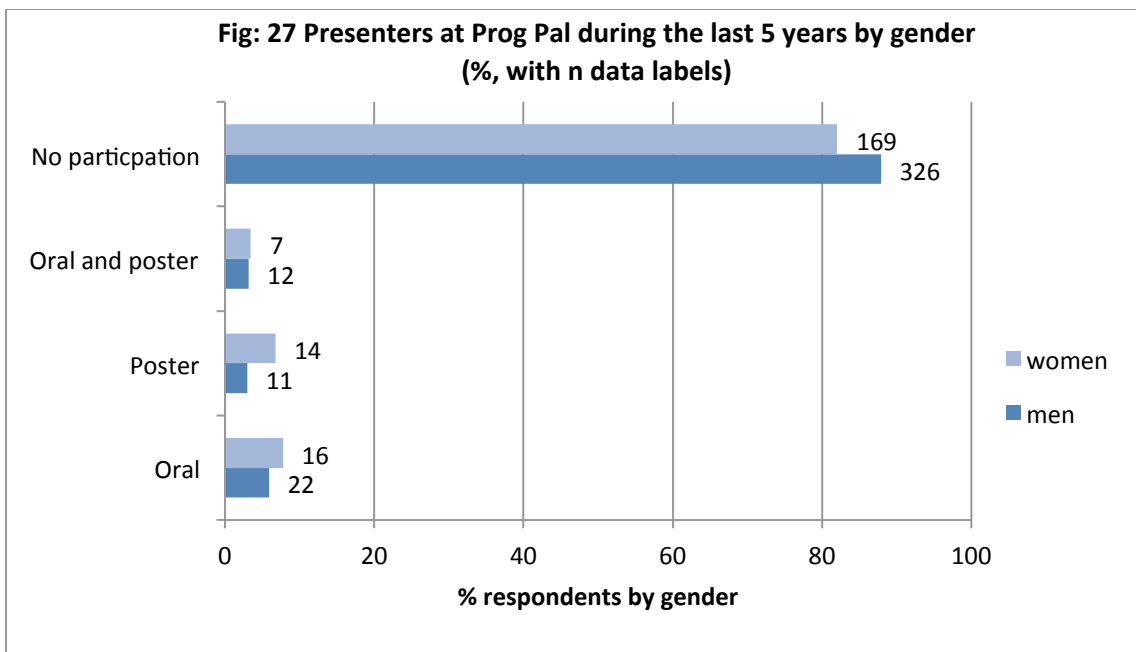
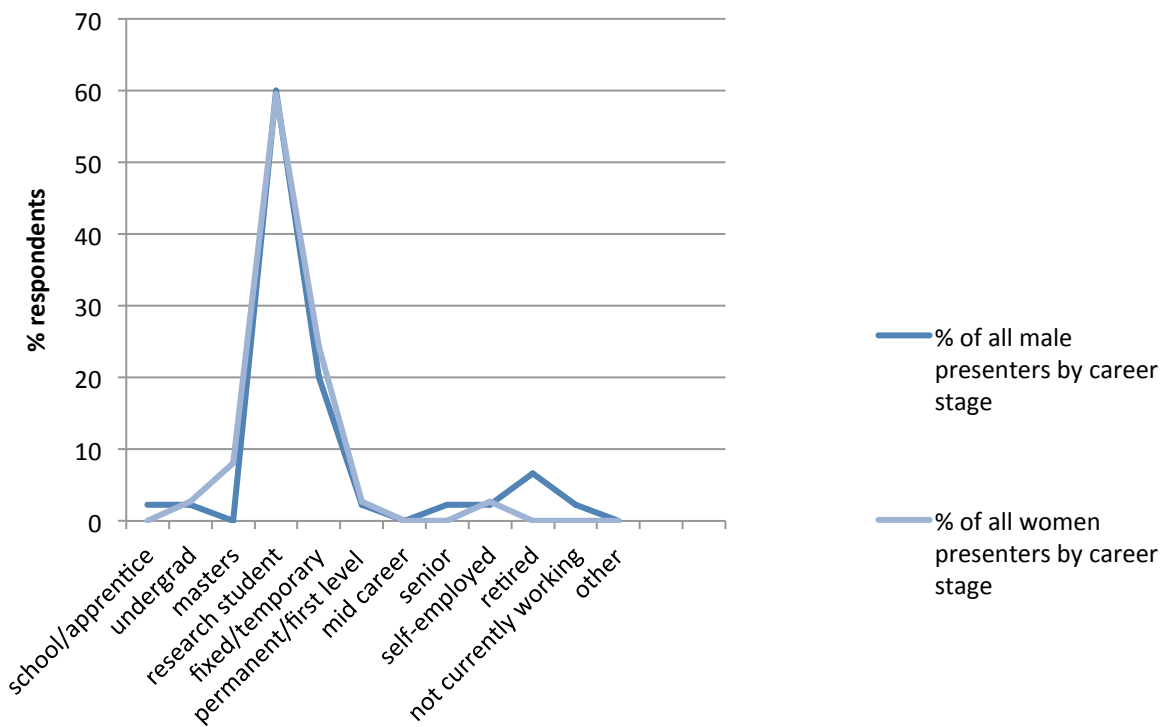


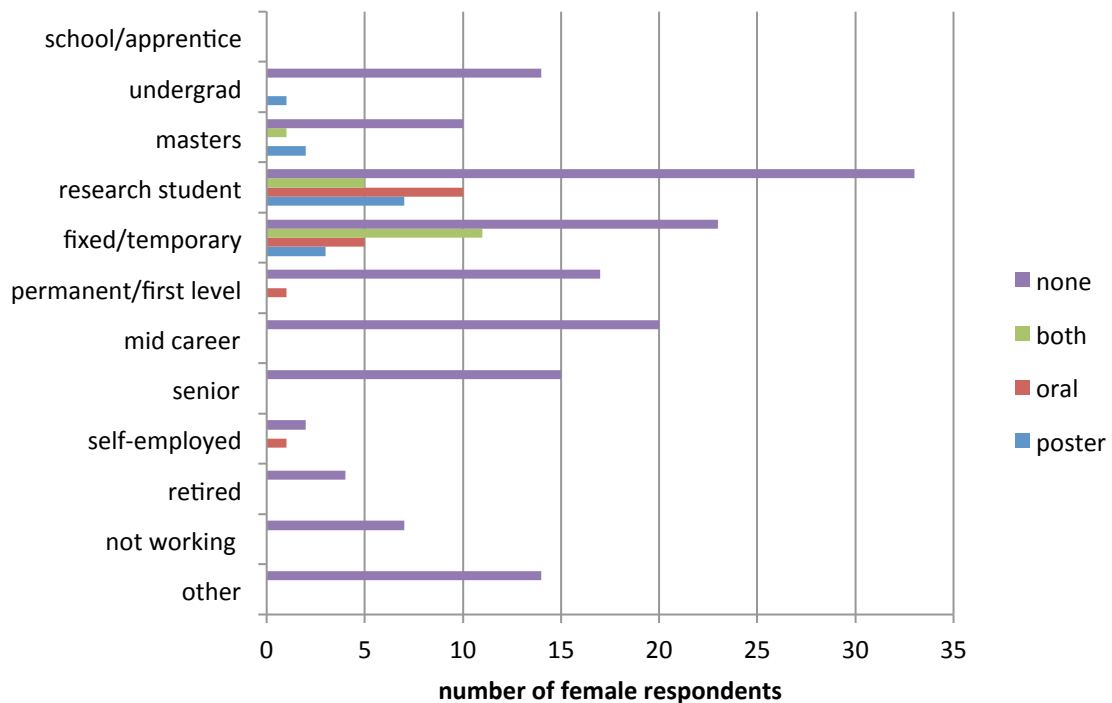
Figure 28 compares, proportionately, the career stages of the male and female ProgPal presenters and finds little difference between the two. The data are also set out by number in figures 29 and 30.

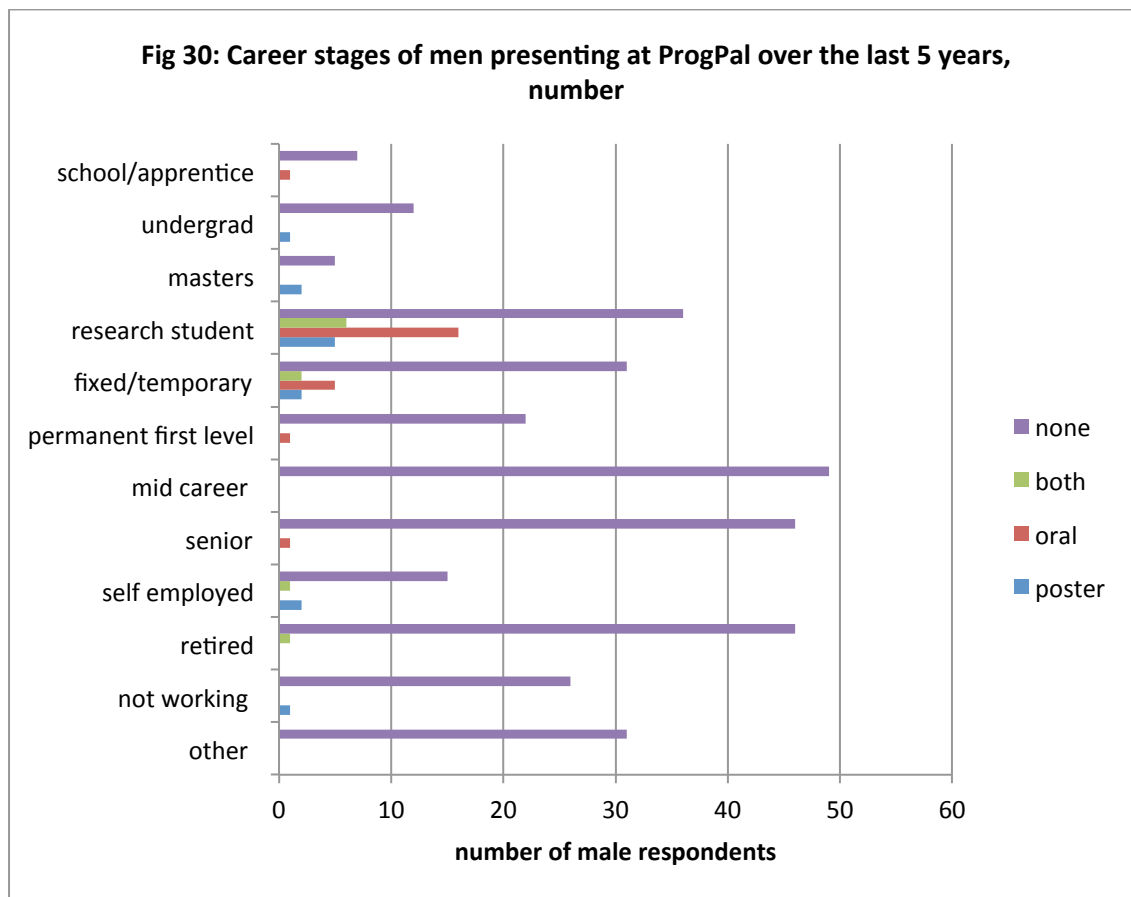


**Fig 28: Career stages of male and female presenters at ProgPal over the last 5 years (%)**



**Fig 29: Career stages of women presenting at ProgPal over the last 5 years, number**





The importance of a supportive environment in which to present one’s work at early career stage was emphasised as a vital part of a palaeontologist’s professional development:

*‘Good mentoring and support to attend conferences and present early in a friendly environment are important. I think that this is something that PalAss and SVPCA do relatively well and should continue to focus on.’*

Several early career researchers said that they would like to receive more career advice and some wondered whether the ProgPal programme could be supplemented with more career-based workshops. One PhD student welcomed a careers workshop that is part of the 2018 Prog Pal programme and hoped this would continue.

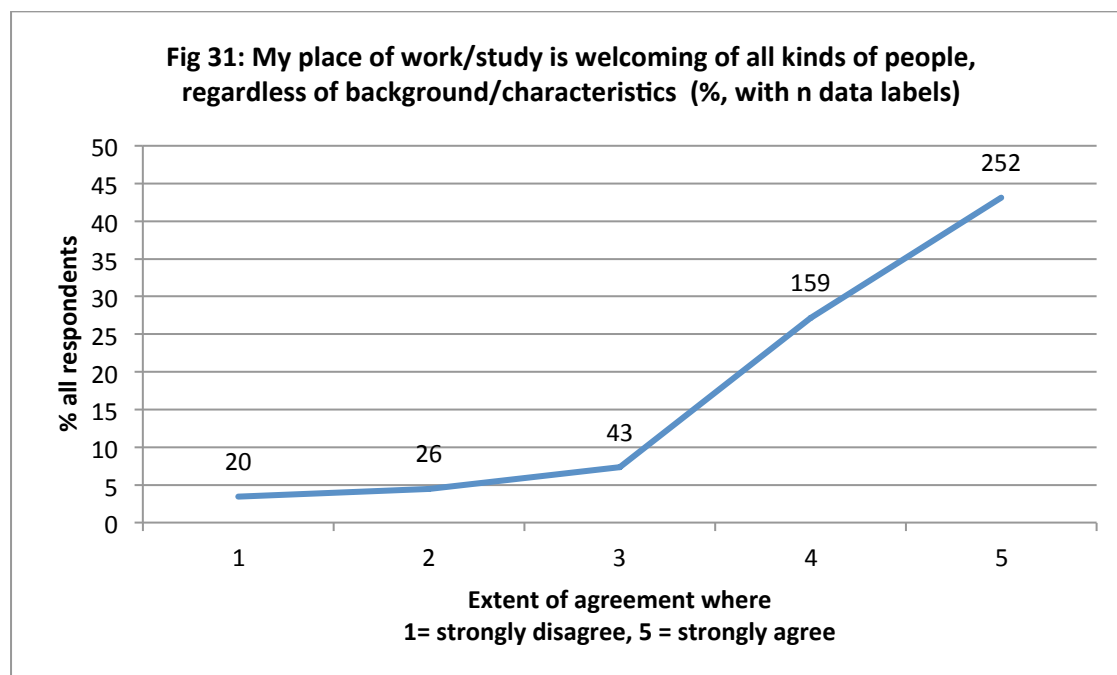
## 11. Opinions about Equality and Diversity in Palaeontology

The survey included three questions to try to gauge the extent to which respondents think that palaeontology is an inclusive discipline into which all people are welcomed and treated fairly, and in which they can flourish regardless of their background and characteristics. Between 80 and 85 respondents opted out of these questions, presumably primarily because they are not currently working or studying in palaeontology.

The first focused on how welcoming and inclusive people found their place of study/work. Respondents were asked to use a 5-point scale where 1 is strongly disagree and 5 is strongly agree to express their agreement/disagreement with the statement: *‘My place of work/study is inclusive and*

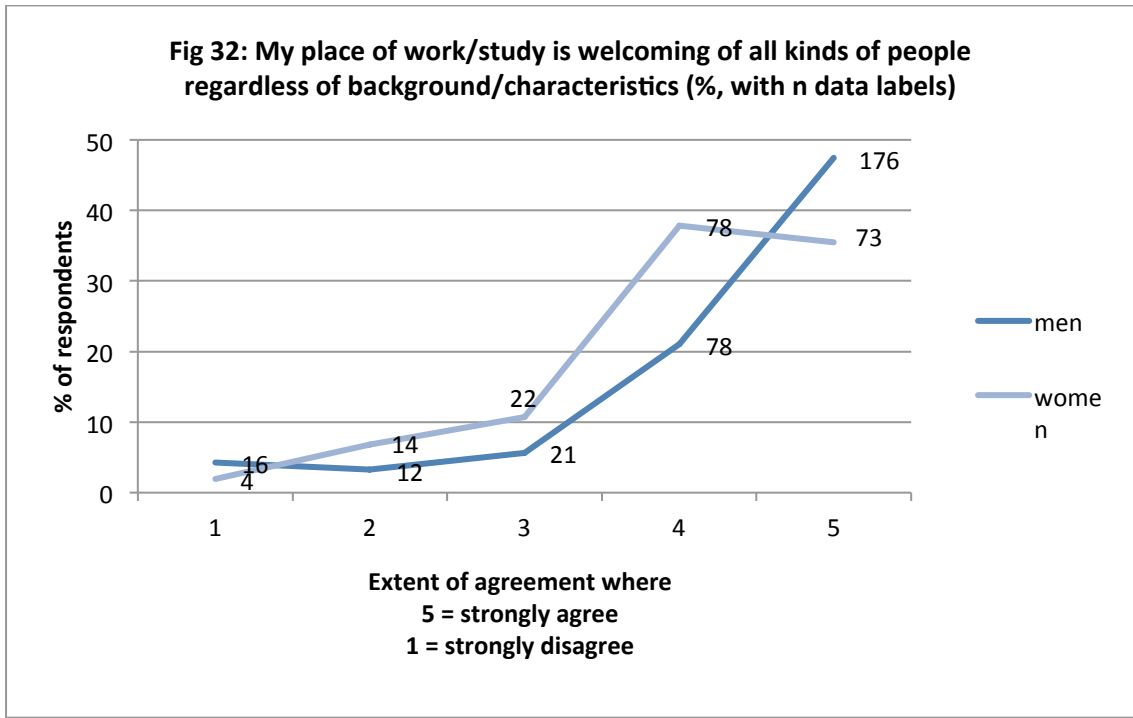
welcoming of all kinds of people, irrespective of characteristics such as disability, ethnicity, gender, age, etc.'

The respondents reacted to this statement as follows:

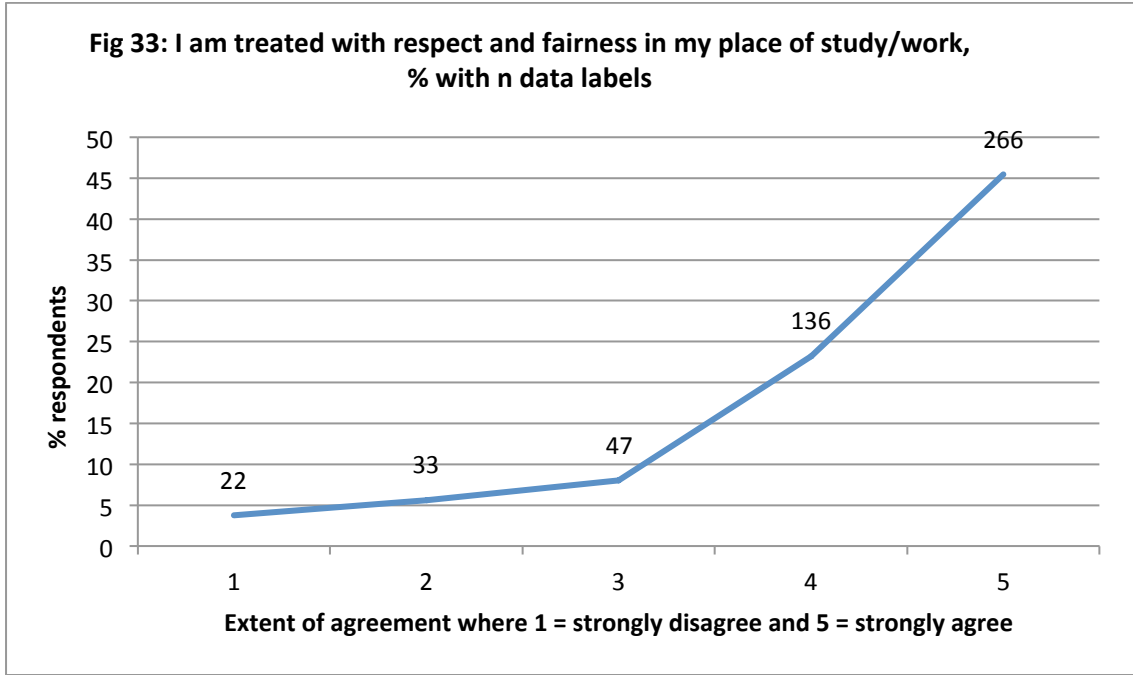


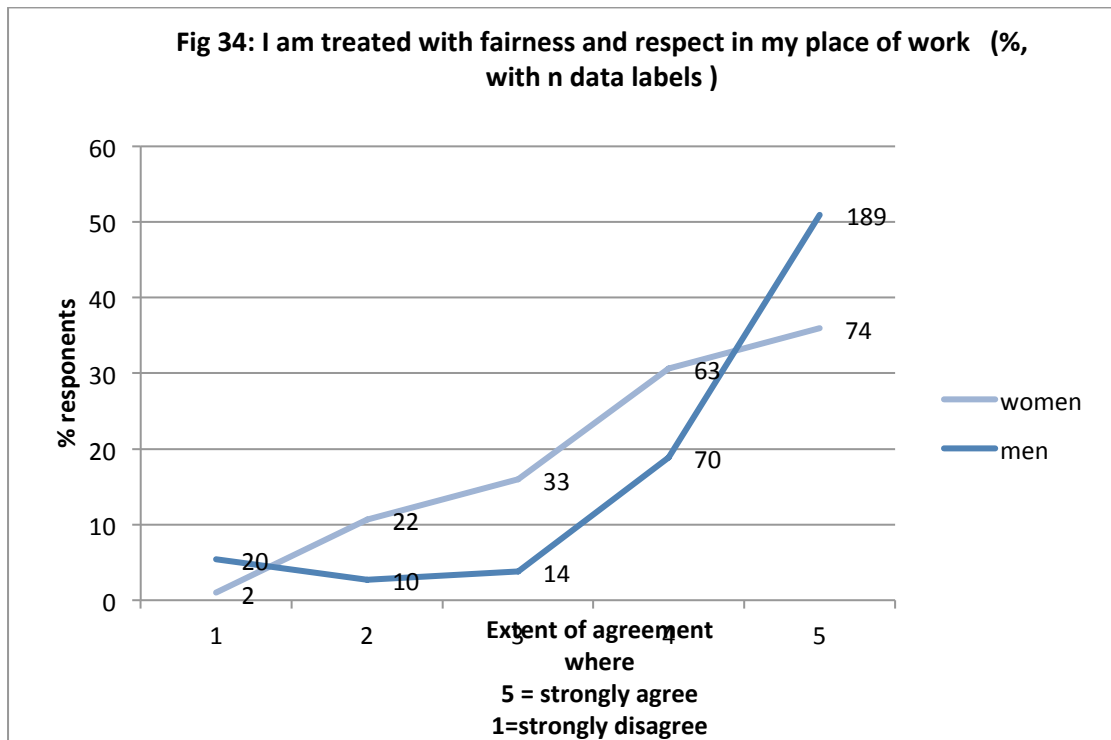
Respondents from outside of UK/Europe were also likely to strongly agree (46.10%, 71) or agree (32.42%, 53) with this statement. The most negative responses by age group came from the 35s-44s with just 31.73% (33) strongly agreeing and 37.5% (39) agreeing.

However, a gender split was noticeable (see Figure 32 below) with men being more likely than women to strongly agree (47.44% (176) of men strongly agreed, compared to 35.44% (76) of women). Men were also slightly more likely to strongly disagree - 16 men (4.31%) strongly disagreed and 4 women (1.94%).



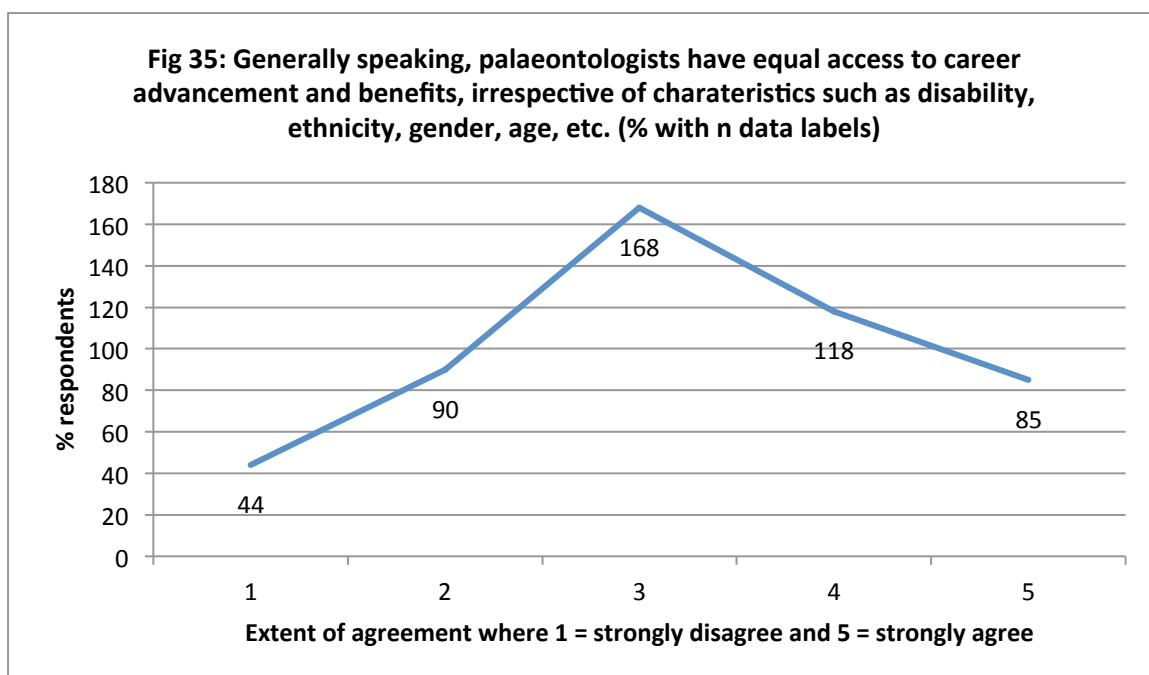
The second statement was 'I am treated with respect and fairness in my place of work/study' and a similar gender-differentiated response could be observed. Just over half (50.94%, 189) male respondents strongly agreed with the statement compared to 35.92% (74) of female respondents. Figure 33 shows the responses of the whole sample and Figure 34 the gender disaggregated responses.





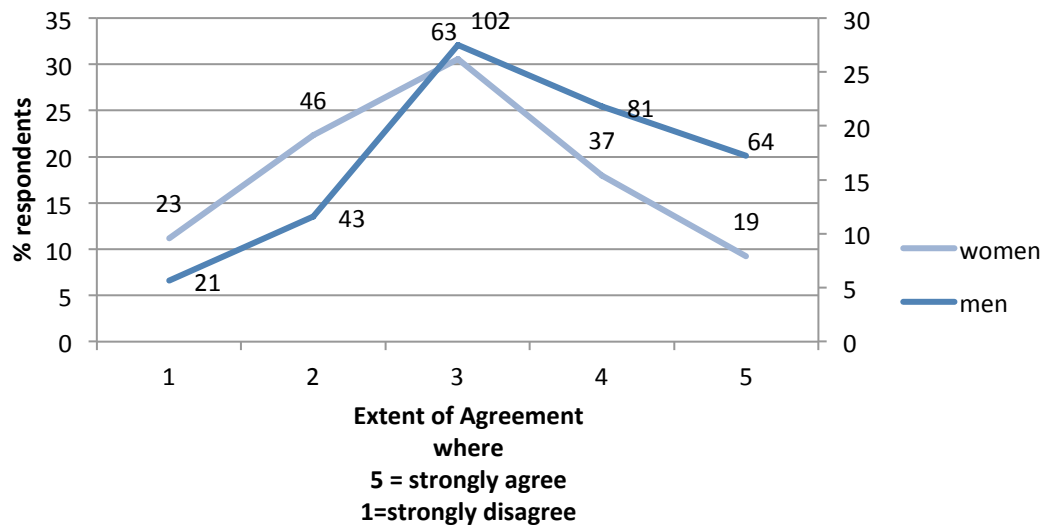
20 men (5.38%) strongly disagreed with the second statement, but just 2 women (0.97%). Over half (52.43%, 140) of the under 35s strongly agreed with this statement and this time the most negative age group was the 45-54s with just 37.88% (25) expressing strong agreement.

Finally, the survey asked whether respondents thought that, generally speaking, palaeontologists have equal access to career advancement and benefits irrespective of characteristics such as disability, ethnicity, gender, age, etc. Across the sample, responses to this statement were noticeably less positive, indicating that even if respondents were not themselves experiencing career barriers they could see others who were.



There was still a noticeable gender difference:

**Fig 36: Generally speaking, palaeontologists, irrespective of characteristics such as disability, ethnicity, gender, age, etc. have equal access to career advancement and benefits (% with n data labels)**



The gender difference in ratings applied regardless of sector – with just one exception<sup>4</sup>.

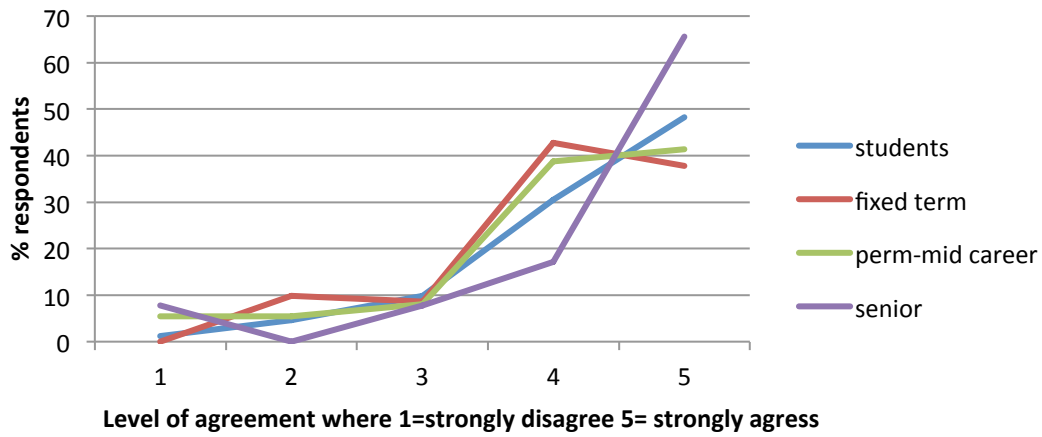
Where universities are concerned, this gendered difference in ratings mirrors to some extent the findings of the 2016 Asset Survey, which looks at the experiences of men and women in academia and their perceptions of gender equality. Asset 2016 found, for example, that:

- Female respondents had more teaching, administrative and pastoral responsibilities than male respondents
- Female respondents also felt that it is significantly easier for a man to obtain a senior post in their department (while male respondents tended to say that it was the same for men and women)
- Female respondents felt that male respondents have an advantage in the allocation of tasks and resources related to professional development (e.g. receipt of mentoring, positive feedback from management, involvement in promotion decisions) and markers of esteem (e.g. invitations to conferences, recognition of intellectual contributions)
- Female respondents described their department as more demanding of their time and effort than male respondents and comments from female respondents addressed how the academic culture of long working hours may have an indirect gendered effect on career progression because of caring responsibilities

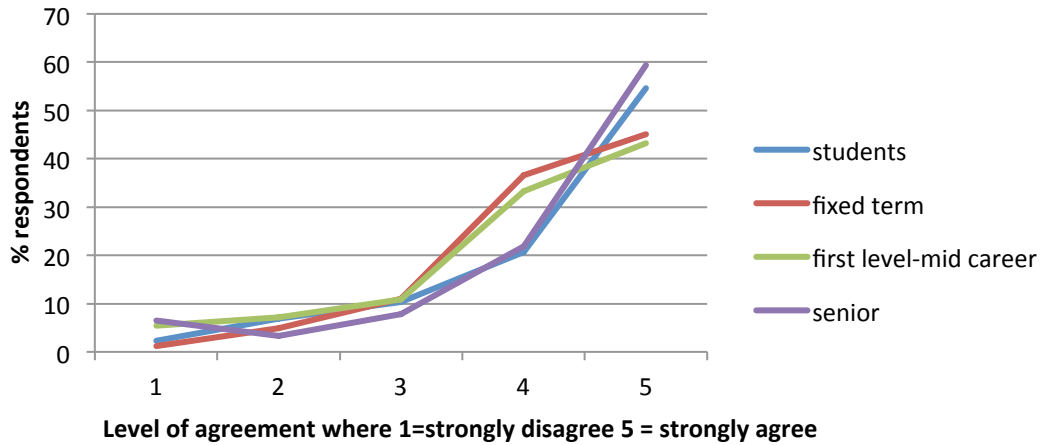
Further analysis of the opinion data compared agreement levels to the three statements by broad career stage, see Figures 37, 38 and 39 below. The higher ratings of the senior respondents in Figures 37 and 39 is noticeable and suggests that this group is the most likely to perceive palaeontology as being an inclusive and fair discipline.

<sup>4</sup> Of those who work in museums, more women (16%) than men (8.32%) strongly agree with the third statement about palaeontologists having equal access to career advancement and benefits irrespective of characteristics such as disability, ethnicity, gender, age, etc.

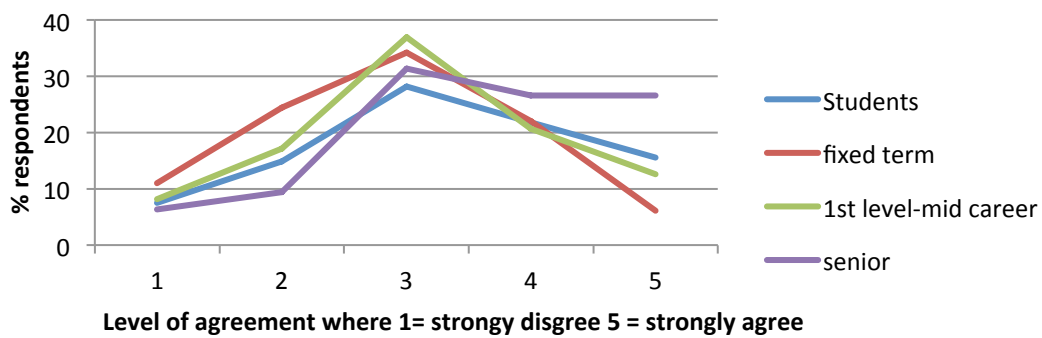
**Fig 37: My place of work/study is inclusive of all kinds of people regardless of characteristics such as disability, ethnicity, gender age, etc. (%)**



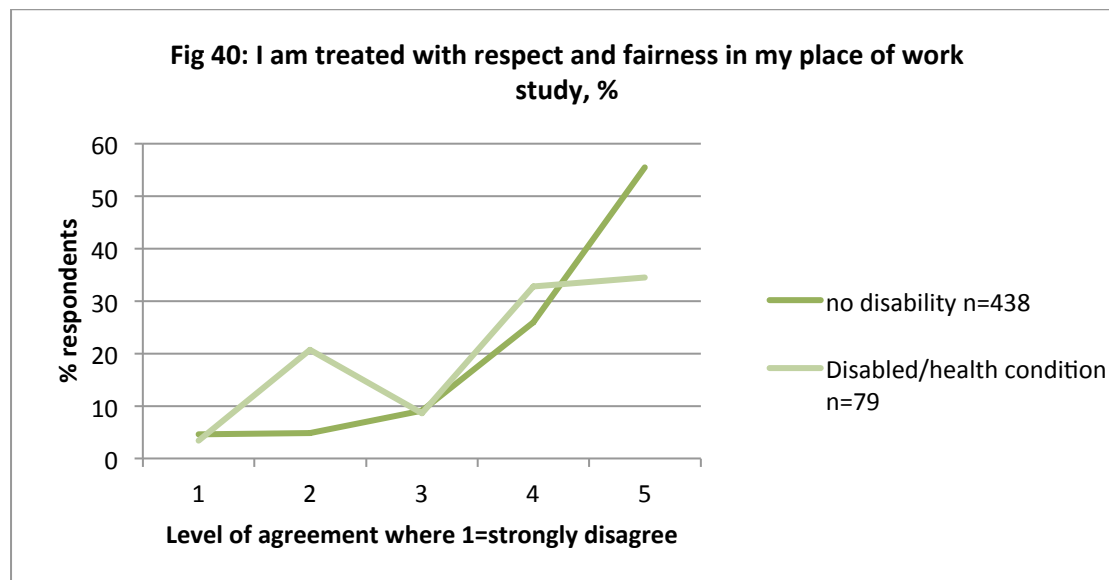
**Fig 38: I am treated with fairness and respect in my place of work, %**



**Fig 39: Generally speaking palaeontologists have equal access to career advancement and benefits irrespective of characteristics like disability, ethnicity, age, gender, etc.**



The final examination of these data was to compare the agreement levels in statement two ‘I am treated with respect and fairness in my place of work/study’ of respondents declaring a disability, long term illness or health condition with other respondents. The results show that those declaring a disability or long-term illness/health condition are less likely to strongly agree, and more likely to disagree with this statement, presumably reflecting their own personal, less favourable experience of working/studying in palaeontology.



## 12. Grants and Awards

### 12a) Grant Success Rates

In reviewing the literature and sector data on access to postgraduate research on behalf of the Wellcome Trust<sup>xlix</sup>, the Bridge Group concluded that:

*‘Any assumption that access to postgraduate research is purely meritocratic is false. Data indicate that access to postgraduate research, the gateway to scientific research careers, is affected by financial considerations, gender, disability, ethnicity and socio-economic status.’*

This demonstrates that simply setting out to choose ‘the best’ applications can be problematic and for this reason, monitoring all stages of the awarding process is important for any grant awarding organisation that values equality and diversity. Currently PalAss holds data that enables monitoring by gender, but not by other protected characteristics.

The success rates of men and women applying for PalAss grants since either 2013 or 2014 are compared below, together with the number of grants awarded each year and the numbers of men and women applying.

Figure 41 shows the data for PalAss **Research Grants**. This scheme for professional or amateur members with a PhD provides up to £10,000 for single research project or a ‘proof of concept’ project which aims to support a future application to a national funding body. Priority is given to first-time applicants. There have been 48 applications for PalAss Research Grants since 2013, 33



from men and 15 from women. The overall success rate for this time period is 45.8% (45.5% for male applicants and 46.7% for female applicants).

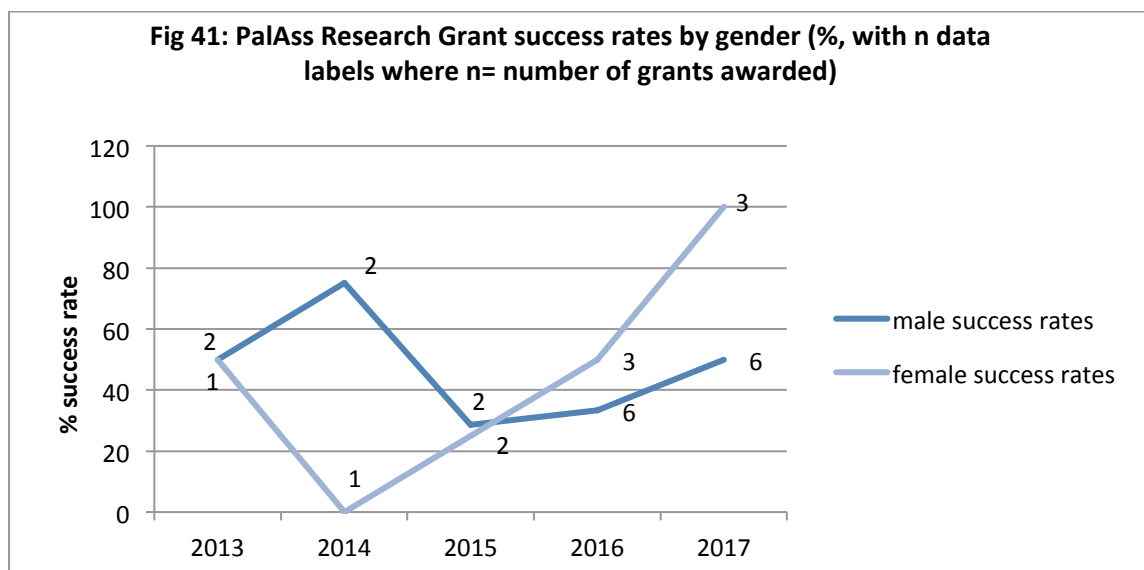
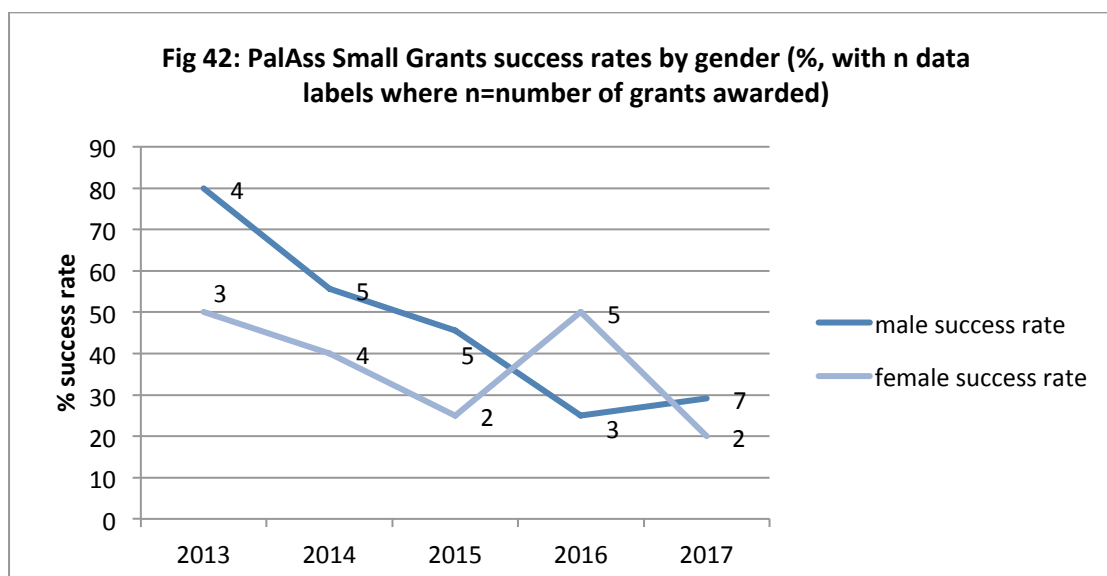
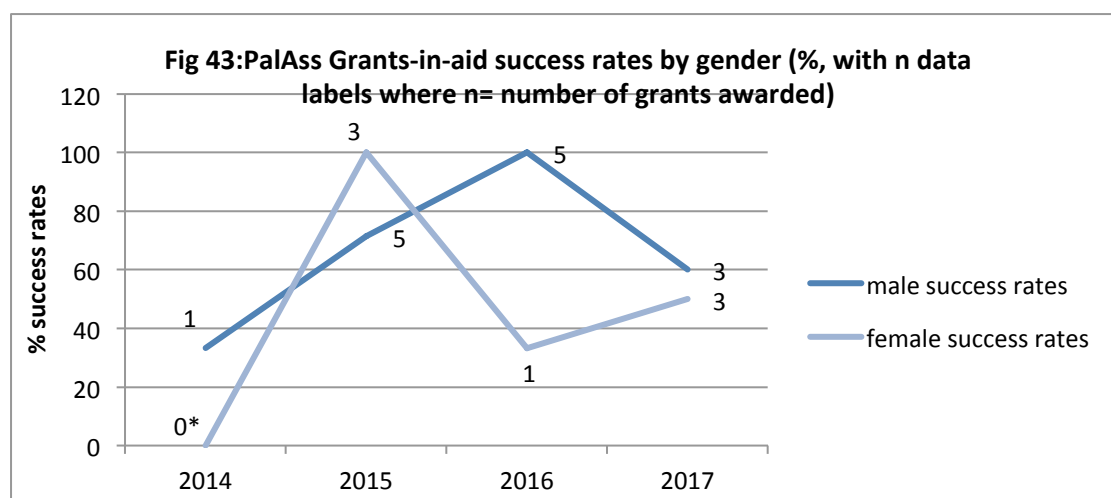


Figure 42 presents the data for the Association’s **Small Grants** 2014-2017. These grants of up to £1,500 are to cover the costs of research travel and fieldwork. They are open to all members, but students, early career and retired members are given preference. Since 2013, 105 applications were received from 61 men and 44 women. 40 awards have been made so the overall success rate for this period is 38.1% (39.34% for men and 36.36% for women).



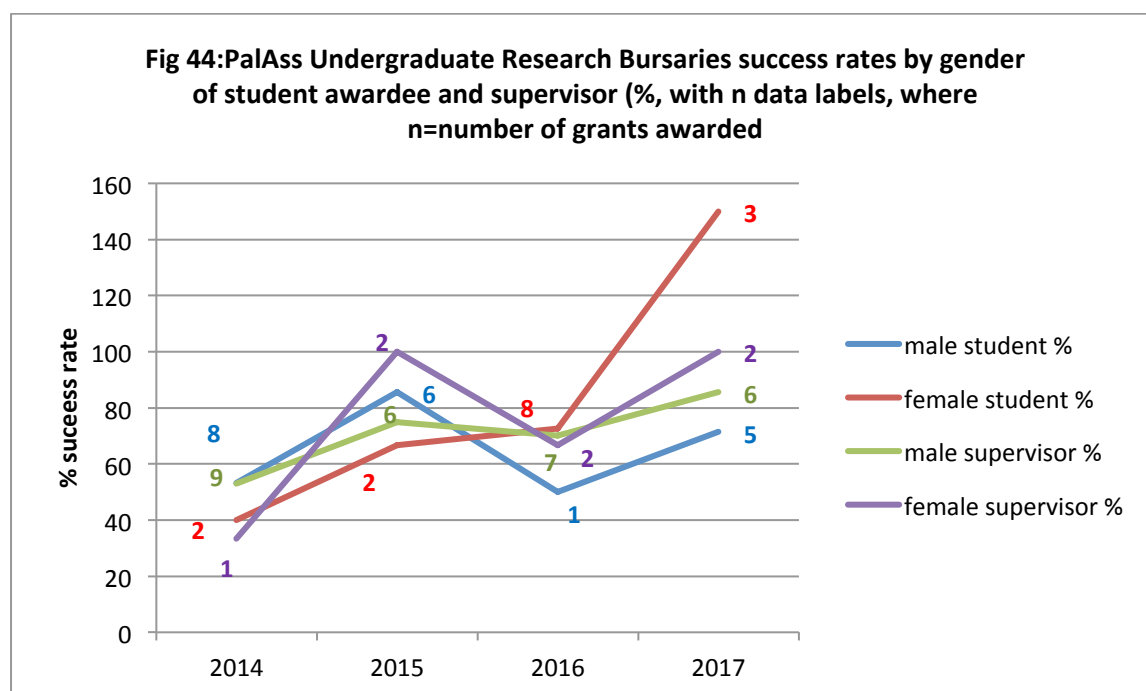
**Engagement Grants** are awarded to encourage educational outreach, public engagement, and related initiatives on palaeontological themes. The grants are normally up to £5,000 but can extend to £15,000 in exceptional circumstances. Funded projects can either be stand-alone initiatives, or proof of concept projects for further funding. A chart has not been drawn up for Outreach and Engagement Grants as the numbers are so small. Only 6 grants have been awarded since 2014, 2 to men and 4 to women. Over this period there were 10 male applicants and 8 females so the overall success rate for this scheme is 33.3% (20% for males and 50% for females).

The PalAss **Grants-in-aid** are to assist the organisers of scientific meetings, workshops and short courses that promote research in palaeontology. There are two deadlines a year and applications are considered by Council. Over the period 2014–2017 12 applications were received from women and 20 from men. The overall success rates over this period were 70% for men and 58.3% for women.

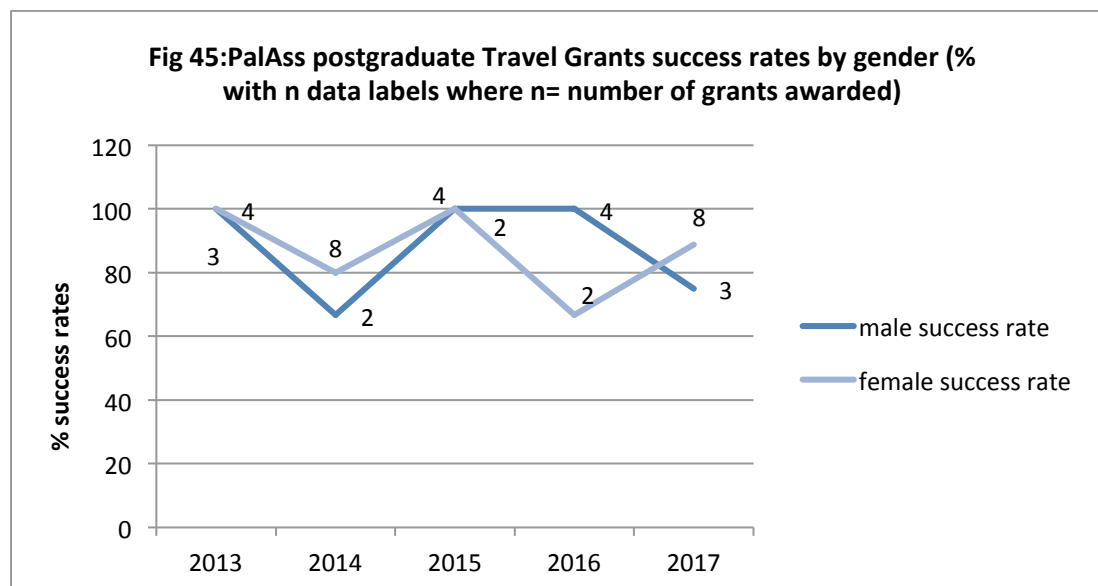


\*No applications made by women in 2014

Palaeontological Association **Undergraduate Research Bursaries** aim to give undergraduate students career-transforming research skills and experience. They provide a stipend of up to 8 weeks for research projects co-designed by students and their supervisors. Since 2014, 52 applications have been received. These can be gender segregated in two ways: a) the 52 included 31 male students and 21 female students, and b) the 52 also included 42 male supervisors but only 10 female supervisors. The overall success rate was 67.3%. For students this was 64.5% for males and 71.4% for females. For supervisors this was 66.7% for males and 70% for females.



**Postgraduate Travel Grants** provide up to £200 to help postgrad students to attend international meetings. Since 2013 there have been 46 applicants (16 males and 30 females) and 40 awards (14 to males and 26 to females). The overall success rate for this period was 86.96% (86.67% for women and 87.5 % for men).



The aim of the analysis above is to look for gender bias. The numbers are small so any findings must be treated with caution and it is difficult to draw firm conclusions. Overall, the figures do not appear to suggest any consistent biases in favour of either sex. Some differences include:

- Women are more proportionately more likely to apply for engagement grants and also more likely to apply successfully
- Men are more likely to apply successfully for Grants-in-aid
- Women are more likely to apply for postgraduate travel grants but are not more likely to be successful
- Male supervisors are more likely than female supervisors to apply for an Undergraduate Research Bursary but are not more likely to be successful. Female students are slightly more likely than male students to be awarded a URB

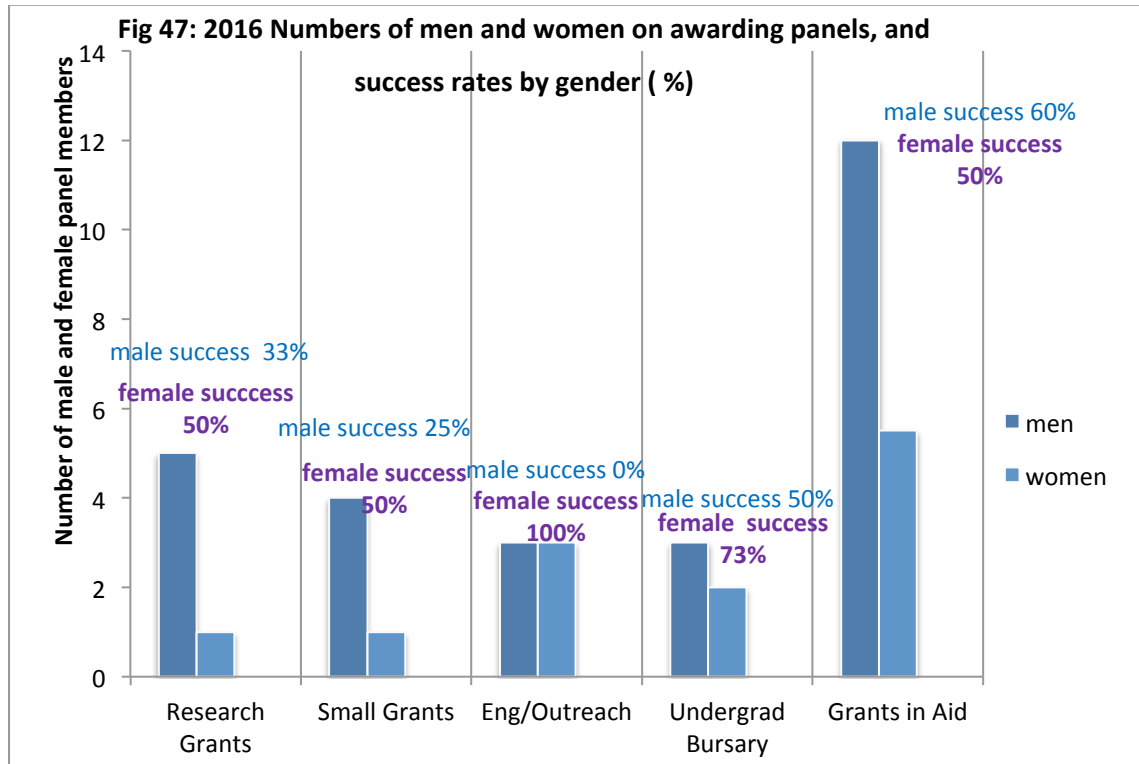
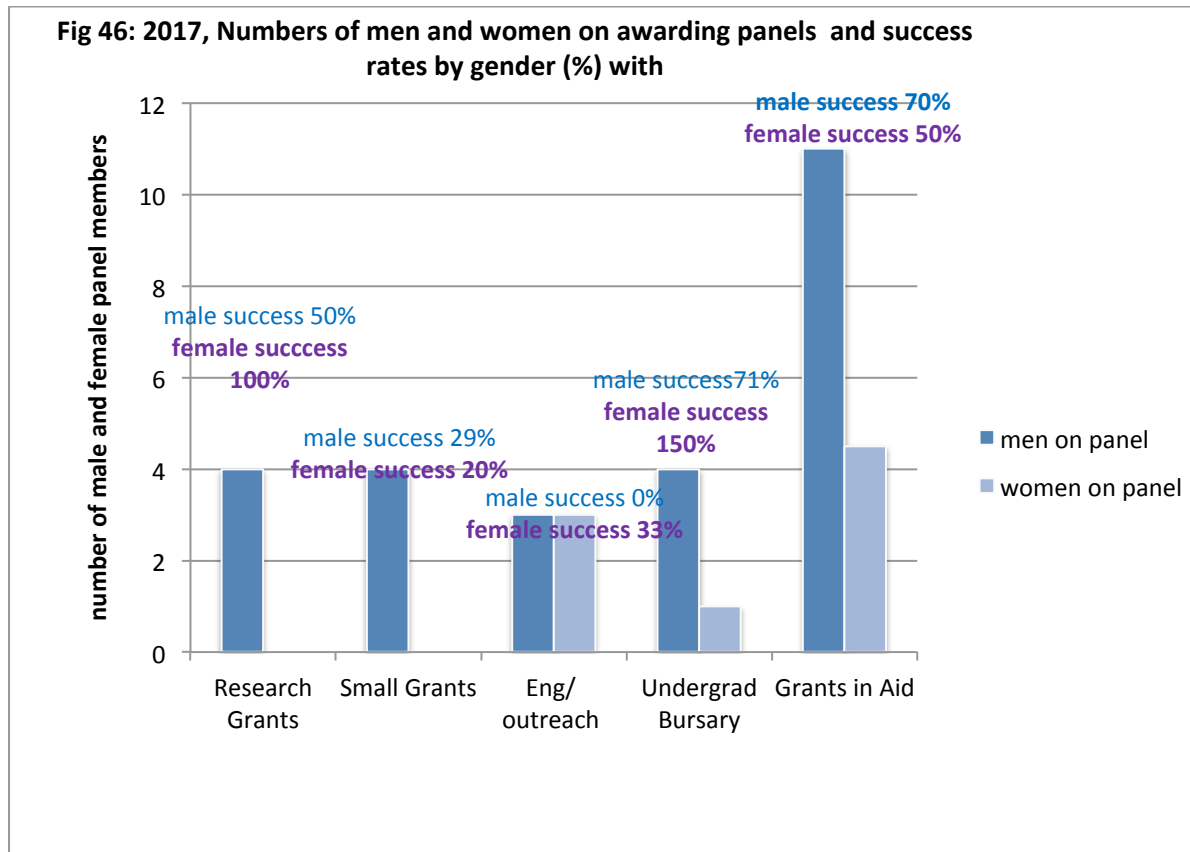
## 12b) Diversity of Panel Members

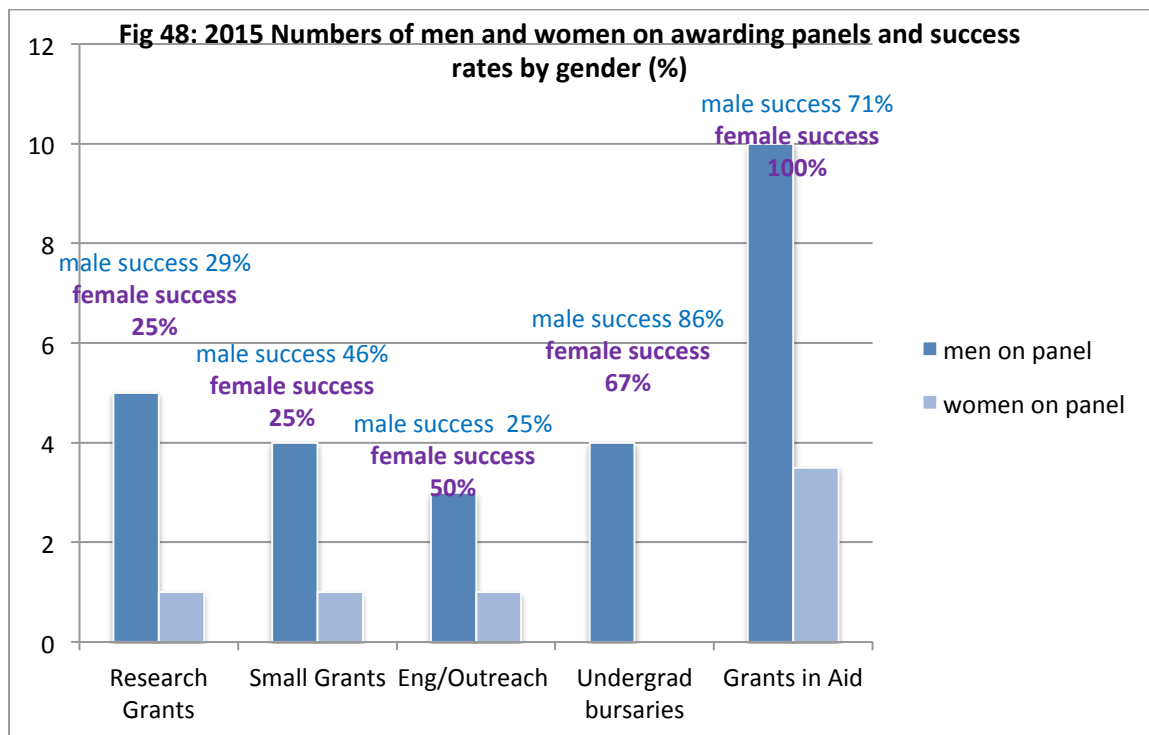
A number of survey respondents, male and female, explicitly encouraged PalAss to ensure that its governing committees are as diverse as possible. Some were aware of steps taken recently to ensure that Council includes a good mix of ages, career stages and genders and were very supportive of this development.

The Diversity Group was interested to know whether the gender make-up of the awarding panel has a direct impact on the gender balance of the awards made.

Grants-in-Aid are awarded by PalAss Council and other grants are awarded by subsets of Council. Figures 46,47 and 48 below show the gender balance of the awarding panels for the various grant schemes and the success rates of women and men for each scheme over the period 2015-17. Again,

the numbers are very small so it is hard to draw any firm conclusions, but there does not appear to be any noticeable relationship between the gender balance of the panel and the decisions made.





In the future it will be important for PalAss to consider other types of bias and disadvantage when reviewing its grant schemes. Best practice is to collect data on the ethnicity and other protected characteristics of applicants to enable potential biases or barriers to be tracked and eliminated if necessary.

It was pointed out by one focus group member, who had had involvement with other grant awarding bodies, that through their awarding criteria grants can influence and direct the behaviour of awardees and achieve a variety of diversity outcomes. For example, the criteria for engagement grants can direct activity towards under-represented groups; the criteria for travel bursaries can target and encourage palaeontologists from under-represented groups; the criteria for grants-in-aid could require the implementation of best practice in delivering accessible events and ensuring gender-balanced presenters, etc. In this way, by building equality and diversity considerations into its awarding criteria PalAss can significantly extend its reach in promoting best practice.

### 13. Prizes

According to the PalAss website, the Association awards prizes to ‘reward excellence’ and to ‘keep a record of the very best palaeontologists worldwide’. Winning a prize is therefore a significant career benefit, which can increase the visibility and status of individuals and give them confidence-building positive feedback about the quality of their work. Prize winners also become role models to those at an earlier career stage by demonstrating success and showing what is possible.

The consultants looked the gender balance amongst the winners of the six PalAss prizes published on the website. The results are set out in Table 8.

**Table 8: Winners of PalAss prizes by gender (data to 2017)**

Prize	In recognition of...	Awarded since	Male awards	Female awards
Lapworth Medal	Outstanding contribution through research	2000	13	2
President's Medal	15-25 years contribution and future potential	2008	9	0
Hodson Award	Notable contribution for up to 10 years post PhD	2001	14	6
Mary Anning Award	Outstanding amateur contribution	1990	29	1
Annual Meeting President's Prize	Best ECR talk at the Annual Meeting	1977	30	15
Annual Meeting Poster Prize	Best ECR poster at the Annual Meeting	1997	10	15

It seems that women are under-represented in all awards except the Annual Meeting Poster Prize, where they seem to be over-represented. Given the healthy numbers of female research students and postdocs in the sample, and the data on participation at the Annual meeting which shows a good gender balance of presenters, it is surprising that the Annual Meeting President's Prize is not more evenly shared between women and men. It could perhaps be argued that the proportion of women winning the Hodson Award does reflect the gender balance at mid-career level and the lack of women winning the Lapworth Medal and the President's Medal reflects the lack of senior women in palaeontology. Council will be able to step back and reflect on the broad community of palaeontology and decide whether having no female winners of the President's Medal and just 2 female winners of the Lapworth Medal does truly reflect the relative contributions of men and women at this level.

The Association does not hold data on the other protected characteristics of prize winners, but first level reviews of ethnicity imply that virtually all prize winners have been white.

Many survey respondents and other contributors addressed the issue of fairness in awarding prizes.

*'Some of the most visible accolades of PalAss are the awards given out at the Annual Meeting each year and these almost always go to male (and white) awardees. This is partly because the membership has a lot to do with gender and ethnicity breakdowns at different career stages, but research shows that women are less likely to nominate themselves or other women and that women*

*are less likely in general to be nominated for these kind of awards. I would like to see a move away from requiring people to be nominated as it is inherently biased.'*

This idea was strongly supported by others who had been involved in considering nominations and who could see inherent flaws and biases in the system. For example, some big names in palaeontology are regular nominators – to the great benefit of their colleagues and students – whilst others never bother. Also, some are better at nominating or better placed to nominate than others:

*'It's so biased. It's just about who gets nominated. Also, I have been on committees – not at PalAss – where it is clear that certain nominated individuals have been disadvantaged not through their own lack of record, but by the nominator.'*

Another survey respondent mentioned a bias towards certain fields and what he described as 'opaque awarding criteria':

*'... there seems to be a significant bias against certain sub-sciences within palaeontology, with the awards being dominated by fossil specific studies (especially vertebrates) with little awards for palaeontological process work (i.e. computational, taphonomic biases, etc.)*

Another was pleased to see more female winners in the last two decades, but nonetheless felt that the long list of white male winners was 'a discouraging sight for young researchers'. He went on to observe that prize winners were often known to judges and asked for more transparent judging criteria:

*'At other palaeontological/biological conferences (e.g. SVCPA, SVP, BES) there are clear criteria for each of the conference prizes and PalAss would benefit greatly from drawing up a similar list in order to make the judging process for the student prizes more transparent and fair... Standardised scoring sheets would discourage biases amongst judges and in turn promote greater diversity amongst winners – not just gender and ethnic diversity, but also greater diversity in the recipient's institution and research topic.'*

A member of Council confirmed in an interview that clear criteria do exist and are used, but these do not appear to be published on the website or in the conference programme. Increased visibility of the criteria may help members to feel more confident in the process.

Many prize-awarding bodies are aware of biases in their systems and are seeking ways to overcome these. PalAss may need to review their criteria, consult their members further and pilot different approaches to see what works best. Some organisations are using search committees that proactively identify individuals who might have been overlooked, and others are using exhibitions, or commissioning portraits to give recognition and visibility to under-represented but excellent scientists<sup>1</sup>.

#### **14. Other comments about peer review**

There is research to suggest that peer review in science is problematic from an equalities perspective. For example, a recent study by the AGU found that women are less likely to be nominated as reviewers, as well being slightly more likely than men to turn down an invitation to

review<sup>li</sup>. The Royal Society has acknowledged that very reviewer is subject to unconscious biases that influence their decisions and has created an online briefing to raise awareness of this.<sup>lii</sup>

Whilst some people conveyed a good deal of trust in PalAss editors and felt confident that they made great efforts to be as impartial as possible, others had little confidence in the peer review process:

*'The community is extremely hostile to newcomers usually exercised through the peer review system. Personal opinions, petty rivalries and old grudges are used to justify and suppression of academic work.... The effectiveness of the peer review system is at the discretion of editors who are frequently not impartial owing to the relatively small size of our field.'*

Echoing the point made in the prizes section above, it was suggested by some survey respondents that the larger more established research groups dominate the journals and meetings and that smaller groups are sometimes overlooked. One interviewee adamantly refuted this explaining that the 'dominant' groups were simply more productive and numerous, but two other interviewees supported this view:

*'It's quite clear that... there are a group of people whose work isn't necessarily any cleverer or better than everyone else's but those are the topics that some people perceive as being the most interesting.'*

One interviewee who benefited from being part of a popular group trusted the current editorial team not to overlook papers inappropriately but thought that publishing a short biennial review of papers published and those rejected with reasons why would be healthy and assist with transparency.

Blind reviewing was strongly recommended by some, mostly junior, survey respondents, but was felt by all more senior and experienced interviewees to be impossible in such a small field:

*'Even if I didn't know the authors' names I would know who they were'*

Plagiarism was suggested by a small number of survey respondents and by one interviewee to be a recognised issue – especially for PhD students:

*'In my institution there have been no fewer than three examples of PhD projects being copied by a senior researcher at another institution.'*

*'You hear stories of people on editorial boards not declaring a clash of interests, reviewing papers they shouldn't be reviewing and deliberately holding up or preventing publication. It doesn't even matter whether the stories are true or not – that is the perception and that is the atmosphere that has been created. There is suspicion and paranoia and that is not conducive to conducting good science.'*

One interviewee said she always put her name to every review she gave and could not see the case for anonymous reviewing in an organisation that tries to be fair and transparent.



## 15. Other topics raised

This section aims to summarise the issues most commonly raised in the survey open section, the focus groups, the interviews and the informal communications at the Annual Meeting.

### 15a) Brand and culture of palaeontology

Many contributors talked about the culture of palaeontology, highlighting the best and worst aspects of the discipline.

Many opined that it is a fair and open discipline, welcoming to all. One described a '*general culture of socialism [sic] and inclusion*' – including lots of public outreach, inclusion of amateur enthusiasts, museum events, fossil festivals, etc., many of which are free of charge and for which many palaeontologists give up their free time. Several survey respondents mentioned actions they had taken to reach out to school children, to mentor young professionals, include and encourage disabled students and generally open up the field to anyone who is interested.

However, some wondered whether palaeontology has an 'image problem' that is perhaps limiting its place alongside other STEM disciplines as well as the diversity of people attracted to it.

*'Palaeontology is not viewed within the broad discipline of geology as being as "important" as other sub disciplines.'*

Some thought it lacked broad appeal as a science, being seen as focusing on dinosaurs and little else:

*'[PalAss should] continue to promote palaeontology as an interdisciplinary science that is rigorous, useful and addresses interesting questions about life and the Earth, rather than something for people that have known the names of all the dinosaurs since they were three. That is not to say that dino-fans are not welcome but the idea of what being a researcher in our field is like can be alienating when you first start out. I was convinced that I wasn't obsessed enough to do a PhD until I worked on an interesting evolutionary question, presented my results and got good support and feedback and I realised there are other ways of being a palaeontologist.'*

Several respondents urged PalAss to be an advocate for and promote the image of palaeontology within the STEM community – e.g. amongst related or overlapping fields that might consider employing more palaeontologists, easing the pressures created by the shortage of open-ended positions:

*'I am a postdoctoral researcher desperately searching for a tenure-track position and there are far too few. If PalAss and other bodies could find a way to illustrate the critical nature of our work towards the fields of geology and biology that would go far in helping create positions.'*

A respondent asked PalAss to find out whether (as he suspected) RCUK grant success rates were lower in palaeontology than in other disciplines:

*'This, I suspect, reflects a broader idea in the science community that palaeontology isn't cutting edge, and isn't as deserving of funding. PalAss can be a public voice highlighting that this is not so.'*

Some people were put off by behaviour they described as 'academic snobbery':

*'Admittedly this is only a minority, but there still are some who treat you according to the hierarchy of what degree you have and your age – rather than what you have contributed.'*

Some felt they had been held back by speaking with a regional accent:

*'I have never heard another accent like mine at the Annual Meeting. I think some people judge me for it.'*

Some interesting views on palaeontology came from interviewees who had left the subject and who could look back with a degree of hindsight and objectivity. However, they differed in their views. One described deciding to leave as 'painful' but looked back with fondness, not bitterness, describing his time in palaeontology as 'fun', although rather lacking in career support. Another interviewee presented the opposite view. She had left palaeontology for another field which she had found to be much more constructive, collaborative and friendly. She felt that the under-resourcing of palaeontology created a competitive and destructive atmosphere:

*'Palaeontology is an old discipline. It's full of egos. It comes with lots of baggage and politics. It has less funding than other areas. Too many people are working in that space and it is quite vicious. I didn't know any different until I moved to a new discipline which is so much more friendly and informal.'*

Many people were enthusiastic about PalAss's new mentoring initiative as they thought this would address some of the key challenges of establishing a career in palaeontology – including contact with role models, support in chasing job opportunities, accessing career advice, and for some, a network to help with their feelings of isolation.

### **15b) The problem with fieldwork**

For some palaeontologists fieldwork is an important and enjoyable professional activity (although many of those consulted did not spend time in the field). Some were attracted to palaeontology because they were outdoor people and the idea of conducting research outdoors was much more attractive than always working in a laboratory. However, a number of issues with respect to the inclusivity of fieldwork were identified, including cost, time commitment, physical demands (such as carrying equipment, hiking to remote locations, camping and being the outdoors) and a lack of washing and sanitary facilities. Someone observed that you had to be part of the 'in-crowd' to be invited on fieldwork and felt that some people with appropriate skills and knowledge were overlooked because they lacked the right contacts ('i.e. *they are not drinking buddies with the PI*). Other than creating virtual field trips, and providing grants to assist with costs e.g. for extra equipment for disabled people or for extra costs of childcare whilst a parent is away on field work, few solutions were suggested. Several people would like to see PalAss foregrounding more research and roles that do not involve fieldwork so that people who cannot participate can still see ways of being a palaeontologist.

Several people did observe that some fieldwork provided a platform for poor behaviour:

*'Sexual harassment (ranging from casual day-to-day behaviour through to serious criminal offences) remains an issue in palaeontology, particularly during fieldwork.'*

Alcohol consumption, late nights, and rowdy behaviour had made some people feel that they didn't belong in this environment, and several survey respondents felt that behaviour on fieldwork should be 'reined in'. One interviewee did however suggest caution with this:

*'Young adults are allowed to have fun. We don't want to be too finger wagging. It's a relatively social subject and there are lots of good friendships that are forged doing fieldwork together. I would regret that going away.'*

PalAss could consider extending the Code of Conduct for meetings to cover fieldwork, linking this to activities that it funds.

### **15c) Sexism and Sexual Harassment**

Several female and a number of male survey respondents addressed what they described as – at the mild end of the spectrum - *'the macho and laddish nature of geological undergraduate courses'* and the more extreme end of the spectrum – *'a wide-spread culture of sexual harassment'*:

*'I feel that there is a systemic masculine culture surrounding palaeontology, common to Earth sciences in general that allows and facilitates levels of sexual harassment uncommon in the corporate world. I have experience sexual harassment at almost every institution I have worked at and I have turned down career and research opportunities because the people they have been with made me feel so uncomfortable.'*

Some felt that palaeontology was no better or worse than other disciplines:

*'As seems to be the case in many STEM fields, sexism is still rampant in palaeontology (although no more or less than other fields).'*

But several felt the problem in palaeontology was serious:

*'I myself have experienced some dismissive (even sexist) attitudes based on my gender from high ranking male professionals and many of my female colleagues have shared similar experiences.'*

*'There are multiple examples of sexual exploitation, bullying and harassment with the community that I am aware of.'*

It was suggested that there is a *'culture of silence'* amongst young/early career women on this topic, partly because they were afraid of the implications of raising it publicly:

*'We [women] are really only just discussing it amongst ourselves, but very few of us have said anything officially for fear that complaining about the behaviour of more senior male colleagues will ultimately be a career-ending move.'*

However, it was also suggested that some palaeontologists, male and female, chose not to challenge inappropriate behaviour, because it benefited them not to do so:

*'Both male and female researchers tolerate and even promote this behaviour to further their own academic gain. There are multiple examples in my institution of older male students behaving in a sexually inappropriate manner, which is endorsed and excused by their female friends.'*

Several people cited poor behaviour - especially of older male colleagues - that was left unchecked because *'they were always like that'* or because *'we were just all expected to ignore it'*. This blind-eye approach sets a poor example to younger males and is not empowering of those on the receiving end. It does not set the tone of an organisation that values equality.

*'At ProgPal some other female colleagues and I were told that we were fundamentally inferior and would not be successful palaeontologists.'*

Recent high-profile news stories and legal cases and current social media campaigns such as #MeToo, #Everydaysexism and #Timesup have increased awareness of the prevalence of sexual harassment and sexism. Victims are being encouraged to speak out and leaders to lead by example, ensuring robust policies are in place, calling out poor behaviour and generally taking a zero-tolerance approach. Transparency and openness are called for<sup>liii</sup>

The introduction of a Code of Conduct for Meetings was felt to be an important step and was widely welcomed. It was hoped that senior members of PalAss would lead by example and would challenge any inappropriate behaviour or language and/or support others in making challenges. One interviewee had attended a meeting of another professional body that had included a women's networking session where this topic had come up. She had found it very useful to discuss the matter and share coping strategies with other women.

#### **15d) Amateur contribution**

Several interviewees acknowledged the important contribution of amateurs. Although it was observed that amateurs were primarily white males, it was suggested that they are from a range of social, educational and professional backgrounds so added diverse perspectives to palaeontological work. Some survey respondents however did not think that the contribution of amateurs was adequately acknowledged:

*'A lot of mainstream palaeontology tends to be dismissive towards amateur and novice fossil collectors and offensive towards anyone commercial or working with commercial fossil collectors.'*

Some would like to see PalAss providing more proactive encouragement for its amateur members:

*'[PalAss should] engage much more directly with the amateur community. Ideally, provide a platform to enable those not trained in palaeontology to publish results and observations in an archived (perhaps online) format that does not assume access to the same resources as academic palaeontologists.'*

#### **15e) Outreach**

Many survey respondents suggested more outreach activities to help bring under-represented groups into palaeontology:

*'I don't think our field is unwelcoming in the strict sense, but we may seem like a closed shop to people outside the traditional demography. Active outreach with the aim of connecting with a more diverse membership is probably a key strategy for changing the composition of our field.'*

A number of people specifically suggested reaching out to children in inner cities, low income areas, to BAME communities and to school-girls. Few specified what form this outreach should take, but a number of practical suggestions were made including:

- Funding/supporting MSc and PhD students to be ambassadors visiting schools – including primary schools
- Running female-only summer camps
- Funding summer placements in museums
- Creating resources for schools to use

One respondent who had worked in schools said that most young people she had met had no idea that careers existed in palaeontology/geology/earth sciences. By the time they heard of these options many had disengaged with physical sciences. She therefore thought any outreach should be targeted at young children.

Some felt that this type of outreach was more suited to museums and that it was outside the remit of PalAss, others agreed that the existing outreach and engagement grants awarded by PalAss could prioritise projects that reach under-represented groups.

#### **15f) Careers – competition and support**

Most of the PhD students and contract researchers who completed the survey and/or who spoke to the consultants were aware that there are many more people at junior levels of academic palaeontology than could hope to build a career in the discipline, creating an extremely competitive job market. Many bemoaned the lack of job opportunities in their chosen discipline and the resulting fierce competition:

*‘Even without any kind of protected characteristic I have found it impossible to gain a career in palaeontology/geology, or a related career path. This, I believe, is primarily due to the meagre number of vacancies that appear, and the excessive academic requirements that employers can demand as a result of competition.’*

*‘...science as it is currently funded and conducted is a pyramid scheme. In many parts of our community having many PhD students is a badge of honour even when there aren’t enough permanent jobs at the end of their programme of student for the majority to stay on in palaeo. This shouldn’t be acceptable.’*

It was pointed out that this situation left many palaeontologists facing a period of unemployment between contracts or before a position could be secured and that this in itself was a block to equality:

*‘this [period of unemployment] will exclude people from a number of minority groups who may be less wealthy or have caring commitments for example.’*

Some said that their PhD experience had prepared them for an academic career in palaeontology and nothing else:

*'Why have I wasted four years on a PhD in palaeontology? I could have gone and got a job and started a family.'*

And others thought that navigating their way to a career outside of academia would be very hard as little careers advice was available:

*'If I decided to leave academia my options would be much more limited and I wouldn't quite know where to start.'*

One interviewee said that her university was putting new effort into trying to outpace palaeontology undergraduates and masters students, ramping up the career advice available. She observed that some need to do unpaid internships or volunteer work for employers to stand a chance of being interviewed for a position – and this is more possible for some than for others. Some people thought that PalAss should provide more career advice and support both to help ECRs to stay in academia and to find a palaeontology career elsewhere – for example by refreshing and adding to the collection of career histories that had previously been published in the newsletter. Mentors and role model speakers from outside academia were suggested along with careers sessions at meetings. A few people, however, thought that outplacing members to careers beyond academia or research was beyond the Association's remit.

Mentoring was seen as a key career support mechanism and the new mentoring programme was warmly welcomed. It was pointed out that a diverse group of mentors would help to inspire a broad group of mentees.

A recent *Nature* article about a project to track career outcomes for those with science PhDs<sup>liv</sup> in the UK and Canada confirmed that few of those gaining a PhD can stay in academic science. Earlier surveys by Vitae had established that around 80% of postdocs want to remain in academia – many more than can do so. This project found that in the UK nearly 80% of the sample had a full-time job 3.5 years after gaining a PhD, about 10% worked part time, 2% were unemployed and the rest were pursuing further studies or volunteering. 30% of those with full-time or part-time jobs were in academia, 20% were in industry and another 20% were medical professionals. Of those in academia 70% were teaching professionals and 30% were researchers.

The research found however that job satisfaction was reasonably high – even for those who had had to change track and leave academia. More than 95% of respondents in the study were at least somewhat satisfied with their career, with 48% being very satisfied. Satisfaction was little affected by sector.

The research also tracked a Canadian cohort of PhD graduates from the University of Toronto in a region where there are two large universities employing graduates. This found that 23% had tenure or tenure-track positions and just over half worked in some kind of academic post – including as administrators. Nearly 30% were in industry and others worked for government, charities or small businesses. 13% of all physical sciences PhDs in the private sector worked in banking, finance or investments – sectors that need employees who can manage big data. Again, job satisfaction levels were high.

PhD graduates are clearly highly employable, but many in this sample were desperately chasing too few jobs in palaeontology and were feeling desperate and bewildered at the thought of having to

leave academia. PalAss will need to decide whether or not supporting palaeontologists to leave academia post PhD is within its remit.

### **15g) Monitoring**

Monitoring is widely seen as best equalities practice. It is the way that organisations work out who is included in and excluded from their activities and it enables the tracking of progress over time. Several survey respondents and interviewees were keen to see the Association set up monitoring systems for all its activities. It was pointed out that publishing monitoring reports would do much to promote transparency and to build the confidence, trust and respect of members.

### **16. Why do people leave palaeontology?**

The Diversity Group was keen to find out why some people had left palaeontology and attempts were made to identify leavers and talk to them about their career decisions. In fact, this proved very difficult to achieve as the most of the leavers identified did not engage with the consultants. Two in depth interviews with leavers were held and their comments have been merged below with some of the feedback from those ECRs at the Annual Meeting who indicated they were intending to leave the discipline. The main reasons for leaving palaeontology put forward during his study are:

- Lack of job opportunities and openings
- Lack of job security at a time when security is needed (e.g. because of dependents)
- Poor career advice or no career advice meaning the person was badly placed to compete for positions
- Accumulating debt
- Low paid jobs
- Being offered other jobs with more money/security
- Drifting out of palaeontology supposedly for a short while, but then finding it was impossible to return
- Perceptions that academic careers and families do not mix
- Lack of role models
- Viewing academic careers as all-consuming and offering poor work-life balance
- Palaeontology being perceived as having an inhospitable culture – rather elitist
- Palaeontology being perceived to be under-resourced

Leavers and potential leavers indicated that the following things might have helped/help them to stay in palaeontology:

- More/better careers advice
- Mentoring
- Visible role models – especially women with families
- Returner grants to assist with coming back to research after a career break
- More funding for ECRs to help them navigate the uncertain postdoc years
- Better professional networks
- Encouragement to publish early – i.e. prior to the completion of their PhD

## 17. Suggestions for action from the Diversity Study contributors

Many contributors to the Diversity Study outlined actions they would like PalAss to take to promote diversity in palaeontology. A large number of specific suggestions have been embedded in the text, but all the feasible suggestions that were made available to Council to help give a feel for the engagement and wishes of PalAss members. The suggestions were made by survey respondents, focus group members, interviewees or attendees at the Annual Meeting in 2017. The most commonly mentioned topics by contributors included:

- A strong feeling of the need for outreach to promote palaeontology to currently under-represented groups – in particular people from ethnic minorities and poorer backgrounds
- A need to ensure that the Annual Meeting is as inclusive as possible
- Tackling the attrition of women and the promotion of gender equality
- A need for career advice and support for those at early career stage
- A need to review the Association's prizes and awards and the associated peer review systems to tackle inherent bias, increase transparency, create more diverse role models, by increasing the diversity of recipients to build the confidence of the community
- A desire from palaeontologists to promote their discipline as being diverse, exciting, relevant and welcoming to everyone, with a visible breadth of sub-disciplines and many different ways of contributing.

When considering how best to respond to these topics Council might consider actions such as:

- Reframing the Engagement Grants to prioritise applications that are targeted at under-represented groups
- Developing an inclusive meetings policy to assist and guide meeting organisers to ensure that events are welcoming, relevant and inspirational to a diverse group of delegates. This could include guidance on, for example, the accessibility of venues, the gender and ethnic mix of speaker line ups and session chairs, considerations about catering, facilities for breast-feeding mothers, gender-neutral toilets, etc.
- Providing training for session chairs to help them run constructive and inclusive debates and handle aggressive questioning
- Provide returner grants to people returning from an extended period of leave to help them re-establish their research and update their knowledge
- Providing funds for more career focused workshops at ProgPal, including careers in palaeontology but outside of academia
- Target the new mentoring programme at under-represented groups
- Resume the practice of producing diverse career case studies and publishing these through the newsletter, plus create a careers section of the PalAss website with links to existing career resources, podcasts of diverse palaeontologists
- To increase transparency and build confidence in peer review, produce and publish an annual monitoring report of papers/articles submitted and accepted with reasons for rejection and require reviewers to reveal their identity
- Encourage grant applicants and authors to reflect on and report the gender balance of contributors in their project
- Reduce PalAss's reliance on nomination for prizes, by exploring and piloting different ways of recognising success; e.g. have Council create a diverse shortlist and then hold a member



poll through the website, or a delegate vote at the Annual Meeting. Talk to other professional bodies about best practice in this area

## **18. Key questions and suggestions for Council**

The Diversity Study has highlighted many areas for consideration, some of which may require Council to think about the remit and scope of PalAss. For example, while many contributors suggested PalAss carry out more outreach activities, some felt that this was work for museums and beyond the remit of a learned society. There were similar diverging opinions about the provision of career advice, especially to those who were considering leaving academia. As well as considering new projects and initiatives, there are many ways in which Council could review and refocus existing activities. For example it could add returners to the intended recipients of Small Grants, or prioritise applications for Engagement grants that focus on under-represented groups.

If the diversity work is to be continued and the current momentum maintained it would be useful to appoint a Council member as Diversity Officer to take a leading role, to develop a diversity strategy highlighting priority areas and setting medium and short term objectives, as well as developing an action plan as a working document to guide and organise activities. Council might also consider setting up themed working groups to contribute to the diversity strategy.

The Diversity Study has been an in-depth project with a representative sample size. However the data collected is already out of date. The study has produced a 'snapshot' of the diversity of PalAss members and other palaeontologists at the end of December 2017. If PalAss decides that this better understanding of its membership is strategically useful it should embrace best equalities practice and set up ongoing monitoring systems to underpin and inform its work. This would involve developing a simple monitoring questionnaire and asking new members and those renewing their membership to share information about themselves and their protected characteristics. The information disclosed would need to be stored securely and kept up to date. The data collected would be used to produce anonymised annual reports on those engaging with PalAss and for benchmarking purposes.

## **19. Conclusions**

The Diversity Study was warmly welcomed by most contributors who freely shared personal information and made a wide variety of suggestions for change. The Study has generated a good deal of interest and engagement and has raised expectations that PalAss will take action, embracing at least some of the ideas presented. A huge opportunity now exists for a fresh look at the Association's activities ensuring that they promote palaeontology and its allied sciences in the most inclusive, relevant and effective ways.

PalAss now has more detailed diversity information than most other small professional bodies or learned societies. Benchmarking is therefore difficult, but several other bodies have shown an interest in working together to develop benchmarking tools. The newly formed Diversity in

Geoscience UK (DiG-UK) Group<sup>5</sup> should be extremely useful for benchmarking, information sharing and the joint development of best practice and PalAss is now well placed to be an active participant in this initiative.

It is important to capture the momentum created by the Diversity Study, to create a framework for responding to the key findings and to embed a range of systems and procedures that enable PalAss to monitor its activities in the future, so that it is able at any moment to interrogate its own data to check for inclusivity and identify areas of under-representation.

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<sup>5</sup> Launched by [International Association for Geoscience Diversity \(IAGD\)](#) at The Geological Society of London on Monday 4<sup>th</sup> June 2018

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