Understanding the status of under-represented groups in the Information and Communication Technologies

A report to the Engineering and Physical Sciences Research Council

Helen Graham, Robert Raeside and Gavin Maclean
Employment Research Institute, Edinburgh Napier University

July 2017
Acknowledgements

The authors would like to thank everyone who gave up their time to participate in the research, especially our interviewees – we appreciate how busy people are. Thank you also to Nigel at EPSRC, and to Ann Blandford, Susan Stepney and Carron Shankland, for their helpful advice and comments at every stage of the research.

The authors

Dr Helen Graham is a Research Fellow at the Employment Research Institute. 
Prof Robert Raeside is the Director of the Employment Research Institute.
Dr Gavin Maclean is a Research Assistant at the Employment Research Institute.

The Employment Research Institute

The ERI is based within the Business School at Edinburgh Napier University. We carry out independent, rigorous and interdisciplinary research that informs stakeholders in the public, business and academic sectors on issues of employment, employability, skills, economic development and equalities. We seek to advance understanding, develop new knowledge and bring it to decision-makers, practitioners, funders, academics and society.

Contact us

Employment Research Institute
Edinburgh Napier University
Craiglockhart Campus
Edinburgh
EH14 1DJ

e-mail: eri@napier.ac.uk
web: www.napier.ac.uk/eri
twitter: @napierERI
# Table of contents

List of figures ................................................................................................................... v
List of tables ..................................................................................................................... vii
Executive summary .......................................................................................................... viii

1. Introduction .................................................................................................................. 13
   1.1. Background ............................................................................................................. 13
   1.2. Project aims .......................................................................................................... 13
   1.3. Report structure ................................................................................................... 14

2. Literature ...................................................................................................................... 15
   2.1. Working culture and value compatibility ......................................................... 15
   2.2. Support and working relationships ................................................................. 16
   2.3. Confidence .......................................................................................................... 17
   2.4. Discrimination ..................................................................................................... 17
   2.5. Conclusion .......................................................................................................... 19

3. Methodology ............................................................................................................... 20
   3.1. HESA data .......................................................................................................... 20
   3.2. Online survey ....................................................................................................... 21
       Survey content and dissemination ........................................................................ 21
       Survey analysis ....................................................................................................... 22
   3.3. Interviews .......................................................................................................... 22

4. The composition of staff and research postgraduates ............................................. 24
   4.1. Staff ..................................................................................................................... 24
   4.2. Students .............................................................................................................. 24

5. Findings from the online survey and interviews ..................................................... 26
   5.1. Motivation for pursuing an academic career .................................................... 26
   5.2. Working conditions and expectations .............................................................. 27
   5.3. Confidence .......................................................................................................... 32
   5.4. Support and working relationships ................................................................... 34
   5.5. Caring responsibilities and flexible working .................................................... 37
   5.6. Discrimination, harassment and aggression ....................................................... 39
   5.7. Future career ....................................................................................................... 41
       Staff ......................................................................................................................... 41
List of figures

Figure 5.1: Challenges to sustaining an academic career, by gender ........................................30
Figure 5.2: Challenges to sustaining an academic career, by disability status – men ........31
Figure 5.3: Challenges to sustaining an academic career, by ethnicity – men ..................32
Figure 5.4: Confidence with selected career aspects, by gender – academic staff ..........33
Figure 5.5: Confidence with selected career aspects, by gender – postgraduates ..........34
Figure 5.6: Those who feel they are perceived as brilliant, and reliable, by gender ..........37
Figure 5.7: Perceived impact of making use of flexible working provisions, and taking a career break, by gender ..............................................................................................................................38
Figure 5.8: Likelihood of postgraduate students seeking an academic job after completing their studies ...........................................................................................................................43
Figure A1.1: Disability status of academic staff, by gender .................................................57
Figure A1.2: Ethnicity of academic staff, by gender ...............................................................58
Figure A1.3: Age (banded) of academic staff, by gender ..........................................................59
Figure A1.4: Percentage female staff in each age band, all academic staff and doctorate holders ........................................................................................................................................59
Figure A1.5: Highest qualification held among academic staff, by gender .........................60
Figure A1.6: Contract level of academic staff, by gender .......................................................61
Figure A1.7: Nationality of academic staff, by gender .............................................................62
Figure A1.8: Nationality of academic staff, by gender and contract level ............................63
Figure A1.9: Part-time employment among academic staff, by gender and contract level ....64
Figure A1.10: Part-time employment among academic staff, by gender and age band........64
Figure A1.11: Fixed-term employment among academic staff, by gender and age band ......65
Figure A1.12: Fixed-term employment among academic staff, by gender and contract level 66
Figure A1.13: Academic employment function, by gender ....................................................66
Figure A1.14: Box plot of the proportion of female academic staff in computer science across institutions ............................................................................................................................67
Figure A1.15: Additional disciplines of academic staff, by gender ........................................68
Figure A1.16: Length of service of academic staff, by gender ................................................68
Figure A1.17: Disability status of postgraduate research students, by gender ....................70
Figure A1.18: Ethnicity of postgraduate research students, UK nationals only, by gender .....70
Figure A1.19: Nationality of postgraduate research students, by gender ..............................71
Figure A1.20: Percentage studying part-time, by gender, disability status, age and nationality ...............................................................................................................................................72
Figure A1.21: Source of tuition fees (UK nationals only), by gender ....................................73
Figure A1.22: Source of tuition fees (UK nationals only), by disability status ......................73
Figure A1.23: Source of tuition fees (UK nationals only), by ethnicity ................................74
Figure A2.1: Current job of academic staff respondents .........................................................76
Figure A2.2: Reasons for choosing an academic career, by gender – academic staff .........77
Figure A2.3: Reasons for pursuing postgraduate study, by gender – postgraduates ..........78
Figure A2.4: Contracted working hours, by gender .................................................................80
Figure A2.5: Reported working hours of those contracted to work full-time, by gender .......81
Figure A2.6: Attitude towards hours worked, by contracted hours ......................................82
Figure A2.7: Attitude towards hours worked among those contracted to work full-time, by gender ................................................................. 83
Figure A2.8: Frequency expected to travel within the UK and abroad, by gender .............. 84
Figure A2.9: Mean satisfaction scores on job attributes, by gender ........................................ 85
Figure A2.10: Mean levels of stress reported in relation to selected tasks, by gender .......... 87
Figure A2.11: Mean extent to which aspects of the job represent a challenge to sustaining current academic career, by gender ................................................................. 89
Figure A2.12: Mean extent to which aspects of the job represented a challenge to sustaining previous academic career – current and former staff ................................................................. 90
Figure A2.13: Mean confidence scores for selected job aspects, by gender .......................... 93
Figure A2.14: Mean confidence scores of postgraduate students, by gender ...................... 95
Figure A2.15: Mean reported levels of stress among postgraduates, by gender .................. 97
Figure A2.16: Mean satisfaction with support from different sources, by gender – academic staff .............................................................................................................. 98
Figure A2.17: Mean satisfaction with support from different sources, by gender .............. 100 – postgraduates........................................................................................................ 100
Figure A2.18: Mean scores on quality of working relationships and integration, by gender – academic staff ........................................................................................................ 101
Figure A2.19: Mean extent to which respondents feel peers perceive them to have certain characteristics, by gender................................................................................. 103
Figure A2.20: Mean scores on quality of working relationships and integration, by gender – postgraduates ........................................................................................................ 104
Figure A2.21: Mean scores on support, quality of working relationships and integration – current and former staff and students ............................................................. 105
Figure A2.22: Proportion of academic staff who have made use of flexible working provisions, by gender ............................................................................................................. 106
Figure A2.23: Proportion of academic staff who have taken a career break, by gender .......... 107
Figure A2.24: Perceived impact of taking flexible working, by gender and whether have taken or might in future ......................................................................................... 108
Figure A2.25: Perceived impact of taking a career break, by gender and whether have taken or might in future ......................................................................................... 109
Figure A2.26: Experiences of discrimination, bullying and micro-aggression, by gender – academic staff .............................................................................................................. 110
Figure A2.27: Experiences of discrimination, bullying and micro-aggression, by gender – postgraduates ............................................................................................................. 112
Figure A2.28: Willingness to relocate for a more senior position, by gender ................. 113
Figure A2.29: Mean likelihood of seeking other types of job, by gender ................................ 114
Figure A2.30: Type of job that offers the most on selected attributes – academic staff .......... 115
Figure A2.31: Willingness to move in order to take up an academic position, by gender – postgraduates ............................................................................................................. 116
Figure A2.32: Mean likelihood of seeking other types of job, by gender – postgraduates .... 117
Figure A2.33: Type of job that offers the most on selected attributes – postgraduates ...... 118
List of tables

Table 3.1: Characteristics of interview participants ................................................................. 23
Table A1.1: Previous employer of new academic staff ............................................................. 69
Table A2.1: Characteristics of survey respondents ................................................................. 75
Table A2.2: Reasons for choosing postgraduate study or an academic career in ICT research –
former staff and students ........................................................................................................ 79
Table A2.3: Mean satisfaction scores on job attributes, by demographic group ................. 86
Table A2.4: Mean levels of stress reported in relation to selected tasks, by demographic
group .......................................................................................................................................... 88
Table A2.5: Mean extent to which aspects of job represent a challenge to sustaining current
academic career, by demographic groups .............................................................................. 91
Table A2.6: Mean confidence scores for selected job aspects, by demographic groups ....... 94
Table A2.7: Mean confidence scores of postgraduate students, by demographic group ....... 96
Table A2.8: Mean reported levels of stress among postgraduates, by demographic groups .. 97
Table A2.9: Mean satisfaction with support from different sources, by demographic groups –
academic staff ............................................................................................................................ 99
Table A2.10: Mean scores on quality of working relationships and integration, by
demographic group – academic staff ....................................................................................... 102
Table A2.11: Experiences of discrimination, bullying and micro-aggression, by demographic
groups – academic staff ........................................................................................................... 111
Executive summary

This report presents the findings of a research project commissioned by the Engineering and Physical Sciences Research Council (EPSRC) to explore the barriers facing under-represented groups in Information and Communication Technologies (ICT) research. The focus of this research is predominantly on the issue of gender, but other characteristics (disability, ethnicity, age, and sexual orientation) were also considered.

To date there has been a lack of specific research looking at the experience of postgraduates and staff in computer science and the related disciplines relevant to EPSRC’s ICT research portfolio. Therefore the aim of the study was to identify and document the challenges and barriers faced by under-represented groups pursuing careers in academic research in these areas. This should help the academic community to better understand and therefore address these barriers, so that more people from under-represented groups are attracted to, and stay in, these disciplines.

The objectives of the study were therefore:
• to investigate the nature of the cohort of researchers in ICT across the career stages;
• to identify and describe the nature of the barriers and challenges facing under-represented groups in pursuing academic careers;
• to identify the features of the environment and culture of ICT as practised in academia that make it more or less attractive to under-represented groups; and
• to generate evidence-based recommendations that can be used by the community and/or EPSRC as appropriate, to effect change.

The study had four elements:

1) A review of relevant literature in order to: identify the key likely issues from existing work on women in STEM, academia and the tech industry more broadly; and to develop the ensuing empirical work and help contextualise its findings.

2) Analysis of bespoke data from the Higher Education Statistics Authority (HESA), in order to establish the extent of under-representation in computer science, and whether job characteristics such as permanence and length of tenure were concentrated within particular groups.

3) An online survey (which was completed by 866 respondents) to collect the views and experiences of current and former postgraduates and staff.

4) 46 follow up interviews, to explore the issues raised in the survey in more depth.
Under-represented groups in academic ICT: facts and figures

HESA statistics on computer science staff show that:

- Representation of women (23%) is lower than in academia more generally (45%), but representation of ethnic minorities and those with a disability is the same or better.
- Men are twice as likely to be professors.
- Women are more likely to work part-time (29% vs 22%), with the biggest gender gap (around 11 percentage points) among women in their 40s.
- Women are more likely to be employed on fixed-term or teaching only contracts, but the gap is small in both cases (2 and 3 percentage points respectively).
- Women and those with a disability are slightly more prevalent among the research student population than among staff, suggesting a disproportionate drop out of these groups in the transition from postgraduate to academic.
- White students are more likely to have student fee assistance, and more likely to have research council grants than those of other ethnic backgrounds. Two thirds of black students and half of Asian students have no tuition fee assistance.

Key findings from this study

Motivation for pursuing an academic career

Women’s motivations for entering a career in academic ICT research were more likely than men’s to be instrumental (i.e. they see it as an intellectual opportunity), while men’s were more likely than women’s to be intrinsic (i.e. a longstanding interest in technology).

Understanding the motivation to pursue a career in academia can help explain why women drop out.

Working conditions

Poor working conditions in academia are due to a long-hours culture and many competing responsibilities from different sources. Some of these pressures were found to represent a greater challenge to women, and to those with a limiting health condition or disability, in continuing with their academic career. There was also a sense that women were more likely to take on additional tasks, particularly ‘good citizen’ activities, which can displace other more prestigious or career enhancing activities.

Confidence

Confidence was found to be a key issue – women exhibited less confidence across a range of tasks, at staff and postgraduate level. This was particularly true of ethnic minority women.
Support and working relationships

Good working relationships and feeling supported by colleagues are key sources of job satisfaction and could foster retention. However, informal social events outside working hours were found to present barriers and exclude people from developing work relationships. In particular, ‘pub culture’ was found to be alienating to those who could not attend due to caring responsibilities, or who did not drink alcohol. Around a quarter of staff and students reported feeling isolated within their department, and women, ethnic minorities, those with a limiting health condition or disability, and older postgraduates were more likely to notice a feeling of ‘difference’ between themselves and others in their department.

Caring responsibilities

Jobs, promotions, and funding are awarded based on the applicant’s accomplishments, but this advantages a certain type of person, who both wants and is able to dedicate excessive time and attention to the job. This is impossible for someone who has caring responsibilities, which impose hard boundaries on the amount of time that can be spent on work. Women were more likely to work part-time, and those who worked part-time were less likely to say it was their preferred option than those who worked full-time. The tension between caring and academic responsibilities was experienced to a similar degree among male and female survey respondents. However, women were more likely to have caring responsibilities, and to have made use of flexible working arrangements, or taken a career break, and women were more likely to feel that this had had an impact on their job security or productivity. Those who had taken absence from work due to maternity leave reported that this can be difficult to manage for those with research grants or supervisory responsibilities, and on returning to work it can be difficult to re-establish research activity at the same time as resuming a full teaching load.

Discrimination

Discrimination and negative attitudes exist and need to be challenged. Discrimination and harassment examples were widely reported in the online survey, while interviews revealed a more complex phenomenon of ‘indirect’ or ‘unquantifiable’ experiences of sexism and other prejudice. Women in the research also recounted various instances of their competence being questioned in ways their male colleagues do not experience.

Future career plans

Most respondents saw many positives about their career, but with some ambivalence about its demands, and an attractive offer from industry could tempt them away – particularly for students and early career researchers. A career in academia was seen as a trade-off, with less pay and security traded for greater autonomy and more interesting work. Future planning was restricted by caring responsibilities, partners’ jobs and location of family. Short term contracts and the need to be mobile in pursuing postdoctoral opportunities were also found
to be restricting future plans. The younger age groups responding to the survey were particularly sceptical about pursuing an academic career, with clear reservations about career progression opportunities and working conditions.

**Diversity**

Existing attempts to address the issue of diversity in STEM have attracted some backlash, which was evident in the comments of some male respondents to the online survey. Female respondents reported being on the receiving end of this; for example, being told they had only succeeded due to reverse discrimination. However, the general feeling was that most of their male colleagues accept the need to increase diversity, but are less aware of the need to take positive action to achieve it. Some respondents felt that existing initiatives such as Athena SWAN were not necessarily picking up on all facets of women’s experiences that make their time in academia more difficult; for example, feelings of isolation or experiences of micro-aggression. There was also a feeling that it is mainly female staff who are shouldering the administrative burden of these diversity initiatives. Finally, some respondents perceived a need to make more room for diversity of thought or approaches, and that there is an inflexible mindset in academic computing that is in part responsible for reproducing existing characteristics within the academic computing population.

**Recommendations**

Our main recommendation is that those who govern and lead HEIs and research institutes attend to the findings which have emerged from this report and redouble efforts to make HEIs and research institutes more inclusive bodies and become exemplars to the rest of society. However, this they should not do on their own, but be aided by industry, professional bodies and funding agencies. Industry has a role in giving guidance and advice on to the creation of high performing work cultures, and could increase their role in offering placements for staff and post graduate students, to give them experience of working in an enterprise which has strong staff engagement. Professional bodies too have a role in encouraging feelings of value and should be more proactive in their interaction with HEIs and research institutions. Funders could strengthen their expectations upon HEIs and research institutions. Perhaps metrics measuring the progress of women and those from minority backgrounds could be used more explicitly by funders in relation to conditions of funding. Those HEIs and research institutions who do not meet expectations could then be called to account or face loss of funding. An explicit metric on tackling issues inhibiting the advancement of women and minority groups could be introduced to assessments of HEIs and research institutions made through the Research Excellence Framework.

**Specific recommendations:**

1) Ensure senior management of HEIs and research institutes are aware of the findings of this report and develop mitigation plans. These plans should be developed in consultation with those in high performance workplaces and professional bodies.
2) Train all managers of research and teaching on combating barriers to the advancement of women and those from minority groups. Develop these managers’ communication skills and how to enable inclusive work teams.

3) Train all research supervisors on how to better inspire and build confidence in those they have responsibility for.

4) Ensure there is access to networking, training and development opportunities for all. This might mean the need to consider access requirements, and when in the year or day these events take place.

5) Funding panels should be cognisant about why some applicants may not have expected levels of accumulated output-based evidence, at least allowing applicants to explain any shortfall.

6) Encourage confidential discussion in performance reviews about barriers to progress individuals have encountered or may perceive, and provide where possible constructive suggestions.

7) Establish a web portal for reporting instances of discrimination, harassment and micro-aggression and develop a culture of zero tolerance in regard to these issues.

8) Generally promote communication, engagement and group working. All staff and students should be encouraged to examine any unconscious biases they may hold against others, especially part-time workers, those who take career breaks, those with a disability or those of a particular nationality or ethnic background, and to appreciate the impact of their words and actions on the confidence or stress levels of those around them.

9) Departments should monitor who is performing ‘good citizen’ activities such as outreach, or diversity work such as Athena SWAN, and ensure that such activities are allocated and rewarded in a fair and transparent manner.

10) Case studies of good practice in the development of women and minorities in ICT should be established by unions and professional bodies.

11) Realistic expectations of what is required by staff and students should be established, preferably by joint consent, and reviewed regularly, perhaps every quarter and no less than twice a year.
1. Introduction

1.1. Background

This report presents the findings of a research project commissioned by the Engineering and Physical Sciences Research Council (EPSRC) to explore the barriers facing under-represented groups in Information and Communication Technologies (ICT) research. It was commissioned because EPSRC and its partners felt that it is important for the strength of the UK research base to harness talent and attract the best researchers. However, the ICT research community is unbalanced with respect to gender and other characteristics.

To date there has been a lack of specific research on the experience of postgraduates and staff in computer science and the related disciplines relevant to EPSRC’s ICT research portfolio.\(^1\) Previous studies of doctoral students in physics (Institute of Physics, 2015) and chemistry (Lober Newsome, 2008) have suggested that negative experiences may put women off pursuing a career in academia, and female representation is even lower in computer science than it is in other STEM subjects. The challenges faced and their impact on diversity are also likely to vary throughout the career. Therefore, this project sought to gather relevant data, alongside the views of those at all career stages, in order to address the issue of under-representation in academic ICT research. The focus of this research is predominantly on the issue of gender, but other characteristics (disability, ethnicity, age, and sexual orientation) were also considered.

1.2. Project aims

The aim of the study was to identify and document the challenges and barriers faced by under-represented groups pursuing careers in academic research in the Information and Communication Technologies. This should help the academic community to better understand and therefore address these barriers, so that more people from under-represented groups are attracted to, and stay in, the discipline.

The objectives of the study were therefore:

- to investigate the nature of the cohort of researchers in ICT across the career stages;
- to identify and describe the nature of the barriers and challenges facing under-represented groups in pursuing academic careers;
- to identify the features of the environment and culture of ICT as practised in academia that make it more or less attractive to under-represented groups; and
- to generate evidence-based recommendations that can be used by the community and/or EPSRC as appropriate, to effect change.

\(^1\) This encompasses all those in Computer Science or Electronic Engineering, but also includes anyone conducting research "which proposes new ways to transmit, present, manage, analyse, process, generate or understand information" (https://www.epsrc.ac.uk/research/ourportfolio/themes/ict/).
The study had four elements. Firstly, a review of relevant literature was conducted, in order to identify the key likely issues from existing work on women in STEM, academia and the tech industry more broadly, and to develop the ensuing empirical work and help contextualise its findings. Secondly, bespoke data was obtained from the Higher Education Statistics Authority (HESA), in order to establish the extent of under-representation in computer science, and whether job characteristics such as permanence and length of tenure were concentrated within particular groups. Thirdly, an online survey was conducted, in order to collect the views and experiences of current and former postgraduates and staff. Finally, follow up interviews were conducted, to explore the issues raised in the survey in more depth.

1.3. Report structure

The remainder of this report is structured as follows. Chapter 2 presents the key points raised by the review of the relevant literature. Chapter 3 outlines the methodology of the study in greater depth. A summary of the findings from the analysis of HESA data is presented in Chapter 4, and then the main research findings from the online survey and interviews are presented thematically in Chapter 5. Chapter 6 offers a conclusion and some recommendations for future actions. Further detail from the empirical work is given in the Appendices.
2. **Literature**

This brief literature review surveys the key work to date on the issue of under-representation in ICT research. Although there is limited research specifically on women in academic computing, it can be brought together with relevant insights from the literature on women in STEM, women in academia, and women in the tech industry. The focus here is on the representation of women, as this is both the focus of this study and the greatest availability of literature, but intersectional issues such as race and sexual orientation are considered in the few places that relevant literature is available.

Much of the research presented here was conducted in the USA, although some pertains to the UK or other European countries. However, the aim of this review is not to paint a comprehensive picture of the prevailing situation in UK academic ICT research, but to raise the issues that may be present, in order to inform the direction and interpretation of the subsequent empirical work.

**2.1. Working culture and value compatibility**

Previous research has suggested that women may enter their studies in computing for systematically different reasons than men. Margolis and Fisher (2003) found that female computing students reported different values and preferences, showing an instrumental rationale for choosing computing and a preference for making a difference, rather than being motivated by an intrinsic interest in the technology itself; a preference that was not always supported by the design of the curriculum. They also suggested that female students were more inclined to drop out because they did not identify with being ‘geeky’ or obsessed with technology; a finding echoed by Rosenthal et al. (2011), whose study of STEM undergraduates noted the importance of identity compatibility in retaining female students. A preference for the practical application of computing over its intrinsic interest was also noted by Machina and Grokhale (2015) in their study of US undergraduates, which suggested that women were more likely to choose a computing major if exposed to information about its practical applications.

Leaving academia will be more likely if the demands of an academic career are incompatible with a person’s own priorities, values and life goals. A survey of 8,373 doctoral students in California in 2006 found high concern about work-life balance, alongside a widespread assumption that finding their desired balance will not be possible based on what they have observed from the previous generation of academics; thus suggesting that values are changing and institutions need to do so too (Mason, Goulden and Frasch, 2009). Lober Newsome (2008) identified concern among chemistry PhD students in the UK that an academic career is too all-consuming and competitive. This could pose a threat to diversity if some groups’ values and preferences happen to be more compatible with the prevailing work culture than others’, for example if women are more likely to prefer a more ‘balanced’ life. Both of these studies found these concerns to be expressed by both sexes, but more prevalent among female respondents.
Sang et al. (2015) argue that one reason academics work long hours is because work is their ‘passion’, and thus the boundary between work and leisure becomes blurred. The implication of this is that anyone who does not work the same hours as the most passionate is at a disadvantage. This is arguably problematic for anyone who does not wish to adopt this way of working, but it is especially so for those whose working time is constrained by caring responsibilities. Previous research on women in academia has highlighted the central role of caring responsibilities in women’s difficulties in progressing in an academic career (Probert, 2005), and a lack of institutional support to manage work-family conflict can leave women feeling marginalised (Gatta and Roos, 2004). A study of linguists and sociologists in the US found that productivity (in terms of publication count) declines more for women than men after having children (Hunter and Leahey, 2010). This may go some of the way to explaining why female authors are under-represented in academic publishing relative to their presence in academia (West et al., 2013). Family responsibilities can also impede women’s mobility, thus narrowing the area in which they are able to consider employment and therefore their career prospects (Ackers, 2004; González Ramos and Vergés Bosch, 2011). Lober Newsome (2008) found that female postgraduates were more likely than male postgraduates to express concern that academia is incompatible with family, and profess a lower desire to pursue an academic career as a result.

2.2. Support and working relationships

The likelihood that someone will stay in an academic career may be influenced by the quality of their working relationships and the degree of support they receive. The 2016 Athena Survey of Science, Engineering and Technology (ASSET) found that women were less likely to report that that their department offered them a supportive environment, or that they had a line manager who was supportive of their career development (Aldercotte et al., 2017). In Lober Newsome’s (2008) study, female chemistry PhD students were more likely to feel uncomfortable with a ‘macho’ working culture, and to experience a lack of integration with their research group. Kachchf et al. (2015) found that the intersection of ethnic and gender identities may also generate a number of particular obstacles to integration for ethnic minority women, resulting in their exclusion from professional networks and a lack of support.

The dominant culture of a mostly male environment may be difficult to challenge, and women entering this type of environment may feel they have to blend in, rather than asserting themselves. Prescott and Bogg (2011) found that women in the male-dominated gaming industry moderated their own gender identity, and therefore the introduction of more women did not change the workplace dynamics. This effort to fit in can be considered a kind of hidden additional work that is not required from those who already conform to the existing culture (Andrew, 2009). However, women may not only accept, but also internalise, the need to conform to the masculine ideal, and can therefore become complicit in reinforcing gendered norms and hierarchies (Derks et al., 2011; Rhoton, 2011; Moss-Racusin et al., 2012; Powell and Sang, 2015). For example, in interviews with female STEM academics,
Rhoton (2011) identified a tendency among many respondents to distance themselves from female colleagues who cannot be ‘objective’ like male colleagues, or who ‘take things personally’.

2.3. Confidence

A lack of confidence may be an impediment to progressing in an academic career. Confidence is particularly important in achieving the self-promotion that an academic career demands, but women may be particularly uncomfortable with this (Bagilhole and Goode, 2001; Fletcher et al., 2007). A survey of PhD students in physics (Institute of Physics, 2015) found that female students were considerably less likely to believe they would make good research scientists (55%, compared to 70% of male students). Lober Newsome (2008) found that female chemistry PhD students were more likely than male students to see experiment failure as reflection of their own competence.

Women may be less likely to receive confidence-boosting affirmation from their colleagues and peers. The 2016 ASSET survey found that women were less likely to say they had been encouraged or invited to go for promotion (60% of male respondents said they had been, compared with 49% of female respondents), and less likely to say they felt their research contribution and external professional activities were valued (Aldercotte et al., 2017).

An issue often cited with relation to confidence is that of impostor syndrome. This can be understood as feelings of fraudulence among successful people who do not attribute their success to their own abilities, even in the presence of objective evidence of these abilities (Parkman, 2016). Related to this is the idea of stereotype threat, where groups who are stereotypically worse in a given area perform worse because the stereotype makes them feel less confident; this can help to explain how women’s performance and interest in STEM can be undermined (Shapiro and Williams, 2012). This is something that has been established for example in relation to women’s confidence in completing computing tasks (Koch, Müller and Sieverding, 2008). Ethnic minority women may be particularly susceptible to this problem, due to particularly negative stereotypes about their abilities (Simard, 2010; Williams, Phillips and Hall, 2014).

2.4. Discrimination

A number of studies have attempted to establish whether there is direct bias against women in academia. Reuben, Sapienza and Zingales (2014) find experimental evidence of hiring bias, which is exacerbated by a male tendency to overstate achievements, and recruiter blindness to this tendency. Similarly, experiments have suggested gender bias in the evaluation of student applications (Moss-Racusin et al., 2012), and that letters of interest sent to professors ostensibly from students seeking mentoring were more likely to get a response if they were signed with typically white male names (Milkman, Akinola and Chugh, 2015). A study of applications to an early career funding grant in the Netherlands found that male applicants were more successful and received higher ‘quality of researcher’ evaluations (van...
der Lee and Ellemers, 2015). There is also experimental evidence of abstracts authored by men on masculine topics being judged to have higher scientific quality than those authored by women (Knobloch-Westerwick, Glynn and Huge, 2013).

However other evidence has suggested that, controlling for ability, female applicants are in fact more likely to be hired in STEM subjects (Williams and Ceci, 2015). Another US study, of hiring in computer science, did not find gender bias after controlling for scholarly productivity – but noted that gender differences in doctoral training and career progression contributed to the asymmetry in productivity (Way, Larremore and Clauset, 2016).

Female staff may also face bias from students, in evaluations of their teaching. There is evidence of gender bias in student evaluations, both from experimental studies (MacNell, Driscoll and Hunt, 2015; Boring, Ottoboni and Stark, 2016) and from analysis of real student feedback (Wagner, Rieger and Voorvelt, 2016). Other staff characteristics have also been found to affect student evaluations, such as sexuality (Ewing, Stukas and Sheehan, 2003) and ethnicity (Pittman, 2010).

One factor that has been suggested as holding women back is gendered evaluations of competence and likeability, and the fine balance between being ‘too masculine’ and ‘not masculine enough’ in attempting to be regarded as such (Cuddy, Fiske and Glick, 2004). Leslie et al. (2015) found that women were less likely to be perceived as naturally brilliant in academic fields where this is seen as a key success factor. Women in masculine fields in STEM may face particular challenges in being perceived as competent and likeable (Hill, Corbett and St Rose, 2010), findings which echo those of Simard and Davies Henderson (2008) with respect to female scientists and engineers in high tech firms.

Efforts have been made in recent years to undertake more careful monitoring of diversity issues in universities, but this kind of ‘institutional housekeeping’ tends to be an additional burden taken on by women (Bird, Litt and Wang, 2004). Indeed, with respect to Athena SWAN, 73% of Institutional Champions and 80% of Departmental Champions are female, and around half of these consider the associated workload excessive (Munir et al., 2014). Although some positive impact may have occurred as a result of Athena SWAN (Munir et al., 2014), subtle and intangible factors may limit its effectiveness. Interviews with female academics by Fletcher et al. (2007) suggest that it is subtle forms of gender disadvantage that exclude women from the research culture; not overt or even deliberate discrimination, but rather a lack of transparency internally (e.g. in the distribution of resources) and externally (e.g. selection for REF panels), as well as a working culture based around homosociability. Gender equality at the policy level may not be enough if it is blind to the actual gender dynamics in the workplace, as Rolin and Vainino (2011) found with respect to their study of a physics department in Finland.

The success of equality and diversity initiatives may also be undermined by a response from academic staff that is lukewarm, or even hostile. Interviews with academics across different disciplines carried out in the 1990s found a number of reactions: some were basically
sympathetic but did not really understand the problem the initiatives were trying to solve; some were fine with equality initiatives as long as they did not subvert existing power structures; some thought that inequality was unfortunate but unavoidable, and women should adapt accordingly; and some were actively hostile or resistant (Bagilhole, 2002). Recent research has also suggested that men, and especially male STEM academics, are reluctant to accept evidence of gender bias in STEM, and evaluate the quality of research that unveils bias as less meritorious than women do (Handley et al., 2015).

Within academia, certain disciplines or sub-disciplines may be considered more ‘masculine’ or ‘feminine’, and this is highly correlated with fields that are considered ‘harder’ or ‘softer’ (Knights and Richards, 2003). Computer science could be considered not only a male-dominated discipline but a masculine one; Ensmenger (2015) argues that this was by design as the discipline came into being in the 1960s, to differentiate it from the traditionally female (and thus lesser valued and lower paid) work of computer programming. Feminist scholars such as Wajcman (2004) argue that the relationship between gender and technology is one of mutual shaping, in which technology is both a source and a consequence of gender relations. This gendering of technology manifests itself as sexism in online communities (Reagle, 2013) and the insistence that women’s lack of participation has nothing to do with sexism and is a rational choice (Massanari, 2017).

2.5. Conclusion

The literature therefore suggests a number of reasons why women (or other groups) might be under-represented in computer science:

- Their motivations for pursuing computer science are instrumental rather than intrinsic – but they are unable to pursue a sufficiently applied or impactful direction.
- They place a greater value on goals outside of academia, family related or not, which are incompatible with the all-consuming nature of academia.
- Responsibilities outside of work impede their ‘productivity’ (which is measured against the norms of those who do not have these responsibilities) and mobility with respect to pursuing available job opportunities in a tight labour market.
- They feel less integrated into their workplaces and less supported by colleagues.
- They lack confidence relative to their peers, and receive less confidence-boosting encouragement.
- They are more likely to doubt themselves and their abilities, and internalise stereotypes, resulting in poorer performance and a drop off in interest.
- They experience direct bias in hiring, promotion and grant application processes, as well as from the students they teach.
- They experience indirect bias, in the allocation of resources (facilitated by opaque allocation processes), and in everyday interactions.
- They are less likely to be perceived as competent and likeable.
- Attempts to address diversity are not engaged with by the ‘majority’ groups.
- Some of the literature argues that computer science is perceived as inherently masculine.
3. Methodology

The research drew upon three sources of data in order to answer the research questions: data on staff and postgraduates from HESA; an online survey of current and former staff and postgraduates; and follow-up interviews with survey respondents.

3.1. HESA data

Sufficiently detailed information on the composition of staff and students in computer science was not available from previously published outputs; therefore, a bespoke data request was made to HESA. Data was obtained on staff and research postgraduate students (masters by research or PhD students, including those at the writing up stage), for the most recent year available (2015/16), who were currently working in a computer science discipline (Computer science, Information systems, Software engineering, Artificial intelligence, Health informatics, Games, Computer generated visual & audio effects or Others in Computer sciences).²

The data on staff was used to address the following questions:

1) What is the composition of staff with respect to key demographic characteristics (gender, disability, ethnicity, age, nationality)?
2) How does the gender balance vary across institutions?
3) Are there gender disparities in:
   a. contract level
   b. mode of employment (full-time/part-time)
   c. terms of employment (permanent/fixed-term)
   d. length of contract
   e. academic employment function (research, teaching or both)?
4) Are there differences in the proportion of non-UK nationals at different career stages?

The data on research postgraduates was used to address the following questions:

1) What is the composition of research postgraduates with respect to key demographic characteristics (gender, disability, ethnicity, age, nationality)?
2) Are there gender (or other) disparities in:
   a. mode of study (full-time/part-time/writing up/sabbatical)
   b. source of tuition fees?

² Although EPSRC’s ICT research theme encompasses those in disciplines beyond computer science, it was not possible to distinguish those outside of computer science carrying out relevant research from the information kept by HESA; the analysis should therefore be considered broadly representative but not exhaustive.
Data kept by HESA on the numbers and characteristics of staff and students is subject to accurate reporting of this information by institutions. Some variables are also self-reported and/or voluntary (e.g. ethnicity and disability), and are therefore subject to differences of interpretation or missing data. However, the HESA data is the best available source of information for exploring the characteristics of this population, as the figures cover the entire population of staff and students, as opposed to information collected from a self-selected sample such as an online survey.

3.2. Online survey

In order to explore the views and experiences of postgraduates and staff working in academic ICT research, an online survey was conducted.

Survey content and dissemination

The survey aimed to establish whether systematic gender (and other) differences exist along the following dimensions, as this may help to explain why women (or other groups) are less likely to pursue academic careers in ICT research:

1) Motivation for pursuing an academic career
2) Attitude towards working conditions in academia, in particular:
   a. attitudes towards hours worked
   b. job satisfaction
   c. levels of stress
   d. the nature of perceived challenges
3) Level of confidence in own abilities as an academic
4) Support received from colleagues and at the institutional level, and the quality of working relationships
5) Caring responsibilities and the impact these have
6) Experiences of discrimination, harassment and bullying
7) Likelihood of leaving academia and the relative attractions of other opportunities

The survey was open to all those whose research fell under EPSRC’s ICT theme, which was described to potential participants as follows:

“This encompasses all those in Computer Science or Electronic Engineering, but also includes anyone conducting research which proposes new ways to transmit, present, manage, analyse, process, generate or understand information”

Data was collected through the SurveyMonkey online survey tool. A link to the survey was sent by EPSRC to relevant heads of department in universities for dissemination to staff and students, and the survey was publicised on social media.
Survey responses were anonymous, with no information about the user collected by the software. However, respondents who wished to participate in follow-up interviews (see Section 3.3 below) were invited to leave their email address so that the research team could contact them. The results were reported in a way that would not identify any individual.

**Survey analysis**

866 people responded to the online survey; 520 current staff members, 300 current postgraduates, 17 former staff and 29 former postgraduates. The level of response from current staff and students meant that sub-group analysis (e.g. differences by gender) could be carried out, but the relatively small number of former staff and student respondents meant that the data from these groups had to be presented in a more aggregated way, with considerable caveats about its wider generalisability to these groups.

Where sub-group analysis was carried out, statistical tests were used to establish the significance of the observed relationships; t-tests or analysis of variance (ANOVA) were used for continuous dependent variables, and chi-square tests for categorical variables. Findings were reported as ‘significant’ when statistical tests indicated significance at the 5% level. The p-values obtained are presented in Appendix 2. In order to establish the effect size, Cohen’s d was calculated for comparisons between two groups (e.g. men and women), and Eta-squared for comparisons across multiple groups (e.g. age categories). Effect sizes (where results were found to be significant) are also presented in Appendix 2. The substantive interpretation of the effect sizes was according to the following rules of thumb: for Cohen’s d, 0.2 was considered a small effect, 0.5 a medium effect and 0.8 a large effect; while for Eta-squared, 0.01 was considered a small effect, 0.06 a medium effect, and 0.14 a large effect.

**3.3. Interviews**

To explore the themes of the online survey in greater depth, qualitative follow-up work was carried out. Interviews were conducted by Skype or telephone with 46 participants, all of whom had volunteered to participate by leaving their details at the end of the online survey. The characteristics of the participants are shown in Table 3.1. Participants were drawn from across the career stages. Most were female, although men were consulted where this was expected to yield information about other relevant characteristics.

Participants were informed in advance of the interview that their responses would be confidential, and reported in a way that did not identify any individual. Interviews were recorded with participants’ permission.

Semi-structured interviews were carried out, based around the seven themes explored in the online survey questionnaire, but also leaving room for participants to raise issues beyond those already covered in the survey. Interview content was tailored to the participant according to relevance and salience. Most interviews lasted between 20 minutes and 1 hour, with an average duration of 35 minutes.
Interviews were transcribed in full, in ‘clean verbatim’ format\(^3\), and the transcripts were coded according to the themes of the research. The analysis is presented here alongside the findings from the online survey, in order to elaborate and contextualise the quantitative findings.

**Table 3.1: Characteristics of interview participants**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
</tr>
<tr>
<td>Limiting disability/health condition</td>
<td>9</td>
</tr>
<tr>
<td>No limiting disability/health condition</td>
<td>37</td>
</tr>
<tr>
<td>Under 35</td>
<td>18</td>
</tr>
<tr>
<td>35-44</td>
<td>12</td>
</tr>
<tr>
<td>45-54</td>
<td>9</td>
</tr>
<tr>
<td>55+</td>
<td>6</td>
</tr>
<tr>
<td>White</td>
<td>41</td>
</tr>
<tr>
<td>Non-white</td>
<td>5</td>
</tr>
<tr>
<td>UK national</td>
<td>31</td>
</tr>
<tr>
<td>Other EU national</td>
<td>6</td>
</tr>
<tr>
<td>Non-EU national</td>
<td>9</td>
</tr>
<tr>
<td>Professor (incl. emeritus)</td>
<td>1</td>
</tr>
<tr>
<td>Senior lecturer/Reader/Associate professor</td>
<td>6</td>
</tr>
<tr>
<td>Lecturer</td>
<td>8</td>
</tr>
<tr>
<td>Research fellow/assistant or postdoc</td>
<td>11</td>
</tr>
<tr>
<td>Current research postgraduate student</td>
<td>18</td>
</tr>
<tr>
<td>Former staff</td>
<td>2</td>
</tr>
</tbody>
</table>

\(^3\) This is where speech is transcribed verbatim but without pauses or non-verbal utterances.
4. The composition of staff and research postgraduates

This chapter summarises the key findings of an analysis of the characteristics of academic staff and research postgraduates in computer science (which is presented in full in Appendix 1). The analysis was conducted on a bespoke dataset obtained from HESA on academic staff and research postgraduates, as outlined in Section 3.1. All data pertains to the academic year 2015/16.

4.1. Staff

Key findings:

- Representations of women was 22.7% - much lower than in the wider academic (45.3%) and general (46%) labour markets.
- Those with a disability was 4.3% - comparable with the rest of academia (4.0%) but lower than the labour force as a whole (10%).
- Ethnic minorities was 22.3% - higher than the academic (14.5%) and general (11%) labour market averages.
- Female representation among doctorate holders fell after age 30.
- Men were twice as likely to be Professors.
- Women were slightly less likely to be non-UK nationals. This was driven mainly by differences at the Research Assistant level; non-UK nationals of both sexes became more scarce at higher occupational levels.
- Women were more likely to work part-time, particularly at the Lecturer and Senior lecturer level.
- Part-time working was most common among those aged over 55, but the largest gender gap was among women in their 40s.
- Women were more likely to be on a fixed-term contract, but the gap was small (less than 2 percentage points), and there was no gender difference in length of tenure.
- Women were more likely to be employed on a teaching-only contract, although the gap was quite small (around 3 percentage points).

4.2. Students

Key findings:

- The representation of women (26.1%) and disabled (6.7%) students was higher than among staff, suggesting a disproportionate drop out of women and disabled students in the transition from postgraduate to academia.
- The research student body was considerably more diverse than staff with respect to nationality; a minority of men were UK citizens (44.9%) and only a slim majority of women (57.2%).
Among UK nationals...
- men were less likely than women to have tuition fee assistance. The proportion of men and women with research council grants was about the same.
- those with a disability were more likely to have assistance with their tuition fees, and to have research council funding.
- there were notable ethnic disparities. White students were considerably more likely to have tuition fee assistance, and more likely to have research council grants, while two thirds of black students and half of Asian students had no tuition fee assistance.
5. Findings from the online survey and interviews

This chapter presents the key findings from the online survey and interviews. Seven themes were identified for the purposes of data collection (see Section 3.2), and findings were analysed and presented under these headings, with a final section noting respondents’ thoughts on the issue of diversity in academic ICT research. A more comprehensive analysis of the survey and interview data can be found in Appendices 2 and 3 respectively.

5.1. Motivation for pursuing an academic career

Survey respondents were presented with a variety of motivations for pursuing an academic career, of which an interest in research was found to be the strongest motivator, selected by 81% of staff. There were two statistically significant differences between men and women; men were significantly more likely to say they had pursued this career because they had always been interested in technology (65%, compared with 51% of women), but women were more likely to say it was because they wanted a challenging career (54%, compared with 41% of men).

The overall ranking of motivations among students was similar to that found among staff, with enjoyment of research a key factor. For students, the only significant gender difference was that men were more likely to say it was because they had always been interested in technology (74%, compared with 54% of women). These findings are consistent with what previous literature has suggested – that men are more likely to have intrinsic motivations for entering this career, while women are more attracted by the opportunities it offers for intellectual challenge.

Among the former staff and postgraduates who responded to the online survey, only half said they had initially pursued an academic career or postgraduate qualification in ICT research because they had always been interested in technology, suggesting that lower intrinsic attachment to technology may be a factor in dropping out. However, the proportion who said they chose this path because they enjoyed research was also lower, at around 60%, suggesting that this group may have been on average less interested in pursuing a research career before they began. The link between people’s reasons for pursuing and leaving an academic research career are arguably complex, and the data available here cannot draw many firm conclusions in this respect.

In the qualitative sample, although some participants had come to the profession from a longstanding interest in technology – often inspired by a parent or teacher – others had moved from industry, or from other academic disciplines such as physics, maths or linguistics. Some felt they had arrived almost ‘by accident’ in their academic careers – they had started on this path and continued because they enjoyed it – while others had felt a strong calling towards the intellectual or teaching aspects of the profession.
The survey data indicated that around two thirds of women had pursued a career in academia because they wanted a challenging career, and this quote from an interview respondent elaborates on this:

“I suppose it remains the closest you can get in the modern age to being a pioneer. They’ve explored most of the earth already, and interspace travel just doesn’t seem to be on the cards anytime soon, so the only place you can break new ground is in research and academia. And the speed with which we are moving forward, especially in information technology, is exciting and I guess I want to contribute my small bit to whatever comes next.” (Interview respondent, female)

The implication of pursuing an academic career for the intellectual challenge is that a person could be equally happy in an equally challenging role outside of academia, and indeed several interview participants said that they would work anywhere that they could find the intellectual challenge they sought. There is therefore a risk that negative aspects of the job could be more likely to discourage those without a specific commitment to technology or academia from pursuing or continuing their career.

“[Academia is] not necessarily the field that I want to stay in, because of the publication pressure put on us, and focus on things that I don’t believe are worth focusing on.” (Interview respondent, female)

The literature has suggested that women are more likely to drop out of academia if it is incompatible with their goals and values, and there was evidence of this from the qualitative data. Women may feel unhappy in an environment where they are expected to display ‘masculine’ characteristics (e.g. being driven and competitive).

“Female members of staff, they expect us to act in a way that a male would, so very egotistically and very driven, very competitive, you know, all the sort of male characteristics, and I think they find it puzzling that women have a different way of approaching some things, and that doesn’t then play into what they see as a high-flying researcher.” (Interview respondent, female)

5.2. Working conditions and expectations

Academic staff responding to the online survey were asked a number of questions about their working conditions; the hours they worked, the expectations upon them, and how they felt about this.

Staff were asked what hours they were contracted to work, and whether this was their preferred arrangement. Part-time working was significantly more common among women (18%) than men (8%). Working part-time was less likely to be a preferred option; 93% of those who work full-time said this was their preferred arrangement, compared with 71% of those who work part-time.
Respondents were also asked how many hours they worked in practice. There was no significant difference between men and women in mean hours worked, once the differences between full-time and part-time workers were accounted for, but among those contracted to work full-time, men were more likely than women to work at least 50 hours a week (53%, compared to 42% of women). There was no significant gender difference in the (minority) proportion who reported ‘extreme’ working hours of 60 or more per week.

A feeling of working too many hours was found to be common but not universal; 57% of full-time workers felt that they work too many hours, and there was no significant gender difference in this respect. In the qualitative data, many respondents reported feeling that the requirements upon them necessitated unreasonably long hours, due to competing teaching, research and administrative pressures:

“I have way too much work to do within a reasonable amount of time, and I think there’s a lot of pressure... I feel very squeezed in the number of hours that I have to do, and the things that I’m required to do... And so I, you know, in practice I end up working closer to 60 hours a week on a good week, and more than that when there’s a deadline.” (Interview respondent, female)

Some interview respondents felt this problem was exacerbated for women, because they took on a disproportionate burden of ‘good citizen’ activities, such as outreach work. The survey data suggested that women do not routinely work longer hours than men, therefore if they are taking on these additional tasks, it may be at the expense of other activities that are more important for career progression. These reports are consistent with the argument made by Grove (2016) in the Times Higher Education that female professors pay a disproportionate price to males by engaging more in “academic citizenship”.

“We are told that unless we do what we would call ‘citizenship duties’, that it will affect promotion, however I know of several colleagues who [don’t do this] and still seem to be promoted, and I would say are promoted over people who actually are good citizens within their workplace... And it seems to be the female members of staff that are the ones that take on a lot more of these good citizenship roles generally, probably at the expense of their own research outputs and probably at the expense of their own health, but they seem to have less of a capacity to say no to people, and so if we look at...most of the outreach things that are done in this department are done by me and one or two other female colleagues, whereas the guys just go ‘sorry I haven’t got time’, well we don’t actually either but somebody’s got to do it.” (Interview participant, female)

Another interview respondent pointed out that it was a problem not having set hours:

“The problem I think with our job is that there is no clearly defined set of tasks you have to do, especially when you do research... It’s open-ended, you can always do more and you have to do more to stay at the forefront of research.” (Interview respondent, female)
Workload was an aspect of the job that a majority of online survey respondents reported as a source of stress – 65% did so (i.e. rated this aspect at least 4 out of 5, where 5 was the most stressful) – but there was no significant gender difference in this. Indeed, no gender differences emerged at all with respect to the sources of stress presented to respondents. Most stressful was felt to be the pressure to acquire funding (69%), while respondents were least stressed about job security (37%). There were however, some other group differences in sources of stress reported. Men with a limiting health condition or disability were significantly more stressed about job security than men without, while women with a limiting health condition or disability were more stressed about their workload than women without. Ethnic minority men also reported higher levels of stress than white men with respect to applying for funding, and the highest levels of reported stress were found among the 35-44 age group.

Staff online survey respondents were asked how satisfied they were with their job as a whole, as well as specific aspects of it. High levels of satisfaction were reported with flexibility and holiday entitlement (80% in both cases rated this at least 4 out of 5, where 5 represents the most satisfied), less so with pay (45%), job security (56%) and career progression (41%). The only statistically significant difference between men and women was satisfaction regarding pay, with men less satisfied (41%, compared with 51% of women). In terms of other group differences, men with a limiting health condition were less satisfied with their career progression than men without, while older age groups were more satisfied with their job security.

In order to explore the factors that might cause someone to leave an academic research career, staff were asked about the extent to which different issues represented a challenge to sustaining their academic career. There were a number of significant gender differences in this respect. Women perceived job security, the travel expected and demands from students as more challenging, while insufficient pay was more challenging for men. Figure 5.1 shows the gender differences in the extent to which these aspects were rated as challenging (at least 4 out of 5, where 5 represents a huge challenge).
A number of other significant group differences emerged with respect to challenging aspects of the job. Men with a limiting health condition or disability, compared to men without, perceived greater challenges from losing interest, the expectation to network, demands from colleagues and the pressure to publish (Figure 5.2). Women with a health condition or disability also perceived demands from colleagues as a greater challenge; 58% rated this at least 4 out of 5, compared to 24% of women without a health condition.
Figure 5.2: Challenges to sustaining an academic career, by disability status – men

Source: Online survey. Current staff, men only. N=242. Percentage refers to those rating the challenge of this aspect at least 4 out of 5.

Ethnic minority men perceived a number of factors to be more challenging than white men did (Figure 5.3); travel, the expectation to network, the lack of job security, insufficient pay, the hours expected, and the pressure to acquire funding. Ethnic minority women also perceived pay (47%) to be a greater challenge than white women did (18%).
Former staff were also asked to rate the extent to which the same aspects had presented challenges to sustaining their academic career. The mean rankings were very similar to those given by current staff. The pressure to acquire funding was the biggest challenge for current and former staff, with a lack of pay and job security on average perceived as more of a challenge than the specific demands of the job itself (e.g. hours or travel requirements).

5.3. Confidence

Staff were asked to rate the extent to which they felt confident about different aspects of their job on a 5-point scale, where 5 represents the most confident. A number of significant gender differences emerged; women reported significantly less confidence than men in applying for promotion, in their abilities as an academic, and in being published. Figure 5.4 shows the gender differences in the extent to which respondents said they felt confident about these.
Confidence was also an issue for men with a limiting health condition or disability, who expressed lower confidence across all aspects apart from their teaching abilities, compared to men without a health condition. Ethnic minority women were found to be less confident about applying for grants; just 23% said they felt confident about this, compared with 46% of white women.

Students were also asked to rate the extent to which they felt confident about different aspects of being a research postgraduate. Women reported feeling less confident about finding a job after completing their studies, their abilities as an academic and being published. No gender difference was found with respect to confidence in teaching abilities. Figure 5.5 shows the gender differences in the extent to which respondents said they felt confident about different aspects.
Confidence also emerged as a key theme for both staff and students in the qualitative data. Academic careers require a range of competencies, and many respondents found this daunting, particularly with respect to skills learned largely ‘on the job’, such as lecturing for staff, or time management for postgraduates.

Some respondents noted feelings of ‘impostor syndrome’ in their academic career, and the feeling that they are a ‘fraud’, and not truly capable of what is expected of them. The feelings of inadequacy were more strongly felt by those who had come to computing from a different discipline.

“We seem to suffer a lot more with feeling, like, we don’t fit and that we just don’t seem to be as confident in our innate ability to complete a PhD, whereas the males... just don’t seem to have that mental block of, ‘Oh, I can’t do this, and I’m not good enough to do this’.” (Interview respondent, female)

5.4. Support and working relationships

Staff responding to the online survey were asked about the extent to which they felt supported by their institution, by managers and senior staff, by their academic peers, and by junior colleagues and students. Similarly, postgraduates were asked about the support they receive from their supervisor, staff in their department, and other postgraduates. No significant gender differences were found in any of these. Among staff, men with a limiting health condition or disability reported lower levels of support from their peers and junior colleagues than men without, and women with a health condition reported lower support
from their junior colleagues than women without. Ethnic minority students felt less supported by their postgraduate colleagues than white students did.

Respondents were also asked about the quality of their working relationships. For staff, no significant gender differences were found, and in general relationships were reported to be fairly good, with 70% agreeing that they had good working relationships with managers and peers, and 81% that they had good working relationships with junior colleagues. The only significant group difference found was that men with a limiting health condition or disability were less likely to agree that they had a good working relationship with their peers than men without.

Among students, men were more likely to agree that they had a good relationship with their supervisor (90% agreed, compared with 82% of women), but there were no gender differences with respect to working relationships with the academic staff in their department, or with other postgraduates. Postgraduates aged 35 and over were less likely to say they had a good working relationship with other postgraduates, but no differences were found with respect to disability or ethnicity.

Survey respondents were asked about the extent to which they felt isolated in their department, and if they felt or looked different from their colleagues. A substantial minority reported feeling isolated (25% of staff and 23% of students), but there were no significant gender differences in this. Among staff, women were more likely to report that they looked different from the others in their department (40% agreed, compared with 21% of men). Men with a health condition or disability were more likely to say they felt isolated (42%) than men without (21%), and to say that they looked and felt different. Ethnic minority men were also more likely to say that they looked different.

An interview response gives further insight into these feelings of isolation and difference:

“The group that I work with at [University], I work with two people very closely and it’s not a clash, it’s just that they are a lot more similar and I’m very different to both of them and I get left out, pushed aside. I’ve had my ideas stolen. I’ve not been given opportunities that other people are given. I bring up things and they get ignored. I get talked over. It’s not a clash, we can get along fine. We can all go to the pub together and socialise but, again, it’s just not the environment that’s good for me to move up in. I’ll never move up in this situation and I’m not happy. I’m not fine with that.” (Interview respondent, female)

Among students, women were more likely to agree that they felt different to others in their department (46% agreed, compared with 29% of men), and to say that they looked different (30% agreed, compared with 10% of men). Those aged 35 and over were more likely to say that they felt different.

These findings suggest that on the whole, female staff and students integrate well into their departments and get on with colleagues at different levels, but that they do perceive subtle
differences between themselves and the men in their department. This was also found in the qualitative data, with participants largely feeling well integrated, but noting the impact of more intangible feelings of difference.

“People are generally, you know, really friendly towards me but I still, although I’m included, I do get treated a bit differently. Maybe, like, the attitudes towards me are a little bit different than to everyone else… Maybe it’s just me being paranoid, but I just feel like I stand out a little bit.” (Interview respondent, female)

High quality personal connections may be important for career progression, but some interview participants expressed concern that they were unable to fully participate in networking due to their background. One respondent felt excluded by the men in her discipline, while another noted the impact of his autism on being able to participate in this type of activity. Another issue raised, both in the interviews and via open responses to the online survey, was the issue of ‘pub culture’, which could be inaccessible for those who did not feel comfortable in this environment (e.g. due to religious beliefs), or to those with caring responsibilities.

“There is a disturbing drink culture that includes post-meeting/lecture "networking" drinks and post-work visits to the pub.” (Online survey respondent, female)

“People always select evening- pub events to socialize. I have to pick children from childminder and I do not consume alcohol nor enjoy being in that setting. So I did feel excluded.” (Online survey respondent, female)

An issue that has arisen in the literature is that women in STEM may find it harder than men to be perceived as competent and likeable by colleagues. In fact, staff responding to the online survey were asked about the extent to which they believed their peers and senior staff perceived them as such, and no gender differences were found with respect to this. However, some interview participants, as well as those leaving responses to the open questions in the online survey, noted examples in which their competence was not questioned directly, but colleagues behaved in a way that suggested they perceived them as less competent. Common experiences included being interrupted more frequently by male colleagues, having their answers double-checked when provided to ensure they were accurate, or having basic things explained unnecessarily to them.

“Yes on numerous occasions, definitely, always challenged, always questioned by men, and one of the things that really used to annoy me is that when they would ask you a question and you would give them the answer, and then they would go and check up with somebody else to see whether your answer matched their answer, and quite often they’d do it in front of you.” (Interview respondent, female)

There were however, some significant gender differences in how respondents felt they were perceived. Women were significantly less likely to feel they are perceived as brilliant, which is
consistent with the issues raised here with respect to confidence. They were also more likely to feel they are perceived as reliable, which perhaps relates to the suggestion above that they are more likely to take on ‘good citizen’ roles. Figure 5.6 shows the gender differences in the extent to which respondents agreed they were perceived to have these characteristics (i.e. rated them at least 4 out of 5, where 5 implies that they definitely are perceived in this way).

**Figure 5.6: Those who feel they are perceived as brilliant, and reliable, by gender**

![Chart showing gender differences in perceptions of brilliant and reliable]

Source: Online survey. All current staff. N=406. Percentage refers to those rating their agreement at least 4 out of 5.

### 5.5. Caring responsibilities and flexible working

34% of staff responding to the online survey reported having caring responsibilities for a child or elderly or disabled adult; 41% of women and 28% of men. Respondents with caring responsibilities were asked to rate on a five-point scale the extent to which they felt that their academic work interfered with their caring responsibilities; just over half rated this at least 4 out of 5 (where 5 represents a great deal of interference), with only 6% saying it did not interfere at all. There was no statistically significant gender difference in this respect.

Among students responding to the online survey, 15% had caring responsibilities; 20% of women and 11% of men. As with staff, just over half of those with caring responsibilities rated the extent to which their academic work interfered with these at least 4 out of 5, with no significant gender difference.

Staff were also asked whether they had made use of flexible working provisions (beyond the flexibility generally accessible to staff), or had taken a career break (including time off to care for dependents). Women were more likely to have made use of flexible working; 35% had
done so, compared with 21% of men. Women were also more likely to have taken a career break; only 8% of men had done so, and two fifths would rule it out altogether, compared 36% of women who had taken a career break and only a quarter said they would not do so.

Among those who had made use of flexible working, it was found that women were more likely to feel that it had a negative impact on their promotion prospects and their productivity as a researcher, and the same was the case for those who had taken a career break. Figure 5.7 shows the gender differences in perceptions of impact (i.e. those who rated this at least 4 out of 5, where 5 represents a huge impact), among those who had taken flexible working or a career break.

**Figure 5.7: Perceived impact of making use of flexible working provisions, and taking a career break, by gender**

![Graph showing gender differences in perceived impact of flexible working and career breaks.]

Source: Online survey. All current staff who have taken up flexible working provisions or taken a career break. N=118. Percentage refers to those rating the impact at least 4 out of 5.

Among those who had not made use of flexible working but said they might in future, women were more likely to be concerned at the impact on how others at work perceive their competence, but not on their own performance. Of those who had not taken a career break but might do so in future, women were more concerned than men about the impact this would have on their promotion prospects and productivity, but not on how others would perceive them.

The tension between academic and caring responsibilities was a key theme in the qualitative data, and there was a strong perception among interview participants that those with caring responsibilities are disadvantaged in the long-hours culture of academia. Indeed, many saw this as the key, or in some cases only, difference in their experience as a female academic.
relative to their male counterparts, and most struggled to think of fathers in their department who had experienced these issues to the same degree.

In addition to being unable to put in the excessive hours required, caring responsibilities were an issue for participants in being able to attend seminars or social events if these were scheduled after school pick-up times. Many felt they were missing out on academic and social opportunities for this reason. Postgraduate student respondents also cited the difficulties in attending intensive and/or residential courses when they had caring responsibilities.

“Events often happen in the later afternoon and early evening which are the times that are difficult for me to do. I don’t think people are intentionally excluding, but it is a common problem that if you’ve got to get back for children you can’t do those events... The way that I’ve felt not included in the department is because of me not being able to be at group events, whether they are academic or social. A classic example is that there will be a late afternoon seminar...and people say we’ll go to the pub afterwards, and even if I can come to the seminar, I can’t come to the pub afterwards and that’s where the soft networking stuff goes on and it’s frustrating.” (Interview respondent, female)

On the other hand, interview participants also noted that their job, or being a postgraduate student, provided them with a valued source of flexibility in their family lives. However, the disadvantage of this was the difficulty in drawing boundaries between work and home, and often working late into the evening. Some interview participants had managed to negotiate alternative working arrangements that suited them (e.g. part-time or remote working), but all felt they had paid a price for this; for example having to accept a job at a lower level, or being looked upon unfavourably around promotion time.

“I think you can’t have it all, unfortunately, and I think I have suffered because I took that decision and I have had to say no to things... I think it’s a gradual erosion process and you don’t really notice it’s happening for quite a long time, and then you look at colleagues who are working full-time and you think, actually, they’ve been able to say yes to everything.” (Interview respondent, female)

Finally, it is worth noting the issues that some participants experienced around taking, and returning from, maternity leave. For those with research grants and students, it was difficult to step away from these, both practically and in terms of feeling guilty about abandoning them and leaving their equally busy colleagues to take them on. It can also be difficult to re-establish research on returning to a full teaching load.

5.6. Discrimination, harassment and aggression

Around 30% of staff felt they had experienced discrimination during a recruitment process. There was no statistically significant gender difference in this respect. However, female staff were more likely to say they had experienced harassment or bullying (49%, compared to 34%
of male staff), and that they had experienced ‘micro-aggression’—i.e. felt excluded or inferior due to remarks made by their colleagues (67% of women, compared to 42% of men). Thus, although bullying and micro-aggression were revealed to be widespread phenomena, they were experienced disproportionately by women.

Those with a limiting health condition were more likely than those without to say they had experienced all three of these, and ethnic minority staff were more likely to feel they had been discriminated against in a recruitment process. Apart from this there were no significant differences that would suggest greater experiences of discrimination, bullying or micro-aggression among ethnic minorities, those of different religions or ages, or those who are not heterosexual.

Only around 13% of postgraduate students felt they had been discriminated against in a recruitment process for postgraduate study, with a slightly higher but still fairly low proportion reporting that they had been bullied or harassed (16%). There were no significant gender differences with respect to either of these. However, female postgraduates were more likely to say that they had felt excluded or inferior due to remarks made by their colleagues (54%, compared with 20% of male postgraduates).

The qualitative responses to the online survey presented numerous examples of the discrimination experienced by women in their academic careers. Particularly notable were examples of discrimination based on maternity leave— or potential maternity leave.

“Expressions of interest were requested for an internal role. I was the only one who responded. Was told that someone else was invited to job share it with me in case I ‘became pregnant again’.” (Online survey respondent, female).

Female survey respondents also reported instances of sexual harassment, as well as direct and indirect sexism. Examples from the online survey included:

“When I started my PhD, in my office of nine men, most of them had page 3 girls as screen savers, and they would make sexual comments about pretty much every female PhD student in the dept. I was also propositioned quite a lot.” (Online survey respondent, female)

“Sexual harassment online from other students who are part of the same doctoral training centre... Being threatened and called a snitch when complaints have been made of sexual harassment (although the complaints were not from me).” (Online survey respondent, female)

“A colleague telling me that women only get appointed to jobs because of reverse discrimination.” (Online survey respondent, female)

---

4 This term was not used in the survey question presented to respondents, but is used here in the reporting of the results.
More prevalent within the qualitative data were experiences of sexism that many of the participants felt were not at the level of harassment or discrimination. There was a reluctance to identify these incidents as sexism. Many of the respondents might recount an incident, but would either preface this by saying their experiences were “nothing direct” or “quantifiable”, or qualify their statement by saying that they could not be sure it was due to sexism.

Participants also noted a divide between the ‘softer’ sub-disciplines, such as Human Computer Interaction and Information Science, which tend to have more female staff, and those in the more male-dominated ‘harder’ computer science disciplines, and some negativity from men in the latter:

“[With my sub-discipline] there’s always an element of ‘it’s not the technical side of computer science therefore she’s a second class citizen’, there’s still some dinosaurs that have that attitude, and therefore you’re maybe not seen as being technical by some people and therefore they look down on some of the work you do.” (Interview respondent, female)

“I used to joke, in a sort of half-hearted way, that every time I stood up in a department seminar and gave the topic of what I was working on, a lot of men would stand up and tell me that my problem didn’t exist or that they’d already solved it” (Interview respondent, female)

A small number of participants engaged in teaching cited their experiences with undergraduate students as a source of problems. Within these discussions, participants would highlight that these classes are themselves male-dominated environments and would sometimes lead to experiences of sexism or having their competence questioned.

5.7. Future career

Staff

There was no significant difference between men and women with respect to how far they would be willing to move if the opportunity arose to progress in their career. Most would be willing to move institution, just over half said they would be willing to move to a different city, and around two fifths said they would be willing to move to a different country.

Respondents were asked how likely they were to consider leaving their academic research career for other types of job, but this was largely considered unlikely, and there were no significant gender differences in these attitudes. The most popular option was a research career in another sector, with 30% of respondents indicating that it was likely they would leave academia for this kind of job (i.e. rated this likelihood at least 4 out of 5, where 5 was the most likely). Only 12% thought it was likely they would leave for a job within higher education but not research, and 19% for a job not in higher education or research. Men with
A limiting health condition reported a higher likelihood that they would seek another job in higher education, or outside of research or higher education altogether, compared to men without a health condition. Seeking a research job in a different sector or outside of research or higher education altogether were also cited as more likely by younger staff. In the interviews, early career staff (e.g. those at the postdoctoral level) noted the difficulty of moving from short-term research positions and permanent lecturing posts, with many arguing that it is difficult to meet the requirements for permanent posts while in fixed-term low level research posts.

Academia was considered to offer a number of advantages over other types of job; a majority of respondents to the online survey felt that academia offered the most to them in terms of personal interest, depth, autonomy, range of tasks, innovation and job security. A research career outside of academia was thought to offer a better salary and work-life balance. This was true for both men and women, with no significant gender differences.

These findings suggest that any frustration expressed by academics with respect to their jobs should be taken in the context of a generally low desire to leave, and highlight the tension between the pecuniary and non-pecuniary aspects of the job. Many interview participants noted that the choice of an academic career amounted to a trade-off, between autonomy and money, and choosing the academic career was a choice to allow themselves more freedom or flexibility despite the lower pay compared to industry.

“Well, I think you basically sacrifice pay for freedom of being able to study things that are interesting to you, and that certainly was why at the moment.” (Interview respondent, female)

Salary was an issue that arose frequently in interviews when discussing the relative attractions of academia compared to industry. Although most survey respondents believed that industry offered better work-life balance, some interview participants noted that this was dependent on which company you worked for. Start-ups, or large American tech firms, were not necessarily considered better places to work, due to the dedication and working hours typically expected in such companies.

Although most online survey respondents felt that academia had the most to offer them in terms of personal interest, a minority of participants wondered if they might have more opportunity in industry to pursue the ‘real life’ application of their research that they wanted. This especially applies to women who were seeking to make their research more impactful and applicable.

Former staff responding to the online survey were offered an open response to state the main reason they left academia. Of the 14 responses to this question: four pertained to stress or overwork; three to the actions of management or senior staff; three to job security or lack of funding; three to a lack of opportunities where they were or more interesting opportunities elsewhere; and one to the incompatibility of academia with having children.
Thus, even from this small sample of responses, it is clear that there is a range of reasons why someone might leave an academic career, which will vary according to individual circumstances and preferences.

**Students**

There was no significant gender difference with respect to how likely postgraduates felt they were to seek an academic job after they completed their studies. The response to this question is shown in Figure 5.8. Around half said this was likely, with only 9% stating they definitely would not, and the remainder more ambivalent. There were no significant differences with respect to ethnicity or health condition or disability, but postgraduates aged 35 and over were more likely to seek an academic career than those under 35.

**Figure 5.8: Likelihood of postgraduate students seeking an academic job after completing their studies**

![Chart showing likelihood of postgraduate students seeking an academic job after completing their studies]


Those who had not ruled out an academic position were asked how far they would be willing to move to take one up. Again, there were no significant gender differences in this respect. Around three quarters said they would move to a different city, and three fifths were willing to move to a different country. However, interview participants noted the complication of the ‘two-body’ problem of two professionals – in some cases two academics – seeking jobs in the same location.

All students were asked in the online survey how likely they were to seek different types of job after completing their postgraduate studies, and there were no gender differences with respect to these intentions. As with staff, the most popular option was a research career in another sector, with 52% of students indicating, that it was likely they would seek this kind of job (i.e. rated this likelihood at least 4 out of 5, where 5 was very likely). 18% thought it was
likely they would leave for a job within higher education but not research, and 32% for a job that is not in higher education or research.

Students had slightly different perceptions to staff with respect to which type of job offered them more. Like staff, students felt that academia offered the most in terms of personal interest, depth and autonomy, and research outside of academia offered a better salary and work-life balance. However, unlike staff, students perceived greater opportunities for innovation and range of tasks in research outside of academia, as well as greater job security. There were no statistically significant gender differences in these attitudes.

Students were therefore somewhat less committed to pursuing an academic career or less convinced of its advantages, than staff. Among interview participants, the key disadvantages that affected plans to stay in academia were the lack of a clearly defined career path and the lack of permanent jobs. The early stages of an academic career were perceived as challenging and competitive, and perhaps just too all-consuming, even by those who wanted to stay in academia, and this was something that put people off.

“There is still the attitude that your work is more than a job and it’s your raison d’être and everything else gets pushed to the side lines.” (interview participant, female)

5.8. Diversity

In the interviews and open survey responses, respondents raised a number of issues pertinent to the research theme of increasing diversity in academic computer science, and it is worth presenting some of these with respect to their perceived barriers to diversity, and attitudes towards diversity endeavours to date.

Existing attempts to address diversity in academic STEM subjects were the subject of some backlash. Some female respondents noted being on the receiving end of this, with experiences of being told by male staff that they only got a job or promotion because of reverse discrimination. Perhaps internalising this discourse, some expressed discomfort with particular initiatives aimed at women on the grounds of wanting to compete on an equal playing field rather than attract attention as a ‘special case’. A handful of male respondents said that they saw diversity initiatives as ‘special treatment’ that was in fact discriminating against them. These respondents also tended to dismiss or trivialise the idea of discrimination or micro-aggression; that it existed, or that it had an impact on other people’s experiences, or that it was a legitimate target for intervention rather than ‘just life’. 
The general feeling among most female respondents was that their male colleagues were broadly supportive of attempts to improve diversity, but although they did not actively resist it, they did not necessarily appreciate the need to address it directly:

“But the male staff are all saying, “Oh, yes, yes, you know, we’re very equitable minded,” and all the rest of it, but I don’t think they understand the difference between personally kind of advocating that this should be done and the changes which have to be made.” (Interview respondent, female)

The onus on addressing diversity tended to fall upon women, taking further time out of their teaching and research time for this specific kind of academic citizenship activity:

“But because I am a female in STEM I am expected to spend some part of my time working on the women in STEM issue. The expectation is quite explicit to the point where people will not accept ‘no’ as an answer, but my male colleagues are never even asked. Through my whole career I have spent countless hours on the topic at the expense of personal research and growth goals. As I write this I am in the middle of sorting out a cake for an Athena SWAN event while the guy in the next office is writing a grant ... And yes it is 10pm.” (Online survey respondent, female)

Furthermore, not everyone felt that initiatives such as Athena SWAN really captured their experience as a woman in STEM. As one respondent put it:

“I feel like I fill out these surveys, I give my input and I know other people are having the same experiences and I share my opinion honestly, but I feel like we’re winning all these awards for being very open and I’m wondering how. Most of the women I’ve known in academia within the department, they’ve had issues with very similar things to me so I’m wondering how we can say we’re very cultured and cutting edge in terms of equality and at the same time everyone’s experience is the same.” (Interview respondent, female)

Finally, some respondents suggested that diversity is hindered by a prevailing ‘this is how we do things here’ attitude, which is hostile to those who do not fit the existing mould:

“They don’t quite see... that there is a different way of doing things and that women do things differently, and you can achieve the same end through different ways.” (Interview respondent, female)

“You have to constantly fight to have your voice heard and that’s exhausting. Especially when you feel like you’re constantly pushed back and somebody says that’s not a valid opinion.” (Interview respondent, female)
6. Discussion and conclusion

6.1. Key findings

Motivation for pursuing an academic career
Understanding the motivation to pursue a career in academia can help explain why women drop out. Women’s motivations for entering a career in academic ICT research are more likely than men’s to be instrumental (i.e. as an intellectual opportunity), while men’s are more likely than women’s to be intrinsic (i.e. a longstanding interest in technology). A person with neither an inherent interest in technology nor a particular commitment to academia may be more vulnerable to leaving academic ICT research if their job is causing them stress, or is inconsistent with their goals and values.

Working conditions
Poor working conditions in academia are due to a long-hours culture and many competing responsibilities from different sources. Some of these pressures may represent a greater challenge to women, and to those with a limiting health condition or disability, in continuing with their academic career. Women may also be more likely to take on additional tasks, particularly ‘good citizen’ activities, which can then displace other more prestigious or career enhancing activities.

Confidence
Confidence is a key issue – women exhibit less confidence across a range of tasks, at staff and postgraduate level. This is particularly true for ethnic minority women. Someone already struggling with confidence may be more easily discouraged from continuing in academia.

Support and working relationships
Good working relationships and feeling supported by colleagues are key sources of job satisfaction and could foster retention. However, informal social events outside working hours can present barriers and exclude people from developing work relationships. In particular, ‘pub culture’ is often portrayed as a relaxed way of encouraging sociality, yet the need to fit this around caring responsibilities or the presence of alcohol may obviate participation. Around a quarter of staff and students reported feeling isolated within their department, and women, ethnic minorities, those with a limiting health condition or disability, and older postgraduates were more likely to notice a feeling of ‘difference’ between themselves and others in their department.

Caring responsibilities
Jobs, promotions, and funding are awarded based on the applicant’s accomplishments, but this advantages a certain type of person, who both wants and is able to dedicate excessive time and attention to the job. This is impossible for someone who has caring responsibilities, which impose hard boundaries on the amount of time that can be spent on work. The tension between caring and academic responsibilities was experienced in a similar way among male
and female survey respondents. However, women were more likely to have caring responsibilities, and to have made use of flexible working arrangements, or taken a career break, and a disparity was noted in the qualitative data between female and male experiences of reconciling caring responsibilities with academic jobs. Absence from work due to maternity leave can be difficult to manage for those with research grants or supervisory responsibilities, and on returning to work it can be difficult to re-establish research activity at the same time as resuming a full teaching load.

**Discrimination**
Discrimination and negative attitudes exist and need to be challenged. While discrimination and harassment examples were widely reported in the online survey, interviews placed an emphasis on the ‘indirect’ or ‘unquantifiable’ perceptions of sexism. Women in the research recounted various instances of their competence being questioned in ways their male colleagues do not experience. Universities’ attempts to address diversity issues may not be successful if they cannot challenge these subtle and informal mechanisms of discrimination.

**Future career plans**
Most see many positives about their career, but with some ambivalence about its demands, and an attractive offer from industry could tempt them away – particularly for students and early career researchers. A career in academia is seen as a trade-off, with less pay and security traded for greater autonomy and more interesting work.

Future planning is restricted by caring responsibilities, partners’ jobs and location of family. Short term contracts and the need to be mobile in pursuing postdoctoral opportunities were also found to be restricting future plans.

The younger age groups responding to the survey were particularly sceptical about pursuing an academic career. This will be to some extent a selection effect – it would not be expected that all postgraduates or early career staff would wish to continue in academia in the long term. However, this appeared to be more than simply not wanting an academic career; this group had clear reservations about career progression and working conditions. Bridging the gap between postdoc and lecturer is important; respondents reported a lack of confidence or a lack of sufficient experience to advance. A conflict exists between research and teaching for the early career researcher. A lack of teaching experience for ECRs mean that they may be unable to access permanent positions, while the most accessible role for many are teaching fellowships which can result in a lack of research and result in a ‘dead end’.

**Diversity**
Existing attempts to address the issue of diversity in STEM have attracted some backlash, which was evident in the comments of some male respondents to the online survey. Female respondents reported being on the receiving end of this; for example, being told they had only succeeded due to reverse discrimination. However, the general feeling was that most of their male colleagues accept the need to increase diversity, but are less aware of the need to take positive action to achieve it.
Some respondents felt that existing initiatives such as Athena SWAN were not necessarily picking up on all facets of women’s experiences that make their time in academia more difficult; for example, feelings of isolation or experiences of micro-aggression. There was also a feeling that it is mainly female staff who are shouldering the administrative burden of these initiatives.

Finally, some respondents perceived greater scope for diversity of thought or approaches, and that there is an inflexible mindset in academic computing that is in part responsible for reproducing existing characteristics within the academic computing population.

6.2. Recommendations

It is evident from the findings that there exist measurable differences in the career progress and day to day experience of different groups in academic computer science; these differences are apparent between men and women, those with a health condition and those without, those with caring responsibilities and those without, and those from ethnic minority and non-minority backgrounds. These findings are persistent in research on academia, but the phenomenon is also widely present across the labour market. Career disadvantage is to some extent due to factors such as caring responsibilities, which disproportionately fall to women, or poor physical or mental health, both of which preclude full involvement in the labour market or in study. In academia, additional factors may also be at play; for example, there is evidence that women take on a disproportionate burden of ‘good citizen’ activities and, perhaps ironically, of the work involved in diversity initiatives such as Athena SWAN, which may displace time for writing research papers and funding bids. These factors all have the effect of reducing the hours that a person can commit to accumulating the experience and outputs that are valued by promotion panels and funding bodies as evidence of competency.

It is however difficult to challenge this ‘merit’ based system and level the playing field. It might be possible to adjust funding or promotion criteria in a way that recognises the uneven opportunities that individuals have to accumulate outputs and experience. Another route might be to establish positive discrimination measures, such as targeted funding schemes, or establishing quotas of particular groups in the allocation of funding or promotions. However, this could be controversial, potentially stigmatising those from the disadvantaged groups, and lead to accusations of tokenism.

Expressions of disadvantage are also manifest amongst women and some minority groups for less tangible facets of their academic careers, such as feeling of (dis)satisfaction, confidence, security and isolation, perceptions of inadequacy and feelings of stress. These observations are applicable to postgraduates as well, and continue or even grow as they develop their careers as lecturers or researchers. This is leading to a loss of skills and the agenda being set by the mainstream hegemony, which is not conducive to diversity. Feeling disengaged from, or lacking coherence with, one’s institution is considered to be a promoter of dissatisfaction.
and exclusion (Oshagbemi, 1997a; Kinman, 2008; Bos et al., 2009). These issues are also exacerbated by having a subordinate place in the hierarchy (Oshagbemi, 1997b).

In light of these findings, it could be argued that a systemic approach is needed to address these less tangible aspects. All agents in the system need to develop a recognition of the problem and do something about it. The principal agents in this system are the HEIs themselves. Many HEIs and research institutions have realised that they are high performing workplaces, in which staff are their greatest asset, and they have endeavoured to introduce leadership commensurate with high performing workplaces and to have a more engaged workforce (Manville et al., 2015). Training schemes are promoted, communication between those of different organisational status is encouraged, and interlinked high function teams are advocated and given autonomy. This activity has led to some improvements (Deem, 2003). Perhaps interventions are best made earlier (e.g. during doctoral study) to build confidence as well as skills.

However, HEIs especially remain highly hierarchical in terms of management structure and appear status ridden (Reskin and Roos, 1987). There is little evidence that staff engagement activities have created a culture of cooperation and respect between management and colleagues that would boost and sustain creativity, innovation and excellence. Thus our main recommendation is that those who govern and lead HEIs and research institutes attend to the findings which have emerged from this report and redouble efforts to make HEIs and research institutes more inclusive bodies and become exemplars to the rest of society. This we believe can be achieved through better leadership, and HEIs and research institutes adopting the attributes of high performing workplaces (Boxall and Macky, 2014; Manville et al., 2015). There is also a need for management at all levels in the university to be appreciative of diversity issues and act to ensure inclusion and communicate openly and effectively to staff and research students. This they should not do on their own, but be aided by industry, professional bodies and funding agencies. In some institutions it is possible that senior management need further training and development to effectively tackle the issues that have emerged in this report. The Athena SWAN Charter is a promising approach and offers a framework for minority groups.

All have a role in the provision of training and resources to boost confidence and encourage interaction amongst staff. Industry has a role in giving guidance and advice on to the creation of high performing work cultures, and industry could increase their role in offering placements for staff and post graduate students, to give them experience of working in an enterprise which has strong staff engagement. Professional bodies too have a role in encouraging feelings of value and should be more proactive in their interaction with HEIs and research institutions.

Funders could strengthen their expectations upon HEIs and research institutions. Perhaps metrics of measuring the progress of women and those from minority backgrounds could be used more explicitly by funders in relation to conditions of funding. Those HEIs and research institutions who do not meet expectations could then be called to account or face loss of
funding. An explicit metric on tackling issues inhibiting the advancement of women and minority groups could be introduced to assessments of HEIs and research institutions made through the Research Excellence Framework.

In regard to reports of discrimination, harassment, bullying and micro-aggression, a zero-tolerance approach should be adopted and enforced at an institutional level. A mechanism to facilitate this could be confidential and anonymous reporting via a web portal to funders, unions and professional bodies. These three agents would have responsibility to question the relevant HEI over the reason for these reports.

Specific Recommendations

1) Ensure senior management of HEIs and research institutes are aware of the findings of this report and develop mitigation plans. These plans should be developed in consultation with those in high performance workplaces and professional bodies.

2) Train all managers of research and teaching on combating barriers to the advancement of women and those from minority groups. Develop these managers’ communication skills and how to enable inclusive work teams.

3) Train all research supervisors on how to better inspire and build confidence in those they have responsibility for.

4) Ensure there is access to networking, training and development opportunities for all. This might mean the need to consider access requirements, and when in the year or day these events take place.

5) Funding panels should be cognisant about why some applicants may not have expected levels of accumulated output-based evidence, at least allowing applicants to explain any shortfall.

6) Encourage confidential discussion in performance reviews about barriers to progress individuals have encountered or may perceive, and provide where possible constructive suggestions.

7) Establish a web portal for reporting instances of discrimination, harassment and micro-aggression and develop a culture of zero tolerance in regard to these issues.

8) Generally promote communication, engagement and group working. All staff and students should be encouraged to examine any unconscious biases they may hold against others, especially part-time workers, those who take career breaks, those with a disability or those of a particular nationality or ethnic background, and to
appreciate the impact of their words and actions on the confidence or stress levels of those around them.

9) Departments should monitor who is performing ‘good citizen’ activities such as outreach, or diversity work such as Athena SWAN, and ensure that such activities are allocated and rewarded in a fair and transparent manner.

10) Case studies of good practice in the development of women and minorities in ICT should be established by unions and professional bodies.

11) Realistic expectations of what is required by staff and students should be established, preferably by joint consent, and reviewed regularly, perhaps every quarter and no less than twice a year.

To conclude, in a system where everyone aspires to do better, we recommend that management of HEIs and research institutions recognise that they are the principal agents for their staff and doctoral students, and take the lead on addressing the issues in this report. However, they should be supported by unions, industry and professional bodies, with funding agencies also having a role to provide guidance and develop metrics to allow progress to be managed.
References


Appendix 1: HESA data

This chapter presents the comprehensive analysis that is summarised in Chapter 4. The analysis was conducted on a bespoke dataset obtained from HESA on academic staff and research postgraduates, as outlined in Section 3.1. All data pertains to the academic year 2015/16.

Staff

22.7% of all academic staff were female, and 77.3% were male. The proportion female was considerably lower than academic staff across all disciplines, of whom women comprise 45.3%\(^5\). The proportion of women was also considerably lower than the labour market as a whole, in which they represent 46% of those in employment\(^6\).

4.3% had a known disability (Figure A1.1), which is comparable to the proportion among academic staff across all disciplines (4.0%)\(^7\), although it is somewhat lower than the most comparable figure for the workforce as a whole, which is around 10%\(^8\). More women (5.8%) reported a disability than men (3.9%).

Figure A1.1: Disability status of academic staff, by gender

![Disability status of academic staff, by gender](image)

Source: HESA data. All staff. N=8115.

---

\(^5\) HESA, Staff in Higher Education 2015/16, Table B
\(^6\) Office for National Statistics, Dataset A03 NSA, Release date 15 March 2017
\(^7\) HESA, Staff in Higher Education 2015/16, Table H
\(^8\) Office for National Statistics, Dataset A08, Release date 15 February 2017
For those whose ethnic background was known (over 90% of staff), 22.3% of staff were non-white. This is more than the average for academic staff across all disciplines, which is 14.5%\(^9\), and double than the average for the UK labour market as a whole, in which around 11% of those in employment are of a non-white background\(^10\). Male staff were slightly more likely to be non-white, and men were more likely to be black while women were more likely to be Asian, although all gender differences were small (Figure A1.2).

**Figure A1.2: Ethnicity of academic staff, by gender**

![Bar chart showing ethnicity of academic staff by gender](image)

Source: HESA data. All staff with known ethnicity. N=7478.

There was little gender difference in the overall age profile of male and female staff (Figure A1.3). However, some differences emerged when considering only those with doctorates; this shows some fall after age 30 for women (Figure A1.4).

---

9 HESA, Staff in Higher Education 2015/16, Table F
10 Office for National Statistics, Dataset A09
Male staff were more likely than female staff to hold doctorates (59.2% vs 53.4%), whereas female staff were relatively more likely to hold other postgraduate qualifications (Figure A1.5).
The occupational structure was quite similar for male and female staff (Figure A1.6), but men were around twice as likely to be Professors (10.6% vs 5.6%), while women were more likely to be employed at Lecturer or Research assistant level.
Information on nationality was available for over 99% of the staff, and the proportion of UK, EU and non-EU nationals are shown in Figure A1.7. Around 40% were non-UK nationals, with women slightly less likely than men to be of UK nationality (41.6% were non-UK nationals, compared with 39.3% of men), but among those not of UK nationality, there was no gender difference in the ratio of EU to non-EU nationals. The proportion of non-UK nationals was considerably higher than the labour market as a whole, where it is around 11%\textsuperscript{11}.

\textsuperscript{11} Office for National Statistics, Dataset A01, Table 8(2), Release date 15 March 2017
The main gender disparities in nationality were at Research assistant level, where women are more likely to be non-UK nationals, and Senior Management/Head of School level, where men are more likely to be non-UK nationals (Figure A1.8). These figures also show that non-UK nationals are disproportionately likely to be employed at lower occupational levels, and become more scarce at higher levels.
Female staff were more likely to work part-time (Figure A1.9), but the gender difference in this respect was not large, and over a fifth of male staff did so as well. Men were more likely to work part-time as Professors, and women in other roles, particularly at the Lecturer and Senior Lecturer level. Part-time working was more common among women at all age groups apart from the under-30s, and the gender gap was largest among women in their forties (Figure A1.10).

Source: HESA data. All staff with known nationality. N=8053.
Female staff were more likely to be on a fixed-term contract (Figure A1.11), but the difference was small (1.7 percentage points). Across the age groups, fixed-term contracts followed a U shaped pattern; they were most common among those in their twenties and thirties, least common among those in their forties and fifties, but then increased in
prevalence among those in their sixties. The proportion of female staff on fixed-term contracts was higher in all age groups apart from the under 30s, and those aged 56-60. However, the gender disparity seems to be largely driven by the higher prevalence of fixed-term contracts among women in senior management positions, who are more likely than men to be in fixed-term jobs, but less likely in most other positions (Figure A1.12).

**Figure A1.11: Fixed-term employment among academic staff, by gender and age band**

![Bar chart showing fixed-term employment by gender and age band](chart)

Source: HESA data. All staff. N=8115.
Figure A1.12: Fixed-term employment among academic staff, by gender and contract level

Female staff were slightly more likely to be on a teaching only contract (21.9% vs 18.6%), with men slightly more likely to be on a combined research and teaching contract (Figure A1.13).

Figure A1.13: Academic employment function, by gender

Source: HESA data. All staff. N=8115.
The proportion of staff who are female varies across institutions\(^{12}\) from zero to half. Half of institutions (as indicated by the box in Figure A1.14) have between 16.7% and 27.8% female staff. Two institutions had values above 42% - these are outliers (indicated by the dots in figure A1.14), with a top quartile range between 27.8% to 42%.

**Figure A1.14: Box plot of the proportion of female academic staff in computer science across institutions**

Approximately 10% of staff were classified in the HESA data under both a computer science discipline and a non-computer science discipline. Among these, women were more likely than men to be classified as also in a social science, medicine or biological sciences discipline, while men were more likely to be in maths, engineering or the humanities (Figure A1.15).

\(^{12}\) This analysis was restricted to institutions with at least 10 staff in a relevant discipline.
Figure A1.15: Additional disciplines of academic staff, by gender

![Chart showing additional disciplines by gender with N=885](image)

Source: HESA data. All staff recorded as working within an additional discipline. N=885.

Figure A1.16 shows that there are few differences between male and female staff in the length of their present academic contracts.

**Figure A1.16: Length of service of academic staff, by gender**

![Graph showing length of service by gender](image)

Source: HESA data. All staff. N=8110.
Table A1.1 shows the previous employers of new starters in the previous year. Women were more likely to have come from the UK education sector, and men were more likely from private industry.

**Table A1.1: Previous employer of new academic staff**

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK education</td>
<td>35.2</td>
<td>27.3</td>
</tr>
<tr>
<td>Student in UK</td>
<td>22.4</td>
<td>23.7</td>
</tr>
<tr>
<td>UK research institution</td>
<td>1.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Private industry/commerce in UK</td>
<td>4.2</td>
<td>9.9</td>
</tr>
<tr>
<td>Other UK employment</td>
<td>12.9</td>
<td>7.7</td>
</tr>
<tr>
<td>Overseas education</td>
<td>9.2</td>
<td>14.8</td>
</tr>
<tr>
<td>Student in an overseas country</td>
<td>3.7</td>
<td>3.8</td>
</tr>
<tr>
<td>Overseas research institution</td>
<td>3.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Other overseas employment</td>
<td>3.1</td>
<td>4.2</td>
</tr>
<tr>
<td>Not in regular employment</td>
<td>4.7</td>
<td>4.4</td>
</tr>
</tbody>
</table>

**N** 325 1067

*Source: HESA data. All staff who started in the last year.*

**Students**

The gender balance among postgraduate research students in computer science was comparable to that among staff, although it was slightly better at 26.1% female (compared with 22.7% for staff), suggesting a slightly disproportionate drop out of women between postgraduate studies and an academic career.

There was not a notable gender gap with respect to disability (Figure A1.17). 6.6% of female students had a known disability and 7.0% of male. The overall rate was comparable to that of postgraduate students as a whole of 6.7%, but it represented a higher proportion than among staff (4.3%), suggesting again a slightly disproportionate drop out of disabled students in the transition to an academic career.

---

13 Data is only available on the previous employer of those classified as new starters. These account for around 17% of the total.

14 HESA, Higher education student enrolments and qualifications obtained at higher education providers in the United Kingdom 2015/16, Statistical First Release 242, Table 6a
Figure A1.17: Disability status of postgraduate research students, by gender

![Disability status chart]

Source: HESA data. All students. N=6676.

The research postgraduate student body in computer science was predominantly white. Data on ethnicity is shown here for UK nationals only, due to large amounts of missing data on ethnicity for other EU students (75% missing) and non-EU students (92% missing). Figure A1.18 shows that men were more likely to be white (84.7%) than women (78.2%).

Figure A1.18: Ethnicity of postgraduate research students, UK nationals only, by gender

![Ethnicity chart]

Source: HESA data. All UK national students with known ethnicity. N=2588.
UK nationals were not the smallest group of research postgraduates in computer science (‘other EU’ was the smallest), but they were a minority (Figure A1.19). The largest group was non-EU nationals, who represented the majority of female students (57.2%) and the largest group of male students (44.9%). This is in contrast to the academic staff in computer science, the majority of whom were UK nationals.

Figure A1.19: Nationality of postgraduate research students, by gender

![Bar chart showing nationality of postgraduate research students by gender]

Source: HESA data. All students with known nationality. N=6613.

Excluding students classified as writing up, there were slight differences by gender and disability status in the proportion of students undertaking their course part-time; male students and those with a disability were slightly more likely to be studying part-time (Figure A1.20). Larger differences were observed by age and nationality, with those over 30 and UK nationals more likely to be studying part-time.
Looking only at UK nationals, male research postgraduates in computer science were more likely to not have funding assistance with paying their tuition fees (Figure A1.21); 33.0%, compared with 29.6% of female postgraduates. Similar proportions of male (34.8%) and female (33.0%) postgraduates had research council grants, and female postgraduates were more likely to be sponsored by an employer.
Those with a known disability were less likely to be paying their tuition fees without assistance (Figure A1.22); 28.1%, compared with 33.1% of those without a known disability. They were also more likely to have most forms of funding including research council grants; 38.5%, compared with 33.7% of those without a known disability.

Source: HESA data. All UK national students with known tuition fee status. N=1938.
There were notable ethnic disparities in funding sources (Figure A1.23). Two thirds of black students did not have financial support for paying their tuition fees, while white students were least likely to be self-funded. The proportion receiving research council grants was similar for white (37.1%) and other (34.7%), with fewer Asian students (22.2%) and few black (8.9%) students.

**Figure A1.23: Source of tuition fees (UK nationals only), by ethnicity**

Source: HESA data. All UK national students with known tuition fee status and ethnicity. N=1823.
Appendix 2: Online survey results

This appendix presents a comprehensive analysis of the quantitative data collected via the online survey.

Survey demographics

866 people responded to the online survey. A breakdown of their characteristics is shown in Table A2.1.

<table>
<thead>
<tr>
<th>Table A2.1: Characteristics of survey respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Unknown</td>
</tr>
<tr>
<td>Under 25</td>
</tr>
<tr>
<td>25-34</td>
</tr>
<tr>
<td>35-44</td>
</tr>
<tr>
<td>45-54</td>
</tr>
<tr>
<td>55+</td>
</tr>
<tr>
<td>Unknown</td>
</tr>
<tr>
<td>Limiting health condition or disability</td>
</tr>
<tr>
<td>No limiting health condition or disability</td>
</tr>
<tr>
<td>Unknown</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Black</td>
</tr>
<tr>
<td>Asian</td>
</tr>
<tr>
<td>Other/mixed</td>
</tr>
<tr>
<td>Unknown</td>
</tr>
<tr>
<td>UK national</td>
</tr>
<tr>
<td>Other EU national</td>
</tr>
<tr>
<td>Non-EU national</td>
</tr>
<tr>
<td>Unknown</td>
</tr>
</tbody>
</table>

The characteristics of the survey respondents are presented next to the proportions of these characteristics among computer science staff according to HESA. This is a rough comparison, as the two populations differ; the survey includes students and former staff and students, and disciplines beyond computer science. However, it suggests that the response to the survey was broadly in line with the expected profile of respondents, with some ‘under-
represented’ groups in the sector somewhat over-represented among survey respondents, as might be expected in a survey about diversity.

Academic staff respondents were drawn from across the career spectrum (Figure A2.1).

**Figure A2.1: Current job of academic staff respondents**

![Bar chart showing current job of academic staff respondents](chart)

Source: Online survey. All current staff who stated current position. N=520.

**Motivation for pursuing an academic career**

Figure A2.2 shows the responses for male and female staff to the question of why they pursued an academic career. The only differences that were found to be statistically significant were that men were more likely to say they had always been interested in technology (p=0.004, while women were more likely to say they wanted a challenging career (p=0.009), although the effect size was small in both cases (d=0.28 and d=0.25 respectively).
For students, the main motivations for pursuing postgraduate study are displayed in Figure A2.3. In general, the hierarchy of motivations was very similar to that of the academic staff. The only statistically significant gender difference was that male students were more likely to cite a longstanding interest in technology (p=0.001), with a moderate effect size in this case (d=0.42).
The responses of former staff and postgraduates to these questions are shown in Table A2.2. The low sample sizes mean that these results should be interpreted with some caution. However, they imply that the most common reason for initially pursuing a postgraduate course or career in academic ICT research was, as for current staff and students, an interest in research, although a lower proportion selected this as a motivation. Only half said they had chosen this path because they had a longstanding interest in technology. Around two fifths said they had wanted a challenging career; similar to the proportion of current staff and students selecting this as a motivation.
Table A2.2: Reasons for choosing postgraduate study or an academic career in ICT research – former staff and students

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Selected this motivation</th>
<th>Did not select this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always been interested in technology</td>
<td>50% 23</td>
<td>50% 23</td>
</tr>
<tr>
<td>Excelled as an undergraduate in this discipline</td>
<td>35% 16</td>
<td>65% 30</td>
</tr>
<tr>
<td>To make a contribution to the discipline</td>
<td>39% 18</td>
<td>61% 28</td>
</tr>
<tr>
<td>To make a difference to society</td>
<td>39% 18</td>
<td>61% 28</td>
</tr>
<tr>
<td>Wanted a challenging career</td>
<td>41% 19</td>
<td>59% 27</td>
</tr>
<tr>
<td>Enjoy teaching</td>
<td>20% 9</td>
<td>80% 37</td>
</tr>
<tr>
<td>As a basis for a career outside academia</td>
<td>9% 4</td>
<td>91% 42</td>
</tr>
<tr>
<td>Enjoy research</td>
<td>61% 28</td>
<td>39% 18</td>
</tr>
<tr>
<td>The economy needs more people working in technology</td>
<td>7% 3</td>
<td>93% 43</td>
</tr>
</tbody>
</table>

Source: Online survey. All former staff and students.

Working Conditions and Expectations

Current academic staff were asked about the hours they worked; both their contracted hours and the hours they worked in practice, and how they felt about this.

Contracted hours are shown in Figure A2.4. A very small proportion of respondents (less than 3%) did not have contracted hours. The majority of respondents worked full-time, although part-time working was more common among women (18%) than men (8%). This difference was statistically significant (p=0.009), although the effect size was small (d=0.17).
Of those who were contracted to work full-time, 93% said this was their preferred arrangement, with 7% saying they would prefer to work part-time. Of those who were contracted to work part-time, 71% said this was their preferred arrangement, and 29% said they would prefer to work full-time. Small sample sizes obviated any robust estimate of whether these attitudes differed by gender.

Respondents were also asked about the hours they worked in practice. Among those contracted to work full-time, the median hours worked were 51 for men and 46 for women, and among those contracted to work part-time, the median hours were 26 for men and 31 for women. Significance tests of differences in mean hours did not reveal a significant gender difference, although mean hours is not the best measure in this case because the data is censored (i.e. the highest number respondents could choose was 61 hours or more) and therefore does not fully represent the variation in hours worked above this level.

Reported hours worked by those contracted to work full-time are shown in Figure A2.5. The only significant gender difference was in those reporting working at least 50 hours per week, with men (53%) more likely than women (42%) to do so (p=0.025, with a small effect size of d=0.23). There was no significant gender difference in the minority who reported ‘extreme’ working hours of 60 or more per week.
Respondents were asked how they feel about the hours they work (Figure A2.6). A majority of those working full-time (57%) felt that they work too many hours, although 41% felt the hours they work are about right. Of those contracted to work part-time, 34% still felt they work too many hours, with around half (52%) saying their hours were about right, and 14% wanting to work more hours. These differences between full-time and part-time workers were statistically significant ($p<0.001$), with a medium effect size of $d=0.63$. 

Source: Online survey. All current staff contracted to work full-time. N=355. Patterned bars represent non-significant differences between men and women.
Among those contracted to work full-time, there was no statistically significant gender difference in attitudes towards hours worked (Figure A2.7). It was not possible to carry out this analysis for part-time workers due to small sample sizes.
Respondents were asked how often they were expected to travel as part of their job, for conferences, meetings, teaching or other events (Figure A2.8). Travel was commonplace, with over half expected to travel within the UK at least once a term, and expected to travel abroad at least once a year. Around a quarter reported monthly travel requirements and only around 1 in 10 said they did not have to travel. There were no statistically significant differences between men and women.
Respondents were asked to score their satisfaction with a number of aspects of their job on a five-point scale, where 5 represents a high level of satisfaction. The mean scores on each aspect are shown in Figure A2.9. Respondents were in general satisfied with the flexibility and holiday entitlement available to them, and with their job as a whole. The only significant difference between men and women was for pay, with which men were less satisfied (p=0.025), although the effect size was small (d=0.23).
There were few significant differences in job satisfaction with respect to other characteristics (Table A2.3). Men with a limiting health condition or disability were less satisfied with their career progression (mean 2.4) than those without (mean 3.1, p=0.005, with a medium effect size of 0.60). Perhaps unsurprisingly, older age groups were more satisfied with their job security than younger groups, with a medium effect size ($\eta^2 = 0.1$).
Table A2.3: Mean satisfaction scores on job attributes, by demographic group

<table>
<thead>
<tr>
<th></th>
<th>Pay</th>
<th>Flexibility</th>
<th>Holiday entitlement</th>
<th>Job security</th>
<th>Career progression</th>
<th>Your job as a whole</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limiting health condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - yes</td>
<td>2.7</td>
<td>4.2</td>
<td>3.9</td>
<td>3.0</td>
<td>2.4</td>
<td>3.3</td>
<td>25</td>
</tr>
<tr>
<td>Men - none</td>
<td>3.1</td>
<td>4.1</td>
<td>4.2</td>
<td>3.5</td>
<td>3.1</td>
<td>3.7</td>
<td>224</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.069</td>
<td>0.951</td>
<td>0.144</td>
<td>0.116</td>
<td>0.005</td>
<td>0.053</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - yes</td>
<td>0.968</td>
<td>0.098</td>
<td>0.983</td>
<td>0.386</td>
<td>0.104</td>
<td>0.833</td>
<td></td>
</tr>
<tr>
<td>Men - none</td>
<td>0.968</td>
<td>0.098</td>
<td>0.983</td>
<td>0.386</td>
<td>0.104</td>
<td>0.833</td>
<td></td>
</tr>
<tr>
<td><strong>Women - yes</strong></td>
<td>3.4</td>
<td>3.8</td>
<td>4.3</td>
<td>3.0</td>
<td>2.6</td>
<td>3.6</td>
<td>20</td>
</tr>
<tr>
<td><strong>Women - none</strong></td>
<td>3.4</td>
<td>4.2</td>
<td>4.3</td>
<td>3.3</td>
<td>3.1</td>
<td>3.6</td>
<td>165</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.968</td>
<td>0.098</td>
<td>0.983</td>
<td>0.386</td>
<td>0.104</td>
<td>0.833</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - yes</td>
<td>0.968</td>
<td>0.098</td>
<td>0.983</td>
<td>0.386</td>
<td>0.104</td>
<td>0.833</td>
<td></td>
</tr>
<tr>
<td>Women - none</td>
<td>0.968</td>
<td>0.098</td>
<td>0.983</td>
<td>0.386</td>
<td>0.104</td>
<td>0.833</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - white</td>
<td>3.1</td>
<td>4.1</td>
<td>4.2</td>
<td>3.5</td>
<td>3.1</td>
<td>3.7</td>
<td>202</td>
</tr>
<tr>
<td>Men - not white</td>
<td>3.1</td>
<td>4.2</td>
<td>4.1</td>
<td>3.4</td>
<td>2.9</td>
<td>3.5</td>
<td>45</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.947</td>
<td>0.661</td>
<td>0.799</td>
<td>0.691</td>
<td>0.375</td>
<td>0.326</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - white</td>
<td>0.947</td>
<td>0.661</td>
<td>0.799</td>
<td>0.691</td>
<td>0.375</td>
<td>0.326</td>
<td></td>
</tr>
<tr>
<td>Men - not white</td>
<td>0.947</td>
<td>0.661</td>
<td>0.799</td>
<td>0.691</td>
<td>0.375</td>
<td>0.326</td>
<td></td>
</tr>
<tr>
<td><strong>Women - white</strong></td>
<td>3.4</td>
<td>4.2</td>
<td>4.3</td>
<td>3.3</td>
<td>3.0</td>
<td>3.6</td>
<td>163</td>
</tr>
<tr>
<td><strong>Women - not white</strong></td>
<td>3.2</td>
<td>3.9</td>
<td>4.2</td>
<td>3.1</td>
<td>3.0</td>
<td>3.6</td>
<td>21</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.510</td>
<td>0.199</td>
<td>0.495</td>
<td>0.657</td>
<td>0.975</td>
<td>0.911</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - white</td>
<td>0.510</td>
<td>0.199</td>
<td>0.495</td>
<td>0.657</td>
<td>0.975</td>
<td>0.911</td>
<td></td>
</tr>
<tr>
<td>Women - not white</td>
<td>0.510</td>
<td>0.199</td>
<td>0.495</td>
<td>0.657</td>
<td>0.975</td>
<td>0.911</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>3.3</td>
<td>4.3</td>
<td>4.3</td>
<td>2.7</td>
<td>3.0</td>
<td>3.6</td>
<td>104</td>
</tr>
<tr>
<td>35-44</td>
<td>3.1</td>
<td>4.1</td>
<td>4.1</td>
<td>3.4</td>
<td>3.1</td>
<td>3.6</td>
<td>156</td>
</tr>
<tr>
<td>45-54</td>
<td>3.2</td>
<td>4.1</td>
<td>4.2</td>
<td>3.5</td>
<td>3.0</td>
<td>3.6</td>
<td>104</td>
</tr>
<tr>
<td>55-64</td>
<td>3.3</td>
<td>4.1</td>
<td>4.4</td>
<td>4.1</td>
<td>3.1</td>
<td>3.8</td>
<td>55</td>
</tr>
<tr>
<td>65+</td>
<td>3.8</td>
<td>4.4</td>
<td>4.2</td>
<td>4.0</td>
<td>3.7</td>
<td>4.5</td>
<td>12</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.173</td>
<td>0.233</td>
<td>0.425</td>
<td>0.000</td>
<td>0.675</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td><strong>η²</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.095</td>
<td>0.032</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Online survey. All current staff. Shaded cells indicate non-significant results.
Respondents were asked to rate the level of stress they experienced in relation to aspects of their work on a five-point scale, where 5 represents a great deal of stress. The highest mean levels of stress were reported in regard for the need to apply for funding, workload and requirements to publish. There were no significant differences between men and women (Figure A2.10).

**Figure A2.10: Mean levels of stress reported in relation to selected tasks, by gender**

<table>
<thead>
<tr>
<th>Task</th>
<th>Men Mean</th>
<th>Women Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need to apply for funding</td>
<td>3.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Teaching responsibilities</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Administrative responsibilities</td>
<td>3.3</td>
<td>3.2</td>
</tr>
<tr>
<td>Requirement to publish</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Workload</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Job security</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Source: Online survey. All current staff. N=469. Patterned bars represent non-significant differences between men and women.

Men with a limiting health condition or disability were found to be significantly more stressed about job security (with a mean rating of 3.7) than those without (mean rating 3.0, p=0.010, with a medium effect size of d=0.55). Women with a limiting condition were found to be particularly stressed about their workload (mean rating 4.4), and significantly more than those without a limiting condition (mean rating 3.7, p=0.019, with a medium effect size of d=0.56). Ethnic minority men reported higher levels of stress with respect to applying for funding than white men (p=0.025), although the effect size was very small (d=0.05). Higher levels of stress across every aspect were reported by the 35-44 age group, with medium effect sizes of around an Eta squared value of 0.06 in most cases (Table A2.4).
Table A2.4: Mean levels of stress reported in relation to selected tasks, by demographic group

<table>
<thead>
<tr>
<th>Limiting health condition</th>
<th>Need to apply for funding</th>
<th>Teaching responsibilities</th>
<th>Administrative responsibilities</th>
<th>Requirement to publish</th>
<th>Workload</th>
<th>Job security</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men - yes</td>
<td>4.0</td>
<td>3.2</td>
<td>3.8</td>
<td>3.9</td>
<td>3.8</td>
<td>3.7</td>
<td>24</td>
</tr>
<tr>
<td>Men - none</td>
<td>3.8</td>
<td>3.1</td>
<td>3.3</td>
<td>3.4</td>
<td>3.8</td>
<td>3.0</td>
<td>220</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.580</strong></td>
<td><strong>0.731</strong></td>
<td><strong>0.068</strong></td>
<td><strong>0.054</strong></td>
<td><strong>0.981</strong></td>
<td><strong>0.010</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - yes</td>
<td>3.9</td>
<td>3.3</td>
<td>3.6</td>
<td>3.6</td>
<td>4.4</td>
<td>3.4</td>
<td>20</td>
</tr>
<tr>
<td>Women - none</td>
<td>3.9</td>
<td>3.1</td>
<td>3.1</td>
<td>3.5</td>
<td>3.7</td>
<td>3.0</td>
<td>158</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.837</strong></td>
<td><strong>0.578</strong></td>
<td><strong>0.133</strong></td>
<td><strong>0.715</strong></td>
<td><strong>0.019</strong></td>
<td><strong>0.174</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - white</td>
<td>3.8</td>
<td>3.1</td>
<td>3.3</td>
<td>3.4</td>
<td>3.8</td>
<td>3.0</td>
<td>197</td>
</tr>
<tr>
<td>Men - not white</td>
<td>4.2</td>
<td>3.1</td>
<td>3.3</td>
<td>3.7</td>
<td>4.0</td>
<td>3.3</td>
<td>45</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.025</strong></td>
<td><strong>0.844</strong></td>
<td><strong>0.638</strong></td>
<td><strong>0.215</strong></td>
<td><strong>0.414</strong></td>
<td><strong>0.107</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td><strong>-0.049</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - white</td>
<td>3.9</td>
<td>3.1</td>
<td>3.2</td>
<td>3.5</td>
<td>3.8</td>
<td>3.0</td>
<td>156</td>
</tr>
<tr>
<td>Women - not white</td>
<td>4.2</td>
<td>3.3</td>
<td>3.2</td>
<td>3.9</td>
<td>3.7</td>
<td>3.2</td>
<td>21</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.205</strong></td>
<td><strong>0.526</strong></td>
<td><strong>0.881</strong></td>
<td><strong>0.133</strong></td>
<td><strong>0.535</strong></td>
<td><strong>0.384</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>3.8</td>
<td>2.8</td>
<td>2.8</td>
<td>3.5</td>
<td>3.6</td>
<td>3.5</td>
<td>100</td>
</tr>
<tr>
<td>35-44</td>
<td>4.2</td>
<td>3.5</td>
<td>3.5</td>
<td>3.7</td>
<td>4.1</td>
<td>3.1</td>
<td>153</td>
</tr>
<tr>
<td>45-54</td>
<td>3.9</td>
<td>3.1</td>
<td>3.3</td>
<td>3.4</td>
<td>3.8</td>
<td>2.9</td>
<td>99</td>
</tr>
<tr>
<td>55-64</td>
<td>3.5</td>
<td>2.9</td>
<td>3.4</td>
<td>3.2</td>
<td>3.8</td>
<td>2.3</td>
<td>53</td>
</tr>
<tr>
<td>65+</td>
<td>2.9</td>
<td>1.9</td>
<td>2.2</td>
<td>2.5</td>
<td>2.6</td>
<td>2.3</td>
<td>12</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.000</strong></td>
<td><strong>0.000</strong></td>
<td><strong>0.000</strong></td>
<td><strong>0.004</strong></td>
<td><strong>0.000</strong></td>
<td><strong>0.000</strong></td>
<td></td>
</tr>
<tr>
<td><strong>η²</strong></td>
<td><strong>0.061</strong></td>
<td><strong>0.065</strong></td>
<td><strong>0.068</strong></td>
<td><strong>0.037</strong></td>
<td><strong>0.063</strong></td>
<td><strong>0.076</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Online survey. All current staff. Shaded cells indicate non-significant results.
Respondents were asked to rate the extent to which different aspects of their job represented a challenge to sustaining their academic career, on a five-point scale where 5 implies a huge challenge. The highest score (i.e. greatest challenge) was found to be the pressure to acquire funding (Figure A2.11). Although comparatively less challenging, the travel expected, was significantly more challenging for women (p=0.010) and insufficient pay was more challenging for men (p=0.034), although the effect sizes were small in both cases (0.26 and 0.21 respectively). No other significant differences were found between men and women.

**Figure A2.11: Mean extent to which aspects of the job represent a challenge to sustaining current academic career, by gender**

There were a number of significant differences with respect to other groups, and the effect sizes were medium in most cases (Table A2.5). Men with a limiting health condition on average perceived greater challenges than men without a health condition from losing interest (p=0.010, d=0.56), the expectation to attend events (p=0.000, d=0.87), demands from colleagues (p=0.032, d=0.455) and the pressure to publish (p=0.039, d=0.45). Women with a health condition also perceived demands from colleagues as a greater challenge than women with no health condition (p=0.021, d=0.563). Ethnic minority men perceived a
number of factors to be more challenging than white men did; travel (p=0.002, d=0.53), the expectation to network (p=0.014, d=0.41), the lack of job security (p=0.036, d=0.35), insufficient pay (p=0.022, d=0.38), the hours expected (p=0.005, d=0.47) and the pressure to acquire funding (p=0.011, d=0.42). Ethnic minority women also perceived pay to be a greater challenge than white women (p=0.012, d=0.61). Most aspects were perceived as most challenging by those in the 35-44 age group.

Former staff were also asked to rate the extent to which the same aspects had presented challenges to sustaining their academic career. The mean rankings were very similar to those given by current staff (Figure A2.12). The pressure to acquire funding was the biggest challenge for both groups, with a lack of pay and job security considered greater issues than the specific demands of the job itself.

**Figure A2.12: Mean extent to which aspects of the job represented a challenge to sustaining previous academic career – current and former staff**

Source: Online survey. All current staff (N=446) and former staff (N=13).
Table A2.5: Mean extent to which aspects of job represent a challenge to sustaining current academic career, by demographic groups

<table>
<thead>
<tr>
<th></th>
<th>Losing interest in the job/discipline</th>
<th>The travel expected</th>
<th>Expectation to attend events for networking purposes</th>
<th>Demands from colleagues</th>
<th>Lack of job security</th>
<th>Lack of jobs in my discipline</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limiting health condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - yes</td>
<td>2.7</td>
<td>2.5</td>
<td>3.1</td>
<td>3.1</td>
<td>3.0</td>
<td>2.9</td>
<td>217</td>
</tr>
<tr>
<td>Men - none</td>
<td>2.1</td>
<td>2.1</td>
<td>2.2</td>
<td>2.6</td>
<td>2.7</td>
<td>2.7</td>
<td>25</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.010</td>
<td>0.124</td>
<td>0.000</td>
<td>0.032</td>
<td>0.307</td>
<td>0.612</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td>0.555</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - yes</td>
<td>2.3</td>
<td>2.3</td>
<td>2.5</td>
<td>3.4</td>
<td>3.3</td>
<td>3.1</td>
<td>154</td>
</tr>
<tr>
<td>Women - none</td>
<td>1.9</td>
<td>2.5</td>
<td>2.4</td>
<td>2.8</td>
<td>2.9</td>
<td>2.7</td>
<td>20</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.116</td>
<td>0.448</td>
<td>0.728</td>
<td>0.021</td>
<td>0.245</td>
<td>0.326</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td>0.563</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - white</td>
<td>2.1</td>
<td>2.1</td>
<td>2.2</td>
<td>2.6</td>
<td>2.7</td>
<td>2.7</td>
<td>196</td>
</tr>
<tr>
<td>Men - not white</td>
<td>2.2</td>
<td>2.6</td>
<td>2.7</td>
<td>2.8</td>
<td>3.1</td>
<td>3.0</td>
<td>44</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.539</td>
<td>0.002</td>
<td>0.014</td>
<td>0.245</td>
<td>0.036</td>
<td>0.174</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td>0.526</td>
<td>-0.526</td>
<td>-0.410</td>
<td>0.245</td>
<td>-0.351</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - white</td>
<td>1.9</td>
<td>2.5</td>
<td>2.4</td>
<td>2.8</td>
<td>2.9</td>
<td>2.7</td>
<td>154</td>
</tr>
<tr>
<td>Women - not white</td>
<td>2.0</td>
<td>2.2</td>
<td>2.6</td>
<td>2.9</td>
<td>3.5</td>
<td>3.2</td>
<td>19</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.832</td>
<td>0.342</td>
<td>0.571</td>
<td>0.955</td>
<td>0.086</td>
<td>0.188</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td>0.509</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>2.0</td>
<td>2.0</td>
<td>2.2</td>
<td>2.6</td>
<td>3.4</td>
<td>3.1</td>
<td>102</td>
</tr>
<tr>
<td>35-44</td>
<td>2.2</td>
<td>2.6</td>
<td>2.6</td>
<td>2.8</td>
<td>3.0</td>
<td>2.9</td>
<td>154</td>
</tr>
<tr>
<td>45-54</td>
<td>2.1</td>
<td>2.4</td>
<td>2.4</td>
<td>2.9</td>
<td>2.6</td>
<td>2.6</td>
<td>99</td>
</tr>
<tr>
<td>55-64</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.6</td>
<td>2.0</td>
<td>2.2</td>
<td>49</td>
</tr>
<tr>
<td>65+</td>
<td>1.6</td>
<td>1.7</td>
<td>1.8</td>
<td>1.9</td>
<td>2.1</td>
<td>1.9</td>
<td>8</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.509</td>
<td>0.000</td>
<td>0.005</td>
<td>0.013</td>
<td>0.000</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td><strong>ƞ²</strong></td>
<td>0.063</td>
<td>0.036</td>
<td>0.030</td>
<td>0.095</td>
<td>0.047</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*contd. on next page*
Table 2.5 contd.

<table>
<thead>
<tr>
<th></th>
<th>Insufficient pay</th>
<th>Demands from students</th>
<th>The hours expected</th>
<th>Administrative demands from your institution</th>
<th>The pressure to publish</th>
<th>The pressure to acquire funding</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limiting health condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - yes</td>
<td>2.9</td>
<td>3.2</td>
<td>2.8</td>
<td>3.6</td>
<td>3.8</td>
<td>4.2</td>
<td>217</td>
</tr>
<tr>
<td>Men - none</td>
<td>2.7</td>
<td>2.8</td>
<td>3.2</td>
<td>3.3</td>
<td>3.8</td>
<td>3.9</td>
<td>25</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.471</td>
<td>0.203</td>
<td>0.147</td>
<td>0.222</td>
<td>0.039</td>
<td>0.168</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen’s d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women - yes</strong></td>
<td>2.5</td>
<td>3.6</td>
<td>3.6</td>
<td>3.5</td>
<td>3.6</td>
<td>4.3</td>
<td>154</td>
</tr>
<tr>
<td><strong>Women - none</strong></td>
<td>2.5</td>
<td>3.0</td>
<td>3.4</td>
<td>3.1</td>
<td>3.4</td>
<td>4.0</td>
<td>20</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.881</td>
<td>0.065</td>
<td>0.435</td>
<td>0.153</td>
<td>0.565</td>
<td>0.362</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen’s d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - white</td>
<td>2.7</td>
<td>2.8</td>
<td>3.1</td>
<td>3.3</td>
<td>3.3</td>
<td>3.8</td>
<td>196</td>
</tr>
<tr>
<td>Men - not white</td>
<td>3.1</td>
<td>3.1</td>
<td>3.7</td>
<td>3.5</td>
<td>3.4</td>
<td>4.3</td>
<td>44</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.022</td>
<td>0.238</td>
<td>0.005</td>
<td>0.335</td>
<td>0.444</td>
<td>0.011</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen’s d</strong></td>
<td>-0.383</td>
<td>-0.473</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - white</td>
<td>2.4</td>
<td>3.1</td>
<td>3.4</td>
<td>3.1</td>
<td>3.4</td>
<td>4.0</td>
<td>154</td>
</tr>
<tr>
<td>Women - not white</td>
<td>3.2</td>
<td>3.1</td>
<td>2.9</td>
<td>3.3</td>
<td>3.4</td>
<td>4.3</td>
<td>19</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.012</td>
<td>0.895</td>
<td>0.087</td>
<td>0.466</td>
<td>0.890</td>
<td>0.350</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen’s d</strong></td>
<td>-0.613</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>2.7</td>
<td>2.5</td>
<td>3.0</td>
<td>2.6</td>
<td>3.2</td>
<td>3.9</td>
<td>102</td>
</tr>
<tr>
<td>35-44</td>
<td>2.9</td>
<td>3.2</td>
<td>3.6</td>
<td>3.5</td>
<td>3.6</td>
<td>4.2</td>
<td>154</td>
</tr>
<tr>
<td>45-54</td>
<td>2.5</td>
<td>3.1</td>
<td>3.3</td>
<td>3.4</td>
<td>3.3</td>
<td>3.9</td>
<td>99</td>
</tr>
<tr>
<td>55-64</td>
<td>2.3</td>
<td>3.0</td>
<td>3.2</td>
<td>3.5</td>
<td>3.1</td>
<td>3.7</td>
<td>49</td>
</tr>
<tr>
<td>65+</td>
<td>2.0</td>
<td>2.4</td>
<td>2.1</td>
<td>2.3</td>
<td>2.3</td>
<td>2.7</td>
<td>8</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.010</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.002</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td><strong>η²</strong></td>
<td>0.032</td>
<td>0.065</td>
<td>0.050</td>
<td>0.116</td>
<td>0.039</td>
<td>0.068</td>
<td></td>
</tr>
</tbody>
</table>

Source: Online survey. All staff. Shaded cells indicate non-significant results.
Confidence

Respondents were asked to rate the extent to which they felt confident about aspects of their job on a five-point scale, where a score of 5 implies high confidence. Confidence levels were generally high (see Figure A2.13), although respondents were least confident about applying for promotion. Women were significantly less confident than men in their abilities, as an academic (p=0.002), and getting published (p=0.006), with small effect sizes in both cases (0.21 and 0.30). They were also significantly less confident about applying for promotion (p=0.040), although the effect size in this case was very small (0.05).

Figure A2.13: Mean confidence scores for selected job aspects, by gender

![Chart showing mean confidence scores for selected job aspects, by gender.](chart)

Source: Online survey. All staff. N=412. Patterned bars represent non-significant differences between men and women.

Men with a limiting health condition or disability expressed less confidence than men without a health condition in all aspects except their teaching abilities, with effect sizes medium to large in all cases (Table A2.6). There were no significant differences between women with and without health conditions. No significant differences were found between white and ethnic minority men, but ethnic minority women were less confident about applying for grants (p=0.010, with a medium effect size of d=0.59). Confidence levels also generally increased with age, with medium effect sizes of around $\eta^2=0.05$ or 0.06 in most cases.
Table A2.6: Mean confidence scores for selected job aspects, by demographic groups

<table>
<thead>
<tr>
<th></th>
<th>Applying for grants</th>
<th>Applying for promotion</th>
<th>Abilities as an academic</th>
<th>Getting published in high-quality journals</th>
<th>Teaching abilities</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limiting health condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - yes</td>
<td>2.2</td>
<td>2.2</td>
<td>3.3</td>
<td>2.8</td>
<td>4.0</td>
<td>25</td>
</tr>
<tr>
<td>Men - none</td>
<td>3.2</td>
<td>2.9</td>
<td>4.0</td>
<td>3.7</td>
<td>4.0</td>
<td>221</td>
</tr>
<tr>
<td>p-value</td>
<td>0.000</td>
<td>0.002</td>
<td>0.002</td>
<td>0.000</td>
<td>0.753</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td>0.852</td>
<td>0.670</td>
<td>0.648</td>
<td>0.880</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - yes</td>
<td>2.8</td>
<td>2.3</td>
<td>3.4</td>
<td>3.3</td>
<td>3.8</td>
<td>19</td>
</tr>
<tr>
<td>Women - none</td>
<td>3.0</td>
<td>2.6</td>
<td>3.6</td>
<td>3.3</td>
<td>3.8</td>
<td>161</td>
</tr>
<tr>
<td>p-value</td>
<td>0.515</td>
<td>0.221</td>
<td>0.289</td>
<td>0.813</td>
<td>0.758</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - white</td>
<td>3.1</td>
<td>2.8</td>
<td>3.9</td>
<td>3.6</td>
<td>4.0</td>
<td>199</td>
</tr>
<tr>
<td>Men - not white</td>
<td>3.3</td>
<td>3.1</td>
<td>3.8</td>
<td>3.9</td>
<td>4.2</td>
<td>45</td>
</tr>
<tr>
<td>p-value</td>
<td>0.187</td>
<td>0.124</td>
<td>0.712</td>
<td>0.073</td>
<td>0.156</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - white</td>
<td>3.1</td>
<td>2.6</td>
<td>3.6</td>
<td>3.3</td>
<td>3.9</td>
<td>157</td>
</tr>
<tr>
<td>Women - not white</td>
<td>2.4</td>
<td>2.4</td>
<td>3.3</td>
<td>3.3</td>
<td>3.4</td>
<td>22</td>
</tr>
<tr>
<td>p-value</td>
<td>0.010</td>
<td>0.304</td>
<td>0.237</td>
<td>0.998</td>
<td>0.069</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td>0.592</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>2.6</td>
<td>2.4</td>
<td>3.5</td>
<td>3.3</td>
<td>3.6</td>
<td>98</td>
</tr>
<tr>
<td>35-44</td>
<td>3.2</td>
<td>2.9</td>
<td>3.6</td>
<td>3.5</td>
<td>3.9</td>
<td>155</td>
</tr>
<tr>
<td>45-54</td>
<td>3.0</td>
<td>2.8</td>
<td>3.9</td>
<td>3.6</td>
<td>4.1</td>
<td>102</td>
</tr>
<tr>
<td>55-64</td>
<td>3.4</td>
<td>3.1</td>
<td>4.0</td>
<td>3.4</td>
<td>4.2</td>
<td>54</td>
</tr>
<tr>
<td>65+</td>
<td>4.3</td>
<td>1.0</td>
<td>4.7</td>
<td>4.6</td>
<td>4.6</td>
<td>12</td>
</tr>
<tr>
<td>p-value</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.004</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>η²</td>
<td>0.065</td>
<td>0.051</td>
<td>0.059</td>
<td>0.063</td>
<td>0.048</td>
<td></td>
</tr>
</tbody>
</table>

Source: Online survey. All current staff. Shaded cells indicate non-significant results.
In regard to confidence among students (Figure A2.14), men reported being more confident with respect to applying for jobs (p=0.002) and getting published (p=0.002), and in their abilities as an academic (p=0.001), although the effect sizes were very small (0.1, 0.1 and 0.01 respectively).

**Figure A2.14: Mean confidence scores of postgraduate students, by gender**

![Bar chart showing mean confidence scores by gender.](chart)

Source: Online survey. All current students. N=238. Patterned bars represent non-significant differences between men and women.

The only difference in confidence by ethnicity was that ethnic minority students expressed greater confidence about applying for jobs after completing their postgraduate studies (p=0.006, d=0.40). Those aged under 35 were also more confident in this respect than those aged 35 and over (p=0.016, d=0.41). No differences were found between those with and without a limiting health condition (Table A2.7).
### Table A2.7: Mean confidence scores of postgraduate students, by demographic group

<table>
<thead>
<tr>
<th></th>
<th>Applying for jobs after completion</th>
<th>Abilities as an academic</th>
<th>Getting published in high-quality journals</th>
<th>Teaching abilities</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limiting health condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3.3</td>
<td>3.7</td>
<td>3.2</td>
<td>3.3</td>
<td>26</td>
</tr>
<tr>
<td>None</td>
<td>3.7</td>
<td>3.3</td>
<td>3.1</td>
<td>3.4</td>
<td>216</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.069</td>
<td>0.071</td>
<td>0.555</td>
<td>0.778</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>3.6</td>
<td>3.3</td>
<td>3.0</td>
<td>3.4</td>
<td>173</td>
</tr>
<tr>
<td>Not white</td>
<td>4.0</td>
<td>3.4</td>
<td>3.3</td>
<td>3.5</td>
<td>69</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.006</td>
<td>0.234</td>
<td>0.056</td>
<td>0.525</td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td>-0.398</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>3.8</td>
<td>3.3</td>
<td>3.1</td>
<td>3.4</td>
<td>199</td>
</tr>
<tr>
<td>35 and over</td>
<td>3.3</td>
<td>3.5</td>
<td>3.2</td>
<td>3.5</td>
<td>47</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>0.016</td>
<td>0.253</td>
<td>0.492</td>
<td>0.442</td>
<td></td>
</tr>
<tr>
<td><strong>ƞ²</strong></td>
<td>0.416</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shaded cells indicate non-significant results

Postgraduate respondents were asked to rate the degree of stress posed by different aspects of their experience on a five-point scale, where 5 indicates high levels of stress (Figure A2.15). Women reported higher levels of stress than men with respect to completing their thesis on time (p=0.035), their teaching responsibilities (p=0.024) and job prospects after graduating (p=0.015), with modest effect sizes of 0.27, 0.32 and 0.32 respectively.
There were few differences in reported stress between other groups (Table A2.8). Ethnic minority students reported greater levels of stress with regard to their teaching responsibilities ($p=0.035$, $d=0.32$), while those aged 35 and over were more stressed than those under 35 about completing their thesis on time ($p=0.032$, $d=0.34$).

**Table A2.8: Mean reported levels of stress among postgraduates, by demographic groups**

<table>
<thead>
<tr>
<th>Health condition</th>
<th>Completing thesis to required standard</th>
<th>Completing thesis on time</th>
<th>Teaching responsibilities</th>
<th>Requirement to publish</th>
<th>Job prospects after graduating</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3.5</td>
<td>3.2</td>
<td>2.0</td>
<td>3.3</td>
<td>3.4</td>
<td>26</td>
</tr>
<tr>
<td>None</td>
<td>3.5</td>
<td>3.4</td>
<td>2.3</td>
<td>3.3</td>
<td>3.0</td>
<td>217</td>
</tr>
<tr>
<td>p-value</td>
<td>0.950</td>
<td>0.472</td>
<td>0.192</td>
<td>0.916</td>
<td>0.143</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>3.4</td>
<td>3.4</td>
<td>2.2</td>
<td>3.3</td>
<td>3.1</td>
<td>173</td>
</tr>
<tr>
<td>Not white</td>
<td>3.6</td>
<td>3.4</td>
<td>2.5</td>
<td>3.3</td>
<td>3.1</td>
<td>71</td>
</tr>
<tr>
<td>p-value</td>
<td>0.493</td>
<td>0.828</td>
<td>0.035</td>
<td>0.933</td>
<td>0.639</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>3.4</td>
<td>3.3</td>
<td>2.3</td>
<td>3.3</td>
<td>3.0</td>
<td>199</td>
</tr>
<tr>
<td>35 and over</td>
<td>3.8</td>
<td>3.8</td>
<td>2.4</td>
<td>3.0</td>
<td>3.3</td>
<td>46</td>
</tr>
<tr>
<td>p-value</td>
<td>0.051</td>
<td>0.032</td>
<td>0.594</td>
<td>0.105</td>
<td>0.213</td>
<td></td>
</tr>
<tr>
<td>$\eta^2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shaded cells indicate non-significant results.
Support and working relationships

Academic staff were asked to rate the extent to which they felt supported by their institution, and by colleagues at different levels, on a five-point scale where 5 indicated high levels of support (Figure A2.16). The highest level of support was reported from academic peers (i.e. those around the same career stage), and the lowest from institutions. No statistically significant differences were found between men and women.

Figure A2.16: Mean satisfaction with support from different sources, by gender – academic staff

Source: Online survey. All current staff. N=431. Patterned bars represent non-significant differences between men and women.

Men with a limiting health condition reported significantly lower levels of support from their peers (p=0.004) and from junior colleagues (p=0.029) than men without a health condition, with medium effect sizes of 0.62 and 0.49 respectively. Women with a health condition also reported lower levels of support from their junior colleagues (p=0.017, with a medium effect size of 0.59). Although some significant differences emerged between the age groups, there was no clear pattern in this regard (Table A2.9).
Table A2.9: Mean satisfaction with support from different sources, by demographic groups – academic staff

<table>
<thead>
<tr>
<th>Limiting health condition</th>
<th>Your institution</th>
<th>Managers and senior staff</th>
<th>Your academic peers</th>
<th>Junior colleagues and students</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men - yes</td>
<td>2.7</td>
<td>3.2</td>
<td>3.0</td>
<td>3.0</td>
<td>221</td>
</tr>
<tr>
<td>Men - none</td>
<td>2.9</td>
<td>3.1</td>
<td>3.7</td>
<td>3.5</td>
<td>25</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.419</strong></td>
<td><strong>0.599</strong></td>
<td><strong>0.004</strong></td>
<td><strong>0.029</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td><strong>0.620</strong></td>
<td></td>
<td><strong>0.491</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women - yes</td>
<td>2.5</td>
<td>3.0</td>
<td>3.3</td>
<td>2.8</td>
<td>164</td>
</tr>
<tr>
<td>Women - none</td>
<td>2.9</td>
<td>3.2</td>
<td>3.6</td>
<td>3.4</td>
<td>20</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.116</strong></td>
<td><strong>0.429</strong></td>
<td><strong>0.251</strong></td>
<td><strong>0.017</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td><strong>0.590</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men - white</td>
<td>2.8</td>
<td>3.2</td>
<td>3.6</td>
<td>3.5</td>
<td>202</td>
</tr>
<tr>
<td>Men - not white</td>
<td>2.9</td>
<td>2.9</td>
<td>3.4</td>
<td>3.4</td>
<td>43</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.921</strong></td>
<td><strong>0.193</strong></td>
<td><strong>0.194</strong></td>
<td><strong>0.685</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cohen's d</strong></td>
<td><strong>0.269</strong></td>
<td><strong>0.421</strong></td>
<td><strong>0.791</strong></td>
<td><strong>0.636</strong></td>
<td></td>
</tr>
<tr>
<td>Women - white</td>
<td>2.9</td>
<td>3.2</td>
<td>3.5</td>
<td>3.4</td>
<td>162</td>
</tr>
<tr>
<td>Women - not white</td>
<td>2.6</td>
<td>3.4</td>
<td>3.6</td>
<td>3.5</td>
<td>21</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.269</strong></td>
<td><strong>0.421</strong></td>
<td><strong>0.791</strong></td>
<td><strong>0.636</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Your institution</th>
<th>Managers and senior staff</th>
<th>Your academic peers</th>
<th>Junior colleagues and students</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 35</td>
<td>3.1</td>
<td>3.4</td>
<td>3.7</td>
<td>3.4</td>
<td>103</td>
</tr>
<tr>
<td>35-44</td>
<td>2.9</td>
<td>3.2</td>
<td>3.6</td>
<td>3.3</td>
<td>154</td>
</tr>
<tr>
<td>45-54</td>
<td>2.7</td>
<td>3.0</td>
<td>3.4</td>
<td>3.6</td>
<td>104</td>
</tr>
<tr>
<td>55-64</td>
<td>2.8</td>
<td>3.1</td>
<td>3.4</td>
<td>3.5</td>
<td>54</td>
</tr>
<tr>
<td>65+</td>
<td>3.0</td>
<td>3.3</td>
<td>4.2</td>
<td>4.2</td>
<td>12</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.106</strong></td>
<td><strong>0.110</strong></td>
<td><strong>0.036</strong></td>
<td><strong>0.028</strong></td>
<td></td>
</tr>
<tr>
<td><strong>η²</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Online survey. All staff. Shaded cells indicate non-significant results.

Students were also asked about the degree of support they received from different sources (Figure A2.17). In general, reported scores were higher than those of staff, with the highest levels of support received from supervisors. There were no statistically significant differences between men and women. The only other significant difference found was that ethnic minority students felt on average less supported by other postgraduates, with a mean of 3.7 compared with 4.0 for white students (p=0.034, with a modest effect size of d=0.31).
Figure A2.17: Mean satisfaction with support from different sources, by gender – postgraduates

![Bar chart showing mean satisfaction with support from different sources by gender.]

Source: Online survey. All current students. N=231. Patterned bars represent non-significant differences between men and women.

Staff were asked to indicate the extent to which they agreed that they had good working relationships on a five-point scale, where 5 indicates strong agreement that these relationships are good (Figure A2.18). In general, working relationships were reported to be good with all three groups; senior staff, peers and junior staff and students. Staff were also asked to indicate the extent to which they felt isolated or different within their group or department. The only significant difference between men and women across any of these questions was in responses to the statement “I look different from most people in my department”, to which women expressed significantly higher agreement (p=0.001, with a modest effect size of d=0.39).
The main other significant differences with respect to working relationships were found between men with and without a limiting health condition or disability (Table A2.10). Men with a health condition were less likely to agree they had a good working relationship with their peers (p=0.042, with a moderate effect size of 0.43), and more likely to say they felt isolated (p=0.030, d=0.47), and that compared to others in their department they felt different (p=0.000, d=0.76) and looked different (p=0.000, d=0.87). Ethnic minority men were also more likely to say they looked different (p=0.000, d=0.86).
Table A2.10: Mean scores on quality of working relationships and integration, by demographic group – academic staff

<table>
<thead>
<tr>
<th></th>
<th>Good working relationship with...</th>
<th>I feel isolated within my group or department</th>
<th>I feel different from most people in my department</th>
<th>I look different from most people in my department</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Managers and senior staff</td>
<td>Academic peers</td>
<td>Junior colleagues and students</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Men - yes</td>
<td>3.8</td>
<td>3.8</td>
<td>4.1</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Men - none</td>
<td>3.9</td>
<td>4.2</td>
<td>4.2</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td><strong>p-value</strong></td>
<td>0.714</td>
<td><strong>0.042</strong></td>
<td><strong>0.567</strong></td>
<td><strong>0.030</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Cohen's d</strong></td>
<td>-0.432</td>
<td>-0.394</td>
<td>-0.897</td>
<td>0.468</td>
</tr>
<tr>
<td></td>
<td>Women - yes</td>
<td>3.6</td>
<td>4.1</td>
<td>4.2</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>Women - none</td>
<td>3.8</td>
<td>4.1</td>
<td>4.1</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td><strong>p-value</strong></td>
<td>0.394</td>
<td>0.897</td>
<td>0.740</td>
<td>0.747</td>
</tr>
<tr>
<td></td>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td>0.479</td>
</tr>
<tr>
<td></td>
<td>Men - white</td>
<td>3.9</td>
<td>4.2</td>
<td>4.2</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>Men - not white</td>
<td>3.6</td>
<td>4.0</td>
<td>4.2</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td><strong>p-value</strong></td>
<td>0.129</td>
<td>0.079</td>
<td>0.998</td>
<td>0.221</td>
</tr>
<tr>
<td></td>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td>-0.861</td>
</tr>
<tr>
<td></td>
<td>Women - white</td>
<td>3.8</td>
<td>4.1</td>
<td>4.1</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>Women - not white</td>
<td>3.9</td>
<td>4.0</td>
<td>4.1</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td><strong>p-value</strong></td>
<td>0.676</td>
<td>0.346</td>
<td>0.799</td>
<td>0.386</td>
</tr>
<tr>
<td></td>
<td><strong>Cohen's d</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Under 35</td>
<td>3.9</td>
<td>4.1</td>
<td>4.0</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>3.8</td>
<td>4.2</td>
<td>4.2</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>45-54</td>
<td>3.8</td>
<td>4.2</td>
<td>4.2</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>55-64</td>
<td>4.0</td>
<td>4.2</td>
<td>4.3</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>65+</td>
<td>4.1</td>
<td>4.7</td>
<td>4.5</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td><strong>p-value</strong></td>
<td>0.642</td>
<td>0.168</td>
<td>0.075</td>
<td>0.352</td>
</tr>
</tbody>
</table>

Source: Online survey. All current staff. Shaded cells indicate non-significant results.
Staff were asked to rate the extent to which they felt that senior colleagues and peers perceived them to have certain characteristics, on a five-point scale, where 5 indicates strong agreement. In general, respondents felt quite well-regarded by their peers (Figure A2.19). Men were significantly more likely to say they were perceived as brilliant (p=0.013, with a modest effect size of $d=0.38$), while women were more likely to say they were perceived as reliable (p=0.002, effect size $d=0.34$).

Figure A2.19: Mean extent to which respondents feel peers perceive them to have certain characteristics, by gender

![Mean extent to which respondents feel peers perceive them to have certain characteristics, by gender](image)

Source: Online survey. All current staff. N=426. Patterned bars represent non-significant differences between men and women.

Similar results were found with respect to respondents’ perceptions of how senior colleagues saw them, with men agreeing more strongly that they are perceived as brilliant (p=0.001), while women are more likely to agree that they are perceived as reliable (p=0.000) and one of the team (p=0.029). Effect sizes were of a similar magnitude (0.34, 0.37 and 0.22 respectively).

Students were also asked to indicate the extent to which they felt they had good working relationships, and felt integrated within their group or department (Figure A2.20), on the same scale as staff. Men were more likely to say they had a good working relationship with their supervisor (p=0.011, $d=0.33$), while women were more likely to say that compared to others in their department they felt different (p=0.011, $d=0.33$) or looked different (p=0.000, with a medium effect size of $d=0.59$).

There were no differences in these perceptions with respect to health conditions or ethnicity. Postgraduates aged 35 and over were less likely to say they had a good working relationship...
with other postgraduates in their department \( (p=0.022, \ d=0.39) \), and more likely to say they felt different from most people in their department \( (p=0.000, \ d=0.59) \).

**Figure A2.20: Mean scores on quality of working relationships and integration, by gender – postgraduates**

![Graph showing mean scores on quality of working relationships and integration by gender - postgraduates](image)

Source: Online survey. All current students. \( N=244 \). Patterned bars represent non-significant differences between men and women.

Former staff and students were also asked about the quality of their working relationships while they were in academia, and the extent to which they had felt isolated or different within their departments. Their responses to these questions were almost identical to those of current staff and students (Figure A2.21). Respondents were most satisfied with the support they received from their peers, least with their institutions, and in general agreed that they had good working relationships both with their seniors and peers.
Caring Responsibilities and Flexible Working

34% of staff reported having caring responsibilities for a child or elderly or disabled adult; 42% of women and 28% of men. Respondents were asked to indicate the extent to which their academic responsibilities interfered with their caring responsibilities on a five-point scale, with a score of 5 implying that they interfered a great deal. The mean score for men was 3.4, while the mean for women was 3.7, but this difference was not found to be statistically significant.

15% of students said they had caring responsibilities; 20% of women and 11% of men. The mean score for the extent to which they felt their academic responsibilities interfered with their caring responsibilities was 3.1 for women and 3.6 for men; this difference was not found to be statistically significant.

Staff were also asked whether they had made use of flexible working provisions (in excess of the standard flexibility available in the job), or intended to do so (Figure A2.22). A considerable proportion of women (35%) had taken up flexible working arrangements, while only 21% of men had. 27% of men and 29% of women had not worked flexibly but would consider doing so, and more men reported that they would not work flexibly (29%, compared with 20% of women). These differences were found to be statistically significant (p=0.004).
Those who said they had taken up flexible working provisions were asked to score on a five-point scale the extent to which they believed aspects of their job may have been affected as a result (with 5 implying a large impact). Those who had not taken these provisions but said they might in the future were asked to indicate the extent to which they thought it might affect these same aspects of their work. The results of this are shown in Figure A2.24. Among those who had taken flexible working, women were more likely than men to believe that it might affect their promotion prospects ($p=0.012$) and their productivity as a researcher ($p=0.002$), with moderate effect sizes of 0.50 and 0.60 respectively. Those who had not taken these provisions but might in the future expressed generally higher levels of concern than those who had. The only significant gender difference in this group was that women were more likely to express concern that it would affect how others at work perceived their abilities ($p=0.007$, with an effect size of 0.47).

Respondents were also asked whether they had taken a career break, including time off to care for dependents (Figure A2.23). 36% of women had done so, but only 8% of men had. Although similar proportions of men and women said they would consider it, men were more likely to say they would not take a career break (38% of men compared to 27% of women). This association was found to be statistically significant ($p<0.001$).
Again, those who had taken a career break, or thought they might in future, were asked to score on a five-point scale the extent to which they felt taking a career break would have consequences for aspects of their work (Figure A2.25). For both those who had taken or might take a career break, women were more likely than men to express concern at the impact on their promotion prospects (p=0.006 for those who had taken a career break and p=0.024 for those who might take one), and their productivity (p=0.000 for those who had taken a career break, and p=0.038 for those who might take one). Effect sizes were moderate for those who might take a career break (d=0.45 and 0.41 respectively), and large for those who had taken a career break (d=0.70 and 0.93). Again, those who had not taken a career break but might do so in future expressed slightly higher levels of concern overall.
Figure A2.24: Perceived impact of taking flexible working, by gender and whether have taken or might in future

Source: Online survey. All current staff who have taken or would take up flexible working provisions. N=239. Patterned bars represent non-significant differences between men and women.
Figure A2.25: Perceived impact of taking a career break, by gender and whether have taken or might in future

Source: Online survey. All current staff who have taken or would take a career break. N=204. Patterned bars represent non-significant differences between men and women.
**Discrimination, harassment and bullying**

**Staff**

Respondents were asked three questions on the issue of discrimination, harassment and bullying, and the results for the staff respondents are shown in Figure A2.26.

The first was if they felt they had ever been discriminated against in a recruitment process. This was something that around 30% of the sample reported. There was no statistically significant gender difference in response to this question.

The second question was whether they had experienced harassment or bullying whilst employed as a member of academic staff or as a postgraduate. Women were significantly more likely to have experienced this (49%) than men (34%).

Finally respondents were asked if they had ever experienced ‘micro-aggression’ – feeling excluded or inferior because of something a colleague had said, even if they did not mean to make them feel this way. Women were significantly more likely to have experienced this (67%) than men (43%).

**Figure A2.26: Experiences of discrimination, bullying and micro-aggression, by gender – academic staff**

Source: Online survey. All current staff. N=432. Patterned bars represent non-significant differences between men and women.

---

15 This term was not used in the survey question presented to respondents, but is used here in the reporting of the results.
Those with a limiting health condition were more likely than those without to say they had experienced all three of these (Table A2.11). Ethnic minority staff were more likely to feel they had been discriminated against in a recruitment process (p=0.038, d=0.28). Apart from this there were no significant differences that would suggest greater experiences of discrimination, bullying or micro-aggression among ethnic minorities, those of different religions or ages, or those who are not heterosexual.

Table A2.11: Experiences of discrimination, bullying and micro-aggression, by demographic groups – academic staff

<table>
<thead>
<tr>
<th></th>
<th>Discriminated against in recruitment (%)</th>
<th>Experienced harassment or bullying (%)</th>
<th>Felt excluded or inferior (%)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>27.4</td>
<td>33.6</td>
<td>42.7</td>
<td>248</td>
</tr>
<tr>
<td>Women</td>
<td>33.2</td>
<td>48.9</td>
<td>67.4</td>
<td>184</td>
</tr>
<tr>
<td><em>p</em>-value</td>
<td>0.198</td>
<td>0.001</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td>-0.235</td>
<td>-0.558</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Limiting health condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48.8</td>
<td>71.1</td>
<td>71.1</td>
<td>45</td>
</tr>
<tr>
<td>None</td>
<td>27.7</td>
<td>36.2</td>
<td>51.4</td>
<td>397</td>
</tr>
<tr>
<td><em>p</em>-value</td>
<td>0.004</td>
<td>0.000</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td>0.465</td>
<td>0.729</td>
<td>0.397</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>28.2</td>
<td>39.6</td>
<td>53.1</td>
<td>68</td>
</tr>
<tr>
<td>Not white</td>
<td>40.9</td>
<td>43.5</td>
<td>58.8</td>
<td>369</td>
</tr>
<tr>
<td><em>p</em>-value</td>
<td>0.038</td>
<td>0.543</td>
<td>0.386</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td>-0.278</td>
<td>0.676</td>
<td>0.312</td>
<td></td>
</tr>
<tr>
<td><strong>Sexual orientation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>31.4</td>
<td>41.0</td>
<td>55.1</td>
<td>45</td>
</tr>
<tr>
<td>Not heterosexual</td>
<td>15.6</td>
<td>31.1</td>
<td>46.7</td>
<td>376</td>
</tr>
<tr>
<td><em>p</em>-value</td>
<td>0.028</td>
<td>0.202</td>
<td>0.286</td>
<td></td>
</tr>
<tr>
<td>Cohen's d</td>
<td>0.347</td>
<td>0.554</td>
<td>0.342</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 35</td>
<td>26.5</td>
<td>35.6</td>
<td>48.1</td>
<td>104</td>
</tr>
<tr>
<td>35-44</td>
<td>26.5</td>
<td>39.4</td>
<td>56.8</td>
<td>155</td>
</tr>
<tr>
<td>45-54</td>
<td>34.6</td>
<td>44.8</td>
<td>55.2</td>
<td>105</td>
</tr>
<tr>
<td>55-64</td>
<td>37.0</td>
<td>40.7</td>
<td>54.7</td>
<td>53</td>
</tr>
<tr>
<td>65+</td>
<td>23.1</td>
<td>46.2</td>
<td>23.1</td>
<td>13</td>
</tr>
<tr>
<td><em>p</em>-value</td>
<td>0.384</td>
<td>0.721</td>
<td>0.144</td>
<td></td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>27.2</td>
<td>41.4</td>
<td>55.3</td>
<td>266</td>
</tr>
<tr>
<td>Christian</td>
<td>31.1</td>
<td>41.0</td>
<td>52.4</td>
<td>105</td>
</tr>
<tr>
<td>Other</td>
<td>38.0</td>
<td>30.2</td>
<td>50.9</td>
<td>53</td>
</tr>
<tr>
<td><em>p</em>-value</td>
<td>0.277</td>
<td>0.306</td>
<td>0.786</td>
<td></td>
</tr>
</tbody>
</table>

Shaded cells indicate non-significant results
Students

Respondents were asked the same three questions as staff on the issue of discrimination, harassment and bullying, and the results for the student respondents are shown in Figure A2.27. Only around 13% of the sample reported that they had ever been discriminated against in a recruitment process, and 16% that they had experienced harassment or bullying. There was no statistically significant gender difference in the responses to either of these questions. However, women were significantly more likely to have experienced micro-aggression; 54%, compared with 20% of men.

Figure A2.27: Experiences of discrimination, bullying and micro-aggression, by gender – postgraduates

Source: Online survey. All current students. N=246. Patterned bars represent non-significant differences between men and women.

No significant differences in these experiences were found by ethnicity, sexual orientation, age, religion or health condition or disability.

Future plans

Staff

Respondents were asked how far they would be willing to move if they had the opportunity to move to a higher level in their career (Figure A2.28). Most were willing to move to a different institution if it did not mean having to relocate their household – only around 12% were committed to staying at their present institution. A majority said they would move to a different city, with fewer saying they would move to a different country. There were no statistically significant gender differences in this respect.
Respondents were asked how likely they were to search for other types of job, on a five-point scale, where 5 equated to very likely. The mean scores are shown in Figure A2.29. The relatively low mean scores indicate that in general respondents were not that likely to consider jobs outside of academic research. There were no statistically significant gender differences in these intentions.
Men with a limiting health condition reported a significantly higher likelihood that they would seek another job in higher education (p=0.019, d=0.50), or outside of research or higher education altogether (p=0.009, d=0.56). Younger age groups were more likely to seek a research job in a different sector (p=0.000, \(\eta^2=0.14\)), or outside of research or higher education altogether (p=0.009, \(\eta^2=0.03\)).

Respondents were asked to indicate the extent to which they felt different jobs offered different attributes (Figure A2.30). Academia was felt to offer most in terms of interest, depth, range of tasks, innovation and job security. A research career outside of academia was thought to offer a better salary and work-life balance. There were no significant gender differences.
Figure A2.30: Type of job that offers the most on selected attributes – academic staff

<table>
<thead>
<tr>
<th>Attribute</th>
<th>An academic research career</th>
<th>A research career outside of academia</th>
<th>A non-academic within the higher education sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Interest</td>
<td>85</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Depth</td>
<td>86</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Innovation</td>
<td>60</td>
<td>37</td>
<td>3</td>
</tr>
<tr>
<td>Range of Tasks</td>
<td>72</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>Autonomy</td>
<td>92</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Salary</td>
<td>10</td>
<td>79</td>
<td>11</td>
</tr>
<tr>
<td>Job Security</td>
<td>56</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>Work Life Balance</td>
<td>31</td>
<td>42</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: Online survey. All current staff. N=364.
Students

Students were asked to rate how likely they were to seek an academic job after they completed their postgraduate studies, on a five-point scale, where 5 indicates highly likely. The mean scores were for men and women were 3.5 and 3.4 respectively, and this difference was not statistically significant. There were no significant differences with respect to ethnicity or health condition or disability, but postgraduates aged 35 and over were more likely to seek an academic career than those under 35 (p=0.043, d=0.35).

Those who did not rule out an academic job were asked how far they would be willing to move to obtain one (Figure A2.31). Over half were willing to move to a different country, and the majority were willing to move to a different city. There were no statistically significant gender differences in this respect.

Figure A2.31: Willingness to move in order to take up an academic position, by gender – postgraduates

![Bar chart showing willingness to move to different countries and cities by gender](chart.png)

Source: Online survey. All current students who have not ruled out seeking an academic position. N=190. Patterned bars represent non-significant differences between men and women.

Students were asked on a five-point scale, with 5 representing ‘definitely’, how likely they were to seek other types of job after their postgraduate studies (Figure A2.32). Respondents were most likely to say they would look for a research job in a different sector. There were no significant differences between men and women.
Students were asked to indicate which type of job they believe offers the most to them on a number of different attributes (Figure A2.33). Like staff, students felt that academia offered the most in terms of personal interest, depth and autonomy, and research outside of academia offered a better salary and work-life balance. However, unlike staff, students perceived greater opportunities for innovation and range of tasks in research outside of academia, as well as greater job security. There were no statistically significant gender differences. Perhaps this might reflect a lack of understanding of academic jobs.
Figure A2.33: Type of job that offers the most on selected attributes – postgraduates

<table>
<thead>
<tr>
<th>Attribute</th>
<th>An academic research career</th>
<th>A research career outside of academia</th>
<th>A non-academic within the higher education sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Interest</td>
<td>61</td>
<td>37</td>
<td>3</td>
</tr>
<tr>
<td>Depth</td>
<td>71</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>Innovation</td>
<td>43</td>
<td>57</td>
<td>1</td>
</tr>
<tr>
<td>Range of Tasks</td>
<td>35</td>
<td>50</td>
<td>16</td>
</tr>
<tr>
<td>Autonomy</td>
<td>73</td>
<td>22</td>
<td>5</td>
</tr>
<tr>
<td>Salary</td>
<td>4</td>
<td>80</td>
<td>16</td>
</tr>
<tr>
<td>Job Security</td>
<td>35</td>
<td>48</td>
<td>17</td>
</tr>
<tr>
<td>Work Life Balance</td>
<td>39</td>
<td>39</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: Online survey. All current students. N=231.
Appendix 3: Qualitative responses

This chapter presents a comprehensive analysis of the qualitative data collected through the interviews, and through the open response questions in the online survey.

Motivation for pursuing an academic career

This section will consider the participants’ motivations for undertaking an academic career or pursuing a PhD, and how the participants’ interests in technology developed, as found within the qualitative data. The analysis of the qualitative findings produced two distinct paths toward a career in technology and computing. Some participants developed an interest in technology from a young age under the influence of their parents, particularly their fathers, or an influential teacher in primary or high school. Participants would recall stories of their first computer at home or the first times they were exposed to computers in school. For this grouping, their interest was then pursued through their studies when able to – particularly in the choice of computing, maths and physics courses in later high school.

“I was about seven years old and we bought our first computer in 1997, and I was the only one who could pick it out how to get it to work, the DOS part of it and make anything work. Yeah, I’ve always been into computers in general, and then I started studying it properly in about sixth grade. We started coding and stuff.” (Interview Respondent No. 31, female)

For the other group of participants, an interest in computing and technology developed from their career. Some of the older participants for example had pursued mathematics degrees and then encountered computers within their university careers, which then led them into the direction of a more technological career.

“I started out by studying literature and comparative literature studies, but then [I discovered] there is such a thing as information science in German, and... it has some programming in it, and then I also became interested in linguistics rather than literature, and linguistics has quite a bit of formula in it, so I gradually became more interested in the mathematical computing side of things, but I didn’t start out studying that.” (Interview Respondent No. 17, female)

I guess I’m old enough to have grown when we didn’t have computers or anything at all, so my first encounter with computers was when I got to university and we learned programming as part of a mechanical engineering degree, and at that point I realised that I was reasonable at programming, so that’s where my sort of interest started and then my PhD was sort of developing a computer controlled machine, so that’s when I realised that I was actually better at being a software engineer than a mechanical engineer.” (Interview Respondent No. 36, female)

From this developing interest in technology, the participants were then asked about how their interest in an academic career developed. For the PhD students interviewed a number
of motivations were discussed. The most common explanations were either that the project sounded interesting or that further study was a logical progression from their undergraduate work.

“Part of it was I wasn’t sure what else to do. I didn’t really know about industry jobs at the time when I was deciding what to do, but also I just quite enjoyed the research aspect. I felt like I was actually doing something fun and useful. I mean, I really enjoyed my undergraduate research projects, so that made me want to do a masters and PhD.” (Interview Respondent No. 12, female)

Other participants cited the example of tutors or lecturers, with a number explaining that they had decided to pursue their PhD at the personal suggestion or recommendation of one of their tutors.

“One of the tutors I had there, my logic tutor, suggested that I consider doing a master’s in artificial intelligence. He had a previous student who had gone on to do that particular master’s and he felt that it would suit me so he suggested I look at it and it looked like an interesting thing to do, so that’s what I did.” (Interview Respondent No. 8, female)

While many of the participants felt they had almost fallen into academia by accident through these routes, a number of the participants felt a strong calling to the intellectual or teaching aspects of the career. The decision to pursue a career in academia was seen as a means of pursuing the cutting edge in technology:

“I suppose it remains the closest you can get in the modern age to being a pioneer. They’ve explored most of the earth already, and interspace travel just doesn’t seem to be on the cards anytime soon, so the only place you can break new ground is in research and academia. And the speed with which we are moving forward, especially in information technology, is exciting and I guess I want to contribute my small bit to whatever comes next.” (Interview Respondent No. 31, female)

While a number of participants cited an academic career as very important to them, others argued that they were primarily interested in technology and research, and that pursuing a career in academia was not their primary motivation. For these participants, academia provided them a means of pursuing applied research.

“I wanted work that’s interesting. If you’re spending so much time working, you want it to be working on something interesting and with people that are interesting, doing something that will hopefully make some sort of progress. I’m not wedded to academia, but if I moved to industry, it would be an industry where I would still be doing research. I try to combine physics and IT, which is what I started from [...] so even if I moved from academia, it would still be working at some other research institute that used the super-computer.” (Interview Respondent No. 32, female)
“I just like programming, analysing data, finding results... so yeah, I think as long as I’m gainfully employed, I’ll be quite happy anywhere, to be honest.” (Interview Respondent No. 21, female)

Understanding motivation to pursue a career in academia can help explain why women drop out, if their experience is not compatible with this. Women may not necessarily be intrinsically interested in tech, but rather instrumentally interested in its applications and the intellectual opportunities presented by an academic career. However, this may not keep them in a job that does not give them the opportunity to pursue the things that matter to them:

“I’m actually thinking about leaving academia because really, this experience here has showed me that it’s not necessarily the field that I want to stay in, because of most publication pressure put on us, and focus on things that I don’t believe are worth focusing on, which is just getting publications out for the sake of it without really necessarily caring ... about whether the quality is great.” (Interview Respondent No. 27, female)

Similarly, women may feel unhappy in an environment where they are expected to display characteristics that do not come naturally to them:

“Female members of staff, they expect us to act in a way that a male would, so very egotistically and very driven, very competitive, you know, all the sort of male characteristics, and I think they find it puzzling that women have a different way of approach some things, and that doesn’t then play into what they see as a high-flying researcher. I think some of the more male characteristics – again, I’m generalising horribly – of, you know, being highly competitive, highly driven, to the point where they almost have blinkered vision on what they’re trying to achieve, is very male and they can’t understand how a woman might not be able to do that.” (Interview Respondent No. 41, female)

One respondent cited the applied focus of her institution as something she valued, because it was compatible with her own motivations, and that she might be less happy in a more theory-orientated environment:

“I do this because I want to help people work better with information and computers and the things that I know how to do and improve systems... [That’s] one of the reasons I came here... I think if I went to [Russell Group university], they are not as focussed on that... They don’t value that practicality as much as the prestige of being academic and that notion of ‘this is a big fancy university and we do what we want here’... I think we have in general just a better grounding of realising that we’re in a very privileged position but being able to use that to help the world in whatever way our expertise will help us to do. Rather than just being able to sit around and think great thoughts all day, or whatever they do at [Russell Group university]” (Interview Respondent No. 7, female)
Working conditions and expectations

Within the qualitative data, it was widely held that the academic career had a number of disadvantages. For a number of the participants, the choice of an academic career amounts to a trade-off, between autonomy and money, and choosing an academic career was a choice to allow themselves more freedom or flexibility despite the lower pay compared to industry:

“Well, I think you basically sacrifice pay for freedom of being able to study things that are interesting to you, and that certainly was why at the moment. It will depend a little bit on how this field that I’m in develops, so it’s not clear at the moment if I have career progression. At the moment, as a young researcher, I’m very happy. If I become more senior and stay at the same pay grade for years, I won’t be so … yeah, it will depend a bit on whether people recognise that, what I’m doing is something useful.” (Interview Respondent No. 32, female)

From this central tension, a number of other disadvantages emerged. Many respondents felt the expectations upon them to be unreasonable. Most in lecturing positions felt it was not possible to carry out all their teaching and admin duties and also achieve the expected research grants and outputs. Pressures came both from institutional pressures (REF, NSS, etc.) but also leadership within departments, with bad practices cascading down from the top.

“I have way too much work to do within a reasonable amount of time, and I think there’s a lot of pressure, not just from my department and from [my university], but… the way that higher education is set up in the UK right now, you have the REF every seven years, you’ve got now the TEF coming in, there are all these metrics that we’re supposed to be meeting, and at the same time, you know, this idea that students are consumers and you have to keep them happy and, you know, there’s a lot of pressure to do well against these metrics… And, you know, I feel very squeezed in the number of hours that I have to do, and the things that I’m required to do, and the things that I actually feel like are going to make the most difference to my students or to the research. And so I, you know, in practice I end up working closer to 60 hours a week on a good week, and more than that when there’s a deadline, and it’s just very tiring.” (Interview Respondent No. 25)

One respondent summarised the problem of a lack of a ‘ceiling’ on hours or outputs – more is always better in academia:

“The problem I think with our job is that there is no clearly defined set of tasks you have to do, especially when you do research… It’s open-ended, you can always do more and you have to do more to stay at the forefront of research.” (Interview Respondent No. 17, female)

There was some suspicion about work allocation mechanisms, with some staff members seeming to end up with more time for research than others, and there was considered to be room for favouritism and prejudice in this, as well as other colleagues being selfish.
“I think you could make this career work for you if you are very principled, if you could say no, if you really trained yourself to be a bit more ruthless, to really follow your career path and not care too much.” (Interview Respondent No. 17, female)

Some respondents talked about the difficulty they had in saying no to things. There were various reasons why they struggled with this. One was a feeling of guilt that another equally busy colleague would be burdened with the task if they did not do it. There was also a concern about the impact of saying no on sustaining and progressing in their career. Respondents also genuinely wanted ‘extras’ such as outreach to happen because they are important or valuable, even if they are not strictly necessary or personally career enhancing. However doing these things (being a ‘good citizen’) was seen as not valued in promotions.

“We are told that unless we do what we would call ‘citizenship duties’, that it will affect promotion, however I know of several colleagues who [don’t do this] and still seem to be promoted, and I would say are promoted over people who actually are good citizens within their workplace... And it seems to be the female members of staff that are the ones that take on a lot more of these good citizenship roles generally, probably at the expense of their own research outputs and probably at the expense of their own health, but they seem to have less of a capacity to say no to people, and so if we look at...most of the outreach things that are done in this department are done by me and one or two other female colleagues, whereas the guys just go ‘sorry I haven’t got time’, well we don’t actually either but somebody’s got to do it.” (Interview Respondent No. 4, female)

Confidence

Confidence emerged as a key theme from the qualitative data collected. Some respondents noted feelings of ‘impostor syndrome’ in their academic career – the feeling that they are a ‘fraud’ and about to be discovered as inadequate in their work. The feelings of inadequacy were more strongly felt by those who had come to computing from a different discipline:

“I think there is no reason I shouldn’t be able to do [my job]. But I do have insecurities from time to time. Irrational mostly.” (Interview Respondent No. 5, female)

“I’ve looked at PhD’s from other people, they’re either so technical I can’t read them because they’re about something really computer sciencey, or they’re kind of just based on a complete literature review [...] it seems a little bit bonkers because people have done what I’m doing before, so why can’t I just get hold of them, but that seems to be because then you’re seen to be cheating, because you might copy someone else’s, but then I don’t know what I’m doing, so it all seems a little bit...I think again I’m being naive but I don’t know if I’m doing enough, and I don’t know if what I’m doing is good enough, that sounds awful doesn’t it?” (Interview Respondent No. 1, female)

Academic careers combine a wide range of competencies – writing, researching, teaching, public speaking, time management – and for many it is a daunting experience. In many cases, developing competence is achieved on the job. Teaching in particular can be particularly daunting as a new lecturer:
“[When you are a PhD student or postdoc] you’re trained to do research, and then suddenly [when you become a lecturer] you’re expected to do teaching and a couple of other things such as pastoral care for students, and all these things you’re actually not trained for… Certainly I didn’t feel very competent to start with… You do get some formal training, and you have to actually do a two year course on that, where you get trained to do all these things, the problem is that when you arrive there you immediately start teaching without having this training.” (Interview Respondent No. 17, female)

Some of the PhD students interviewed reported lacking confidence across a range of competencies.

“The things that I’m struggling with now…. organisation and so on, in a career in academia, there’s just more things that you need to juggle and more deadlines that you need to meet, and more responsibility and I just don’t feel like I’m cut out to do that. And giving talks and things is obviously something that will improve over time as you do it more, but I just feel like a lot of the key things in academia are things that I actually find really difficult.” (Interview Respondent No. 30, female)

Issues of confidence related to diversity appeared within the qualitative data, with a number of respondents linking the confidence with which some people display with social background. The following accounts link specifically to issues of class and gender. For example, the first participant commented that she did not feel her background had given her a sense of entitlement to pursue an academic career. The second participant argues that feelings of ‘imposter syndrome’ do not seem to affect her male counterparts.

“No-one in my family would have guessed that I would even try to pursue research and certainly not in computing... so I’m not sure that I was prepared socially for going forward after finishing. I don’t know if that makes sense. I had a few colleagues who finished and it was clear that they were going to continue with research, and it wasn’t because their work was much better than mine, but maybe they had a different, or ended at least, with a different sense of entitlement than I did.” (Interview Respondent No. 6, female)

“We seem to suffer a lot more with feeling, like, we don’t fit and that we just don’t seem to be as confident in our innate ability to complete a PhD, whereas the males seem to … even though some of them are significantly less well-qualified than us, and achieve less than us, just don’t seem to have that mental block of, “Oh, I can’t do this, and I’m not good enough to do this,” and those kind of things. They just don’t have that.” (Interview Respondent No. 40, female)

Support and working relationships

Throughout the research, ‘the people I work with’ was something that was repeatedly cited as a major positive in most respondents’ accounts of their jobs. A number of the participants felt that collaboration, meeting people and networking were seen to be among the most important sources of job satisfaction:
As I said before the opportunity to travel and to meet people, the networking [socially] aspect, to be involved in technology at the forefront, to see what’s happening out there and to feel like you are actually a part of all that, you’re integral to the way that technology is developing and the impact that that’s going to have on the future generations, and that’s quite an amazing feeling when you sit back and take that in a little bit.” (Interview Respondent No. 14, female)

Some of the staff within the interviews recounted that they had experienced issues with colleagues:

“The group that I work with at [University], I work with two people very closely and it’s not a clash, it’s just that they are a lot more similar and I’m very different to both of them and I get left out, pushed aside. I’ve had my ideas stolen. I’ve not been given opportunities that other people are given. I bring up things and they get ignored. I get talked over. It’s not a clash, we can get along fine. We can all go to the pub together and socialise but, again, it’s just not the environment that’s good for me to move up in. I’ll never move up in this situation and I’m not happy. I’m not fine with that.” (Interview Respondent No. 9, female)

Although most students generally felt well integrated, some expressed a sense of being different, for example one student noted that they were less interested in computer gaming then their peers, while another (who was the only girl in her student cohort) noted a more intangible feeling of being ‘different’:

“People are generally, you know, really friendly towards me but I still, like, although I’m included, I do get treated a bit differently. Maybe, like, the attitudes towards me are a little bit different than to everyone else… Maybe it’s just me being paranoid, but I just feel like I stand out a little bit.” (Interview Respondent No. 26, female)

One respondent commented on the importance of personal connections in helping with the next stage of career after PhD, e.g. who gets the (best) first jobs:

“I think that through your PhD that in order to progress onto your first job afterwards, a lot of it comes down to personal recommendation and there’s a thing about if a supervisor has goodies to hand out, it’s who they go to, who gets invited along with the supervisor and is who the supervisor introduces people to.” (Interview Respondent No. 11, female)

Yet, not all the participants felt they were successful in this respect. Acknowledging that academic work by its very nature involves a great amount of networking, some of the participants specifically cited networking as a barrier to their participation in an academic career. Illustrative of this is this account from an experienced lecturer with autism:

“One of the things you have to do as an academic is networking to further your career and talk to people and do collaborative research and stuff, and that’s particularly hard if you’re
autistic, because autism essentially puts a brake on social interactions.” (Interview Respondent No. 33, male)

“Academic work requires networking and likability. Men in this discipline are often overpowering and refuse to involve women especially those with ethnic minority background. Networking has started to be an impossible task...I hate it” (Online survey respondent, female)

Furthermore, some have found that cultural differences can cause isolation. One of the participants recounted that, coming from a Muslim background, he feels isolated from what he perceives as a less sociable atmosphere compared to the background he comes from:

“It’s accepting people socially and trying to be more sociable, that they have really failed miserably and a lot of my Muslim colleagues that I speak to, they say the same things, that social isolation, and it’s really affecting them and they’re thinking of new jobs, thinking of moving and even me, I’m thinking of moving. I can’t cope with this.” (Interview Respondent No. 39, male)

He then goes on to specifically link ‘pub culture’ as a key barrier that often results in him being excluded by virtue of being a Muslim. This site of networking was widely reported by a number of participants from different backgrounds as problematic. Participants often explained that because a lot of informal networking was conducted in pub, or involving alcohol, females were often excluded in addition to those who were uninterested for religious reasons. A number of the female participants recounted their discomfort or inability to access these informal sources of networking:

“Building connections and networking in my field is done mainly by spending after work time in pubs, which I cannot do due to caring responsibilities” (Online survey respondent, female)

“There is a disturbing drink culture that includes post-meeting/lecture "networking" drinks and post-work visits to the pub.” (Online survey respondent, female)

“People always select evening- pub events to socialize. I have to pick children from childminder and I do not consume alcohol nor enjoy being in that setting. So I did feel excluded.” (Online survey respondent, female)

Caring responsibilities and flexible working

Academic work was widely held by the participants to have a long-hours culture. For the participants in this study, many found it hard to find a balance between working long hours and managing their own personal lives. For those with caring responsibilities, there was a strong perception that those who cannot work excessive hours are disadvantaged in academic work.
While many people felt that an academic career was incompatible with having caring responsibilities, a number actually found that an academic career was giving them invaluable flexibility in their family lives.

‘It was a lot more flexible... because I came from a background where you never brought your children into work and you didn’t mention them, and so I joined the university because they had a really good play scheme, and it was only later that I gradually noticed that people brought their children in occasionally and worked at home and things like that. So yes, I achieved what I wanted, but I didn’t realise how flexible it could be, and I certainly didn’t take advantage of that at the beginning.’ (Interview Respondent No. 34, female)

‘I kind of fell into teaching and it was just something I did a long time, and it was easier to hold down a job while I had a job while my son was growing up, and it meant we always had that extra income so from that point of view it kind of made sense to stay there’ (Interview Respondent No. 14, female)

The flexibility of being a PhD student was also valued in meeting their caring responsibilities:

“They are very happy to be flexible about my needs as a carer, the time I need to spend as a carer. When I started, I spoke to my supervisor and said, “Look, I’m concerned that this is full-time and I’m not going to be able to commit to that level,” and my supervisor said, “Well, you know, you’ve got a good background... We know that you can do the work and that you can fit yourself round it. Basically, I think they just trust me to do the best I can and that’s okay.” (Interview Respondent No. 22, female)

However, although the flexibility of academia was valued in reconciling work and family, the downside of this was still working or answering emails late at night:

“There’s a very grey dividing area between life and work, and work inevitably spills over into the rest of my life. So like I said, I work in the evenings when my kids have gone to bed, I have email on my phone which I find incredibly useful for keeping in communication with colleagues and students, but at the same time it’s a doubled-edged sword because it does mean that you’re constantly on call. So it’s very hard to entirely turn off from work, I think.” (Interview Respondent No. 24, female)

Another issue for those with caring responsibilities was being unable to attend seminars or social events because they are after school pick up times. Some participants were not particularly aggrieved at missing out on some social events, arguing this is not limited to academia but their wider social lives. Yet, many felt that they were missing out on academic events because these events were not arranged with parents in mind. Furthermore, the PhD students who also had caring responsibilities, reported similar issues with regard to missing seminars and social events:

“Events often happen in the later afternoon and early evening which are the times that are difficult for me to do. I don’t think people are intentionally excluding, but it is a common problem that if you’ve got to get back for children you can’t do those events... The way
that I’ve felt not included in the department is because of me not being able to be at group events, whether they are academic or social. A classic example is that there will be a late afternoon seminar...and people say we'll go to the pub afterwards, and even if I can come to the seminar, I can’t come to the pub afterwards and that’s where the soft networking stuff goes on and it’s frustrating.” (Interview Respondent No. 11, female)

“Things like workshops and seminars, I’ve quite frequently not been able to attend those because they’re outside my working hours when I have childcare responsibilities.” (Interview Respondent No. 24, female)

As the PhD students interviewed explained, some PhD courses require intensive and/or residential courses, which is difficult to balance with other responsibilities. Indeed, there is perhaps an assumption by those designing courses that a PhD student does not have caring responsibilities. Having children also limits mobility with respect to finding a postdoc position. The future career plans of many of those with caring responsibilities was consistently found to be limited as a result.

For many respondents, the impact of caring responsibilities was seen as the biggest difference between male and female academics – even male academics with children did not seem to have to make the same career compromises:

“No I don’t think they do, which sounds awful but if you’ve got children, and this is going to sound terrible, but if you’ve got kids I think it’s less frequent that you come across dads being single dads with sole responsibility for their children, so I certainly don’t come across it so often, and I haven’t met anybody doing a PhD who is a single dad looking after a young person, they’re either single men who have no responsibilities or they’re married men who have got a wife who is a part of that family unit.” (Interview Respondent No. 1, female)

“Some of my male colleagues have children about the same age as my little daughter, they seem to be staying quite a long time in the department, and they’re coming in early, I don’t know how they do it, they must have very supportive wives.” (Interview Respondent No. 17, female)

“Most of my male colleagues that have families are lucky enough to have a partner who is largely stay at home, and so they end up doing very little of the caring part of it, so I think there’s an imbalance there... I think a lot of male staff also see maternity leave and caring leave as, well, it only affects your career for the time that you’re actually on the leave. They don’t perhaps realise that it takes a while to get back into the swing of things.” (Interview Respondent No. 41, female)

Some had managed to negotiate alternative working arrangements that suited them (e.g. part-time or remote working), but all felt they had paid a price for this, such as having to accept a job at a lower level, or being looked upon unfavourably around promotion time.
“Possibly if I had continued [full-time], I would probably now be in a much more secure employment... One of my colleagues, we were about the same age, we did our PhDs at the same time, so she’s now a lecturer and I’m just a Research Fellow... In hindsight, I probably shouldn’t have taken a big gap, but the gap ended up being longer than I had envisaged to start with... I hate to think what my pension’s going to be! It’s not going to be very good. And also scrabbling around for part-time contracts, you know, they’re always short-term, about 18 months, two years, and then, you know, often there’s a couple of months’ break while they try and sort out some more funding, and then I get another 18 months. It’s not ideal.” (Interview Respondent No. 21, female)

“I think you can’t have it all, unfortunately, and I think I have suffered because I took that decision and I have had to say no to things... I think most of it is the kind of slow kind of eating away at the time where you would use activities to develop your own career. So things like attending workshops, presenting at workshops, possibly travelling to conferences and things like that. I think it’s a gradual erosion process and you don’t really notice it’s happening for quite a long time, and then you look at colleagues who are working full-time and you think, ‘actually, they’ve been able to say yes to everything’... So I think yes, I think my career has suffered, but I don’t think there was anything I could have done differently apart from going back to work full-time, but they’ve changed that significantly and that’s something that I didn’t want to do.” (Interview Respondent No. 24, female)

One respondent noted the guilt they felt when they took maternity leave, not only in abandoning their students and postdocs, but also leaving colleagues to pick up the slack, and she had continued to carry out some duties whilst supposedly on leave:

“In some ways I feel like I didn’t get my maternity leave, I didn’t get time off much; I was working from home trying to balance a small baby and a flood of incoming emails, and I’m not sure how this could be handled better, also the problem was that the colleagues who were asked to look after my students and my postdocs didn’t get any compensation for that, so they felt ‘oh it’s just another task I have to do’, and for example some of my colleagues just didn’t meet with my PhD students, even though they were supposed to cover, so it’s really hard going on maternity leave when you’re research active” (Interview Respondent No. 17)

One respondent also noted that being overwhelmed with teaching on returning from leave makes it difficult to re-establish research:

“It might have helped if there’d been a more specific get back to work package after maternity leave with a focus more on getting me back up to speed quickly. I came back and went straight back into the second semester teach team which was my heavy teaching half of the year anyway so I didn’t have any chance to re-establish myself.” (Interview Respondent No. 8, female)
Discrimination, harassment and aggression

Discrimination and harassment

The qualitative responses to the online survey presented numerous examples of the discrimination experienced by women in their academic careers. Particularly notable were examples of discrimination based on maternity leave – or potential maternity leave.

“Expressions of interest were requested for an internal role. I was the only one who responded. Was told that someone else was invited to job share it with me in case I ‘became pregnant again’.” (Online survey respondent, female)

“I was asked if I wanted babies in a job interview” (Online survey respondent, female)

Of particular note was the specific issue of maternity leave and funding grants:

“Insufficient guidance and support available from UK funding providers for when a PI takes maternity leave. If a grant is suspended or extended as a result there are no additional funds to extend the researcher’s salary so there is usually a far from ideal situation in which the researcher continues on without the PI. This pretty much always ends up as a mess. This is likely to become more problematic now that men can also take shared parental leave.” (Online survey respondent, female)

“As a postgraduate researcher, I wasn’t allowed to take two maternity leaves on an EPSRC grant. After the maternity leave, I came back to the department working as a teaching assistant and someone else was working on ‘my’ previous grant.” (Online survey respondent, female)

“If I was asked not to get pregnant again by my doctoral training centre as they don’t have any money in the budget for maternity leave.” (Online survey respondent, female)

Female members of staff and PhD students alike, particularly in the online survey responses, indicated they had experienced instances of sexual harassment throughout their time in academia.

“During a tour for VIPs in the lab I was doing my PhD at, I was introduced as ‘this is [name] who is not only beautiful but also brilliant at the work she is doing’” (Online survey respondent, female)

“Sexual harassment online from other students who are part of the same doctoral training centre... Being threatened and called a snitch when complaints have been made of sexual harassment (although the complaints were not from me)” (Online survey respondent, female)

“When I started my PhD, in my office of 9 men, most of them had page 3 girls as screen savers, and they would make sexual comments about pretty much every female PhD
student in the dept. I was also propositioned quite a lot” (Online survey respondent, female)

The online survey responses also presented a number of examples of racist discrimination. For a number of the non-UK nationals within the online survey recounted that they had experienced discrimination felt that their competencies were under-estimated or opinions disregarded because they were not British, especially if their English language skills were not perfect.

Incidents were not always dealt with well. For example one respondent had been harassed by another student. The university ostensibly condemned the behaviour, and the perpetrator was investigated but ultimately not sanctioned, and it was only when the police became involved that the perpetrator ceased their harassment. The respondent was particularly critical of the length of time the matter took to resolve, and the poor communication she received from the university during this time.

‘Direct’ and ‘indirect’ sexism

More prevalent within the qualitative data were experiences of sexism that many of the participants felt were not at the level of harassment or discrimination. There was a reluctance to identify the various incidents as sexism. Many of the respondents might recount an incident, but would either preface by saying their experiences were “nothing direct” or “quantifiable”, or qualify their statement by saying that they could not be sure it was due to sexism.

“It’s not exactly quantifiable, you know, but sometimes you get the feeling, so to speak, that sometimes your male co-workers talk over you, which they stop if you, you know, interrupt them and point out what they’ve done which, again, you know, I think that happens in most places, but it’s still a bit … you don’t see them doing it with their male co-workers as much. So it’s little things like that which sort of tend to add up all the time, and again, you know, it’s not like they mean to, you know … it’s not that it’s done intentionally, it’s almost subconscious for them as well, so it’s really hard to point it out” (Interview Respondent No. 32, female)

“Yeah, I also feel like the most challenging personal situations I’ve had with people I worked with have had other issues at play, where it’s, you know, I wouldn’t want to say, “Oh, it’s because of sexism,” and I wouldn’t want to say, “Oh, well, sexism had nothing to do with it.” I think, you know, there are complicated situations … yeah, it’s hard to generalise from them.” (Interview Respondent No. 25, female)

As a result of these qualifications on their experience, many of the participants felt that their experiences were not worthy enough of HR’s consideration.

“I feel like if I went to someone and said, “This person made this sexist comment,” they’d be like, ‘That doesn’t sound that bad. It didn’t affect your performance.’ So I don’t really
feel like I can deal with them in any way. I usually just laugh along with them and then I go and complain to my supervisor as a friend, rather than as a work thing. I just say, “So and so said this and it was really frustrating,” and he goes, “That would be frustrating. I feel really bad for you.” That’s about it. I don’t ever really think about escalating it because it’s never what I think an HR-type person would consider sexual harassment. It’s just sexist comments that are demeaning without people realising it, I think is the key.” (Interview Respondent No. 12, female)

Indeed, rather than overt forms of discrimination and harassment, the majority of women within the study reported that it was their competence that was often in doubt because of their gender. Broadly, women reported that there was an assumption that, within computing and software development, “women won’t be the programmers, and women will do the softer jobs so to speak, and not the hardcore” (Interview respondent, female). They would then recount instances when they were made to feel their competence questioned. Common experiences included being interrupted more frequently by male colleagues, or having their answers double checked when provided to ensure they were accurate:

“Yes on numerous occasions, definitely, always challenged, always questioned by men, and one of the things that really used to annoy me is that when they would ask you a question and you would give them the answer, and then they would go and check up with somebody else to see whether your answer matched their answer, and quite often they’d do it in front of you.” (Interview Respondent No. 14, female)

Some respondents perceived some disciplinary ‘snobbery’ regarding their work, with those in more ‘technical’ research areas telling them (with varying degrees of seriousness) that their work was less valuable:

“[With my sub-discipline] there’s always an element of ‘it’s not the technical side of computer science therefore she’s a second class citizen’, there’s still some dinosaurs that have that attitude, and therefore you’re maybe not seen as being technical by some people and therefore they look down on some of the work you do.” (Interview Respondent No. 4, female)

“I used to joke, in a sort of half-hearted way, that every time I stood up in a department seminar and gave the topic of what I was working on, a lot of men would stand up and tell me that my problem didn’t exist or that they’d already solved it” (Interview Respondent No. 16, female)

Furthermore, a small number of participants engaged in teaching cited their experiences with undergraduate students as a source of problems. Within these discussions participants would highlight that these classes are themselves male-dominated environments and would sometimes lead to experiences of sexism or experience their competence being questioned:

“I mean, there have been ... well, the obvious way has been students who have just said they don’t want a female lecturer, and in that case I have been fully supported by a
Director of Programmes who just basically said words to the equivalent, ‘Tough, that’s the person taking the course’. (Interview Respondent No. 34, female)

“I wonder if sometimes the students can be more critical of a female lecturer. I think maybe ... I don’t know, this might just be my paranoia or something, but sometimes I feel like things that a male lecturer could say and get away with, or could sort of, you know, would just be accepted. There’s sort of a tendency to either appeal to our maternal nature ... it can be two things. It can be them sort of thinking, ‘Oh, she’s nice’, you know, ‘I can sort of get one over’ kind of thing, or just not taking my word for it, or getting more critical and sort of jumping on things that I say. But yeah, I don’t know. Maybe that’s just in my head, but I’ve felt that a couple of times.” (Interview Respondent No. 29, female)

The experiences of the classroom are often mirrored with other staff. A number of the participants felt that they were looked at unfavourably when it came to promotions.

“I was always knocked back because of the male being in the same situation and in the same workplace, if there was a chance for promotion the male always got it and I was always overlooked, and it used to drive me mad, so that’s not a nice place to be.” (Interview Respondent No. 14, female)

Future career

As discussed previously, the academic career was felt to have many disadvantages. Within this section, the future plans of the staff and students will be discussed. Within the qualitative findings, emphasis was made by the participants on how these disadvantages impacted their future plans. In particular, the key disadvantages of the academic career that affected future plans to stay in academia was the lack of a clearly defined career path and the lack of permanent jobs. Indeed, the early stages of an academic career were perceived as challenging and competitive, even by those who wanted to stay in academia, and something that put people off:

“There is still the attitude that your work is more than a job and it’s your raison d’être and everything else gets pushed to the side lines... Even if I wanted to make it the overwhelming thing in my life, I’m not going to be able to because I have caring responsibilities both of young kids and older parents. Permanently working weekends and evenings is not practical, but I also recognise if you’re coming up to deadlines you might need to put in those extra hours. All the people who I have talked to in the department will talk about the culture of very long hours and very high workloads.” (Interview Respondent No. 11, female)

“I’d definitely like to stay in something science-related, but I don’t think that I’d like to go into academia... It seems from the lecturers I met when I was an undergrad, it seems like it’s very stressful work for not a lot of money... The folk I’ve met in academia, they all seem to take their work with them home a lot. I quite often see lecturers or professors working late in the department, and then they’ll go into work and they’ll say, ‘I was working on this at home last night, or at home over the weekend’” (Interview Respondent No. 26, female)
In addition, the jump between short-term research positions and permanent lecturing posts was considered a problem, with many arguing that it is difficult to meet the requirements for permanent posts while in fixed-term low-level research posts. Indeed, this balance between teaching and research was cited as a key theme. For some short-term researchers, there was a feeling that they lacked teaching experience sufficient to make the move to lecturing position. Others argued that if they are looking to get experience they may end up in teaching-only positions which restrict their ability to maintain their research record.

“We have a lot of people on these short term contracts without the university particularly viewing them as future permanent employees and I think it would help to have less uncertainty at that stage in people’s careers... They come in and they do research, usually in a fairly direct fashion, and they don’t get that much experience of teaching normally.” (Interview Respondent No. 8, female)

“[You’re in a situation of] you’ve got your PhD but you haven’t got the experience to get that next step, so how do I get that experience, so a lot of people have ended up going into a teaching fellow position, which obviously is not great for your research output. I suppose it keeps you on staff but it’s very difficult to make that step to junior lecturer from a postdoc.” (Interview Respondent No. 4, female)

Industry was always in the background of discussions with participants. As discussed previously, intellectual challenge and autonomy generally seen as a trade-off for better pay in academia. A number of participants said that while they were making this trade-off for an academic career, the situation might not remain this way for the rest of their career:

“I could be working in industry and easily make three times my salary, so it’s the constant sort of waking up in the morning and saying, ‘Well, I’m sacrificing a lot for this job, and is really the right thing to be doing?’” (Interview Respondent No. 25, female)

“My whole life I’ve said I’m not going to choose a job just for money and I know I would never choose a job just for money, but at some point that becomes a practical concern. I’m almost 35 and I’ve only ever been barely making enough money to scrape by and then there’s this whole other field where I’d have a million opportunities and could literally make three times what I’m making and at some point you have to think of it practically.” (Interview Respondent No. 8, female)

In contrast, a minority of participants felt that industry was an environment where they could apply their research into more ‘real life’ situations than academia. For these participants, academia was found to be somewhat restricting and that industry could provide them with more practical research:

“I think I’m more goal-orientated and like the problems that apply more to real life. There isn’t a lot of freedom to do that in academia. It’s more blue sky research, which is great in some ways, but a lot of the times the problems that we study are not very applicable to
real life and there’s a lot of real world problems that aren’t always considered. I just like problems that are a little more tangible.” (Interview Respondent No. 9, female)

In addition to the greater pay on offer, participants perceived industry as likely to offer greater security with official HR procedures, a clear career path and realistic goals. The contrast between industry and academia is often pronounced in the eyes of the participants:

“I’ve had people coming from industry and find this very peculiar that we have no specified scheme of progression that you would normally expect to help people up through grades to get on and different methods that you would normally have, and we just don’t have that.” (Interview Respondent No. 23, female)

However, there was also some reluctance to move into industry or disadvantages perceived. Participants were then aware of that industry could potentially restrict the participants’ autonomy. Importantly too, the criticisms of a long hours culture directed to academia were believed to be equally valid in industry. Discussions in the qualitative interviews indicated an awareness that many small companies would be dependent on long working hours, or moves abroad might equally result in long hours.

“[I am concerned that] because they are American companies, and most of them want you to move to America, that the work life balance is even worse, and that there is less personal freedom which [is why I] want to stay in academia.” (Interview Respondent No. 17, female)

One respondent who had worked in academia outside of the UK noted that advantages in other countries included a greater sense of entitlement to work-life balance, and less of an audit culture:

“The audit culture in the UK both REF as well as exam boards and the way that teaching is also audited, it’s a lot of work. It’s something that I didn’t quite anticipate coming from [other country], not that it doesn’t have audit culture but... I feel like it’s somewhat less intrusive... I think those will be the things that would push me potentially in a few years’ time to start looking for something [abroad].” (Interview Respondent No. 10, female)

A further problem observed by the staff and students interviewed was the ‘two-body’ problem. This problem was faced by those contemplating life as an early career researcher but who had dependents – partners, children or family – nearby and were reluctant to move away. For the students or early career researchers, short contracts and postdoctoral opportunities put an emphasis on being mobile that can act to restrict the ability of participants to maintain their academic careers:

“[Husband] has a [new job], so we will be here for another four or five years. So I’m here and I don’t really know what I can do. I would love to do some research, probably I would need to do research in English. I can’t research in the UK, legally, anymore. I don’t have the right to work there, so that’s out. So I don’t really know. I don’t really what my future is... I’m trying to get excited about industry!” (Interview Respondent No. 6, female)
“It’s one thing that does annoy me about me and my career, because I’ve got, like, a really close family close where I live, and I’ve got a long-term boyfriend, been together for a long time now, so you know, I can’t just pick up and leave without thinking about him and also buying the house now as well, we’re even more tied down. So I guess yeah, there’s not much ... I would be willing to move for a job, but it would just be difficult” (Interview Respondent No. 35, female)

Some of the participants too felt they were ‘too late’ for a move to industry, with their lengthy tenure in academia making they felt they would be unable to adjust to work outside of the University:

“At this point, I don’t think I could fit in. I think I’ve been doing this for too long now and this is where the majority of my experience is.” (Interview Respondent No. 7, female)

Some of those who had previously worked in industry said they had actually found it more sexist than academia; others had found no difference, but none reported finding academia more sexist than industry.

“I actually found it was more in industry where I felt excluded, more than I do here. Just because there were so many more men and a lot of them had the attitude that I couldn’t do the job for whatever reason, so I had to prove myself.” (Interview Respondent No. 7, female)

“I don’t generally notice it most of the time, because the people that I speak to a lot, my supervisors and my office, and they’re normally alright. So I don’t feel, like, sexism there. I felt it at my work quite a bit when I worked outside of academia” (Interview Respondent No. 35, female)

Diversity

A number of more general findings emerged with respect to respondents’ views on diversity, and it is worth presenting these here.

Attitudes to increasing diversity initiatives

Within the qualitative interviews, participants were asked about their views on the diversity of academic computer science. A number of participants were optimistic that things might be changing. Participants noted greater awareness and efforts within this area from universities and funders. In addition, there was greater awareness noted of things like all male panels at conferences. Yet, there was variation between the participants and the various departments they described in how committed those at the top seemed to improving diversity. Indeed, there was a sense that improving diversity in academic ICT will not happen without firm actions - good intentions are not enough:
“But the male staff are all saying, “Oh, yes, yes, you know, we’re very equitable minded,” and all the rest of it, but I don’t think they understand the difference between personally kind of advocating that this should be done and the changes which have to be made.”

(Interview Respondent No. 41, female)

Some respondents reported that they were grateful that initiatives such as Athena SWAN were giving the problem of diversity greater recognition in universities. Yet, there was concern that a focus on the formal – e.g., numbers, flexible working policies - did not capture more subtle forms of discrimination experienced by those interviewed:

“It doesn’t always accurately reflect what’s happening within the department… I feel like I fill out these surveys, I give my input and I know other people are having the same experiences and I share my opinion honestly, but I feel like we’re winning all these awards for being very open and I’m wondering how. Most of the women I’ve known in academia within the department, they’ve had issues with very similar things to me so I’m wondering how we can say we’re very cultured and cutting edge in terms of equality and at the same time everyone’s experience is the same… I know that, in some respects, we are moving forward so I don’t want to act like it just happened overnight, but I think that there’s still a lot of room for growth and we’re still missing a lot of people’s voices when we collect feedback.” (Interview Respondent No. 9, female)

Furthermore, there was an expectation reported in the qualitative data that women would take on diversity work such as Athena SWAN:

“There are always other things that are expected of us. I’m the lead for my department on Athena SWAN, and the application was completed in pretty much my spare time, and all the other bits and pieces that go along with, like, my outreach work, that again has to be done in my spare time. And that’s seen as de rigueur, you know, that you’re going to put these extra hours in to do these extra activities which the department values but doesn’t take account of in your workload.” (Interview Respondent No. 41, female)

“Because I am a female in STEM I am expected to spend some part of my time working on the women in STEM issue. The expectation is quite explicit to the point where people will not accept ‘no’ as an answer, but my male colleagues are never even asked. Through my whole career I have spent countless hours on the topic at the expense of personal research and growth goals. As I write this I am in the middle of sorting out a cake for an Athena SWAN event while the guy in the next office is writing a grant … And yes it is 10pm.” (Online survey respondent, female)

Importantly, a minority view was also observed within the qualitative interviews. Some participants argued that technology and computers were neutral to issues of inequality and a lack of diversity. The belief here was that simply having an interest and being good at computing was all that was required to have advance in an academic career. For some of the participants, there was the feeling that initiatives, like female only fellowships, were actually counterproductive as this interviewee explained:
“I keep finding that I have to fight to make people stop giving me extra help for being a female, so for example things like they have these female only fellowships, and that’s really nice but I always try very hard not to apply for any of those because I want to know that I was the best out of everyone, not just the best out of the other women, but that is my biggest issue, even at school, there were activities just for girls and I used to find that very annoying, and just recently somebody was implying I got the fellowship because I’m a woman and I don’t like that, there are equal chances to both male and female, so that is my biggest thing, it’s the other way.” (Interview Respondent No. 15, female)

It is important to qualify this by citing other examples from the online survey. The feeling that women’s achievements are devalued because of policies to address diversity was reported by other respondents. These respondents recounted that they had experienced sexism from colleagues based on achieving promotions or research grants. Examples from the survey included:

“A colleague telling me that women only get appointed to jobs because of reverse discrimination.” (Online survey respondent, female)

“When I received a grant ahead of a male colleague, he said it was only because I was a woman and he wasn’t.” (Online survey respondent, female)

Diversity initiatives may be met with backlash from those not the target of the initiatives. The online survey yielded a handful of negative responses in this respect, with complaints falling into five main categories.

1) Resentment at specific attempts to recruit under-represented groups, and citing ‘meritocracy’ as an argument against this.

“Posts were advertised as especially welcoming applications from persons of a background other than my own, rather than as looking for the best person for the role.” (Online survey respondent, male)

“[I was discriminated against because] women applied.” (Online survey respondent, male)

2) Feeling that they are unable to be themselves or express their opinions at work because they are too ‘un-politically correct’

“Sure, pretty much everyone is now too afraid to talk about anything which is not the "party line", to disagree with certain ideas... because otherwise harassment and/or bullying by the administration, interest groups, state officials and so on is guaranteed plus losing his or her career. This is pretty much the only kind of systematic and institutionalized bullying and harassment occurring.” (Online survey respondent, male)

“I feel excluded because of my conservative views and I’m rather afraid to share my opinion with others at work.” (Online survey respondent, male)
3) Dismissing or trivialising the issue of micro-aggression in the workplace

“I think this is the least of the concerns.” (Online survey respondent, male)

“I think that's just workplace life isn't it?” (Online survey respondent, male)

4) Not accepting any onus on individuals to examine the impact of their own words or behaviour:

“[I experience micro-aggression] All the time, that's life, but nice that you make it even independent of intent...” (Online survey respondent, male)

5) Taking attempts to increase female participation as a personal attack:

“Constantly being told that there are too many men around, even when working in female dominated departments.” (Online survey respondent, male)

Barriers to diversity

When considering why more women were not talking part in academic ICT occupations, a number of participants argued that there was a ‘leaky pipeline’ problem from initially gaining an interest in technology, to education to finally arriving in computing careers. Although she managed to avoid dropping out of the industry after facing these barriers, this interviewee outlines the barriers she perceives women have to face:

“The issue is people dropping out, really. We start off with a higher percentage of women and then they sort of fizzle, fade out, so I don’t think there’s any reason why it shouldn’t be an excellent career for women [...] I think some of it is that people do encounter sort of men’s club type, you know, sort of old boys network type of thing and feel that they don’t fit in. I think some of it can be that they leave when they have families and whatever, and it can be difficult to get back in. Because it’s such a fast-moving industry, it can be difficult to get back in, although there are programmes for women returners” (Interview Respondent No. 36, female)

As has been discussed throughout the previous sections, the working conditions within academia make it difficult for anyone not committing excessive time and effort. Indeed, a number of participants outlined they worked in departments that had a ‘that’s the way we do things here’ attitude. The departmental culture meant that there was hostility to those who take different approaches:

“They don’t quite see... that there is a different way of doing things and that women do things differently, and you can achieve the same end through different ways.” (Interview Respondent No. 23, female)

“I think that it would be extremely beneficial for there to be more diversity in academia and in sciences. I think confining ourselves to hiring white males with a common purpose
or not, is taking away options for very, very good people who are ethnic minorities or who are female. I think that that’s not necessarily a hiring problem. It’s also a pipeline problem. I think there’s definitely room for diversity and it would greatly improve things.” (Interview Respondent No. 40, female)

Furthermore, there was a widely shared view that the prevailing culture in academia favours the extrovert and the selfish over those who have less confidence or are more collegial.

“Not everybody is as extroverted and loud with their opinion and people that are more introverted and quiet... are not always heard. In some ways there’s free flowing ideas [in academia] but I still think there’s a whole demographic that’s often missed. I think they’re the people you see leaving academia because you have to constantly fight to have your voice heard and that’s exhausting. Especially when you feel like you’re constantly pushed back and somebody says that’s not a valid opinion.” (Interview Respondent No. 9, female)