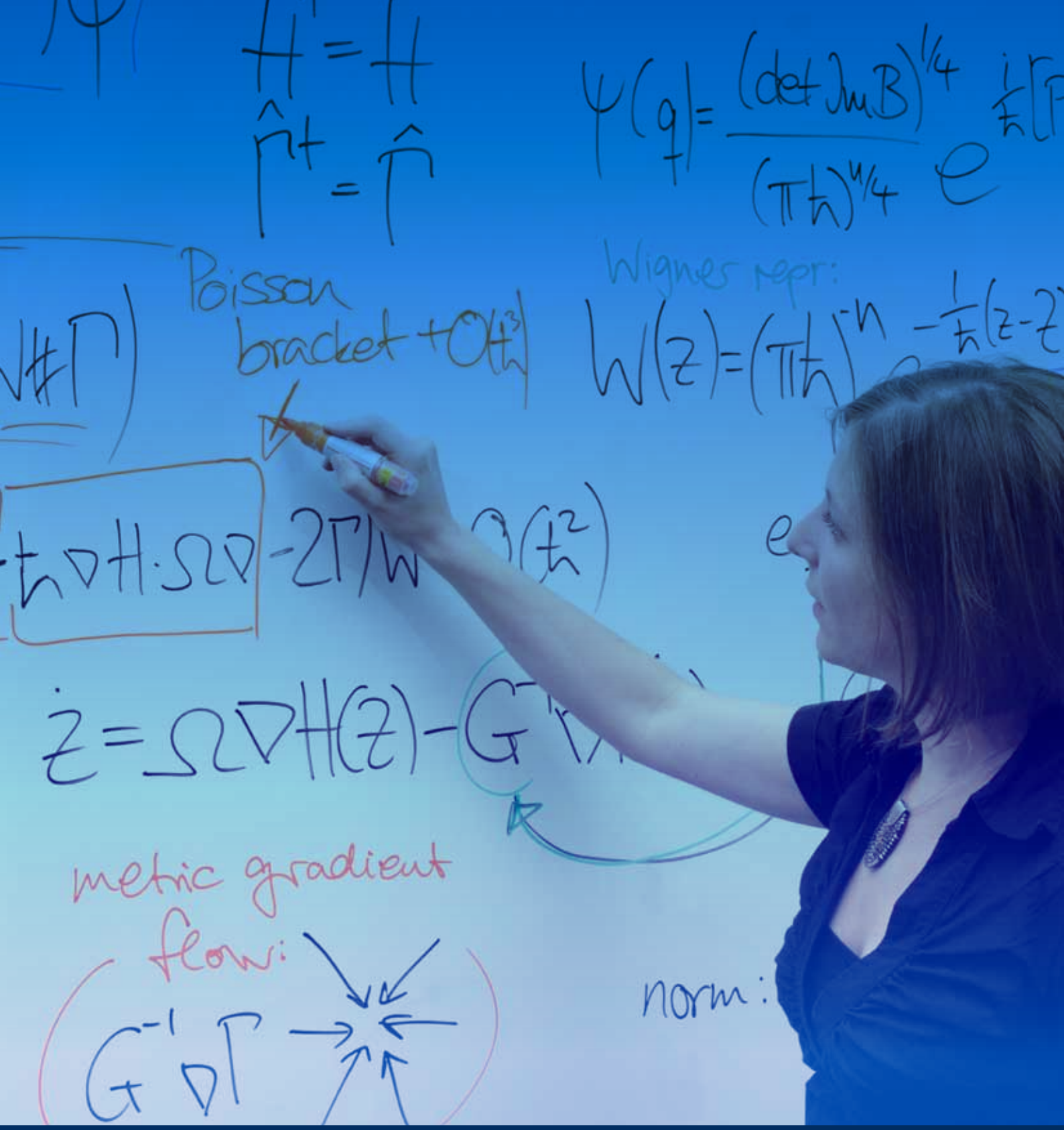

ADVANCING WOMEN IN MATHEMATICS: GOOD PRACTICE IN UK UNIVERSITY DEPARTMENTS

February 2013

This report was prepared for the London Mathematical Society by Sean McWhinnie and Caroline Fox of Oxford Research and Policy. Sean McWhinnie established Oxford Research and Policy in 2009. Oxford Research and Policy is a consultancy that carries out research and evaluation, and specialises in higher education, science policy, and equality and diversity.

Tel +44 (0)1235 439188
E-mail info@oxfordresearchandpolicy.co.uk
www.oxfordresearchandpolicy.co.uk

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Foreword

We are delighted to present the findings of this initiative by the London Mathematical Society (LMS). As described in its Council Statement on Women in Mathematics in 2008, the LMS has a longstanding interest in encouraging women to study mathematics and pursue careers in mathematics, particularly at the highest levels of research and teaching, where the relatively low participation of women leads to disadvantages and missed opportunities for the advancement of mathematics.

This issue attracted much greater attention following the publication of the International Review of Mathematical Sciences (IRMS) in 2010 which included as one of its main findings that "Action about gender diversity is not a sufficiently high priority for the UK mathematical sciences research community" noting that "compared to other countries, the proportion of women is strikingly small". One of the main recommendations made in the Review was that "Urgent action should be taken to improve participation of women in the mathematical sciences community".

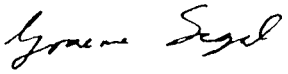
More recently (January 2013), the UK Research Councils have issued a statement on their Expectations for Equality and Diversity describing how they expect those in receipt of Research Council funding to promote and lead cultural change in relation to equality and diversity and to provide evidence as to how they are addressing these issues at an institutional and departmental level.

The anticipation of such a statement and the publication of the IRMS have led many departments to begin to look at ways in which they could address these issues, for example by engaging with the Athena SWAN award system, which recognises higher education institutions with a commitment to advancing women's careers. The LMS was keen to help departments in this work and, through its Women in Mathematics Committee, established a Good Practice Scheme to support departments seeking to get involved. We are pleased that a large number of departments from a range of backgrounds have signed up as Supporters of the Scheme and took part in the Benchmarking Survey which led to this report.

Although such surveys have been carried out for other disciplines, this is the first time that such a survey has been carried out for mathematics departments. It provides an enlightening insight into areas of good practice where mathematics departments are particularly strong or weak and enables each department who took part to benchmark itself against the national picture. More importantly, it identifies several examples of good practice that some departments have already established, and we hope that these will provide inspiration for many other departments looking for ideas of actions that they can take.

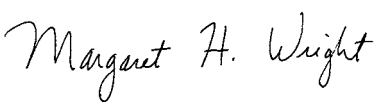
The report also provides valuable data on the proportions of women at each career stage. It shows that a surprisingly small proportion of women in the UK go on from an undergraduate degree in mathematics to study for a PhD in mathematics and that, of those women who achieve positions as university lecturers, worryingly few are promoted to professor, with many being engaged on teaching only contracts. Again, for the first time, this data enables each department to benchmark itself against the national picture and will assist both departments and the LMS to target actions appropriately.

It has been a pleasure to see so many departments of mathematics beginning to take these issues seriously and we hope that this report will provide a valuable resource for those seeking to make changes so that more women may achieve their true potential as mathematicians.



Graeme Segal

President of the London Mathematical Society



Margaret H Wright

Silver Professor of Computer Science at Courant Institute of Mathematical Sciences, New York University, and Chair of the IRMS 2010

Dedication

Anne Bennett, who sadly passed away in September 2012, was the LMS Head of Society Business. Her work included the Women in Mathematics Committee and Anne was instrumental in taking forward the Society's Good Practice Scheme, of which this Report is a part. Anne had a sense of vocation in the furtherance of mathematics and in particular advancing women's careers in mathematics. This report is a lasting legacy of Anne's ability to facilitate collaborative working, her energy and drive, and her real interest in ensuring that mathematics and women in mathematics are properly represented at the highest levels.

Acknowledgments

Our thanks go to the many individuals in university mathematics departments that spent time completing the good practice checklist. Thanks are also due to the individuals who provided us with personal profiles.

Caroline Fox and Sean McWhinnie
Oxford Research and Policy

Executive Summary

This report has three main elements: an overview of quantitative data relating to men and women mathematicians in UK HEIs; a summary of the working practices of mathematics departments; and case studies of a number of women mathematicians working in UK HEIs.

The majority of the report is devoted to giving the results of a survey of working practices in mathematics departments. A Good Practice Checklist was distributed to the mathematics departments throughout the UK. The checklist contained 90 statements of practices, processes and arrangements, with which departments were asked to compare themselves. The statements were arranged under 30 benchmarks. This part of the report is in ten sections, with three benchmarks to each section. Departments were also asked to describe briefly the working practices they had in place. Thirty departments returned the checklists. The report summarises the working practices found under each of the 90 statements, and provides examples of the good working practice found.

There was a wide range of practice. However, all departments had some good practice in place. In some, often the smaller departments, much was informal and relied on the good will of staff. A number of departments, in particular those preparing for Athena SWAN submissions, had more formal systems in place.

Organisation for Action on Women and Mathematics

This looks at how established and robust department organisational frameworks were to deliver equality of opportunity and reward. A few departments did have committees or groups that were involved in Athena SWAN work. The majority supported the development of better working practices and work to support women in mathematics but had not, as yet, done much.

Evidence Base for Action

This examines how departments collect, communicate and use quantitative and qualitative data. Around half of the departments reported some, or good, use of student data. Some collected data, or had data available to them, but did not use it. A minority reported some use of staff data. Many reported that student and staff surveys were carried out but the data were not always analysed by gender. Few departments were using data as the basis for planning and taking action, monitoring progress and measuring success.

Appointment and Promotion Processes

This reviews a department's input to, and involvement in, their university's appointment and promotion processes, and the decisions taken. Some departments did include at least one woman and one man on appointment panels. There was a general concern with overloading female staff. Practice on the training of panel members varied, particularly in ensuring that members were aware of issues of unconscious bias. Some departments relied on the university to communicate information on appointment and promotion, while others made sure themselves that communications were timely and effective. Only a few regularly monitored appointments and promotions. There was a common view that the numbers were too small to be statistically meaningful.

Levelling the Appointment and Promotion Playing Field

The section explores how departments ensure that men and women are equally likely to apply for appointment and promotion and are equally likely to be successful. Few departments took action to widen the candidate pool for appointments. Similarly, few were pro-active in identifying promotion candidates. Practice on supporting promotion candidates varied, from departments that took steps to broaden candidates' experiences, to those who expected this would be addressed during appraisal or that it was down to the individual. In general, feedback was available to unsuccessful promotion candidates.

Career Development Provision

This covers the quality and effectiveness of the career development provided. Most departments had some form of induction in place. Approaches to meeting the development needs of their staff varied. In some, training needs were identified at appraisal, elsewhere it was more ad hoc. Support for early career researchers differed. Some were well supported by mentors and/or senior colleagues. For others there was little/no specific support. There was little monitoring of the uptake of training, often because the university did not keep departments informed. Some departments felt that centrally provided courses were often not relevant. Some departments ran annual appraisals which were well regarded; one or two reported full participation. In others, experiences were less satisfactory. Generally it was unclear whether postdoctoral research fellows were regularly appraised.

Career Development Activities

This section examines what departments do to make sure that their staff are engaged in activities which contribute to their career progression and professional profile. Practice varied but in general departments were supportive/recognised the importance of staff raising their profiles internally and externally. Some departments made efforts to encourage female academics to act as role models while others felt this happened implicitly rather than explicitly.

Effective Management

The section describes the arrangements departments have in place to manage the administrative and academic contributions of their staff. The general view was that mathematics departments had "lighter touch" management arrangements than were usual in experimental science departments and that reporting lines were simple, and hence clear. Some reported effective and open communication, while others were concerned about communications with postdoctoral research fellows and communications between sections. For many, fairness and openness was the guiding principle in allocating roles and resources, but others reported that some aspects were seen as arbitrary. The effectiveness and coverage of workload mentoring varied. Many gave lighter workloads to new academics.

Culture and Ethos

This examines a department's working environment and its inclusivity, the support it provides and how individuals' contributions are recognised and valued. The overall impression was that mathematics departments were open and friendly, with many members of staff who offered support and encouragement. Departments had various ways of recognising individuals' contributions. Some departments reported that staff perceived that some aspects of their roles were valued more highly than others.

Flexibility

The section looks at how departments ensure flexibility in their working arrangements. A general view was that in mathematics most staff work autonomously, hence flexibly, and because of this formal checks are irrelevant. Most departments took a light touch approach, so with little monitoring there was little awareness of the consistency of approach across a department. Generally there was no discouragement if staff want to work long hours but no direct pressure to do so. Some departments made efforts to limit meetings and events to "core hours", but with varying success. There were references to part time staff, with some departments trying to accommodate them and others acknowledging that more could be done.

Career Breaks and Interrupted Careers

This describes department arrangements made for career breaks and for returners. Some had little/no recent experience of career breaks, some relied on their university, others approached this case by case, and a few had more formal and organised approaches. Some reported university schemes to release returners from teaching and administration. Others were reliant on goodwill and supportive colleagues. Some took a formal approach to planning cover and staged returns with good support to make sure returners' careers got back on track.

1. Introduction

Although over 40% of graduates in the mathematical sciences are female, in common with other science, technology, engineering, mathematics and medicine (STEMM) subjects, there is a significant drop-off in the proportion of women who become academic mathematicians. Only about 6% of professors of mathematics in the UK are female. Although all STEMM subjects suffer a drop in the proportion of women in senior positions, relative to the entry level, the fall off is particularly bad for mathematics.

1.1 London Mathematical Society and Women in Mathematics

The London Mathematical Society (LMS) is committed to addressing actively the issues facing women in mathematics. It is concerned about the loss of women from mathematics, particularly at the higher levels of research and teaching, and at the disadvantages, and missed opportunities that this represents for the advancement of mathematics. In 1999 it set up a Women in Mathematics Committee[1] to bring forward suggestions for policy, as well as concrete measures to address issues facing women in mathematics. These have included the Grace Chisholm Young Fellowships, which support women whose mathematical careers have been interrupted by family responsibilities, or relocation of a partner; childcare support grants which supplement travel grants for attending conferences to include support for childcare expenses incurred; regular Women in Mathematics workshops; and the prestigious annual Mary Cartwright Lecture, which features an eminent female mathematician. In 2008 the Committee also worked with the Council of the LMS to produce a statement on Women in Mathematics[2], which recognised the need to give active consideration to ensuring that men and women are treated equally in their prospects, recognition and progression.

The 2010 International Review of Mathematical Sciences[3], commissioned by the EPSRC, included as one of its main findings that "action about gender diversity is not a sufficiently high priority for the UK mathematical sciences research community" and recommended that "urgent action should be taken to improve the participation of women". The panel also stated that, compared with other countries, the proportion of women in the UK mathematical research community was strikingly small.

Following the International Review, the LMS decided to establish a Good Practice Scheme[4] with the aim of supporting mathematics departments interested in embedding equal opportunities for women within their working practices. The Scheme is run by the Women in Mathematics Committee and provides specific support for departments working towards Athena SWAN Award status. There are currently over twenty mathematics departments, from a range of backgrounds, who have registered as Supporters of the Scheme. The commissioning of this report was one of the major initiatives of the LMS Good Practice Scheme.

1.2 The Athena SWAN Charter and Awards

The Athena SWAN Charter is a scheme that recognises excellence in STEMM employment for women in UK higher education. It operates through providing awards, and providing opportunities to share good practice.

The Athena SWAN process ensures that all aspects of academic progress and careers are examined, with a focus on gender equality and opportunity; it focuses on good practice in the recruitment, retention and promotion of women in university STEMM departments.

Any higher education institute which is committed to the advancement of the careers of women in STEMM and which accepts, and agrees to promote, the Charter principles can become a member.

The Athena SWAN Charter principles are:

- A change in culture and attitudes across the organisation is required to tackle the unequal representation of women in science.
- The absence of diversity at management and policy-making levels has broad implications which the organisation will examine.
- The high rate of loss of women in science is an urgent concern which the organisation will address.
- The system of short-term contracts has particularly negative consequences for the retention and progression of women in science, which the organisation recognises.
- There are both personal and structural obstacles to women making the transition from PhD into a sustainable academic career in science, which require the active consideration of the organisation.

Athena SWAN members and their STEMM departments are expected to develop good practice in the recruitment, retention and promotion of women. This requires commitment and action from everyone, at all levels of the organisation.

The Athena SWAN Charter offers awards for both institutions and departments. There are three levels of award - Bronze, Silver and Gold.

Bronze awards demonstrate that an institution, or department, as a whole, has a solid foundation of policies and practices to eliminate gender bias and an inclusive culture that values female staff.
A department (or equivalent) must be part of an institution that has received a Bronze award before it can apply for a Bronze or Silver department award.

Silver awards recognise a significant record of activity, and achievement by the institution, or department, in promoting gender equality, and in addressing challenges particular to STEMM, implementing activities to address the challenges, and demonstrating the impact of the activities.

Gold awards recognise a significant sustained progression and achievement by the department in promoting gender equality and in addressing challenges particular to the discipline. Gold departments should be beacons of achievement in gender equality, and should champion and promote good practice to the wider community.

At the time of writing almost 80 departments hold Bronze or Silver awards. However, only two mathematics departments have Silver awards, both of which are held at School or Faculty level, and a further two have Bronze awards.

1.3 The Aims of the Project

The LMS engaged Oxford Research and Policy to carry out a project to:

- Identify good practice in mathematics departments;
- Disseminate examples of good practice in mathematics for adoption/adaptation;
- Identify issues that are special to mathematics and/or common across departments, and ways they can be tackled.

The project was owned by the LMS and managed by the LMS Women in Mathematics Committee.

1.4 Project Methodology

The methodology used is based on work by the Royal Society of Chemistry, the Athena Project and the Institute of Physics. All UK university mathematics departments were invited to provide information, using a Good Practice Checklist which can be found in Annexe A. Thirty mathematics departments returned completed checklists and these are listed in Annexe B.

The returned checklists were analysed in order to gain an understanding of current practices in mathematics departments and to identify examples of good practice. Those examples were used to provide the content of this report.

In addition, the practices described in the checklists were scored in order to benchmark each department. Those scores were used, in individual reports for departments, and to produce an overall summary for the LMS.

1.5 Good Practice Checklist

The Good Practice Checklist shown in Annexe A is a refinement of the checklist used in the 2008 Royal Society of Chemistry report.

The Checklist covers:

- The fundamentals in planning for success that delivers equality of opportunity and reward in STEMM - covering evidence and data, leadership and resources;
- Appointment and promotion processes that encourage women and men to apply for academic posts at all levels;
- Structures and systems that encourage and support career progression and development;
- Organisational arrangements and cultures that are open, inclusive, transparent and engage all staff;
- Flexibility across the working day, the working year and working life that maximises individuals' participation in STEMM at all life and career stages.

Departments that completed the checklist were also asked to provide a gender profile of students and staff.

1.6 Lessons from Previous Research on Good Practice in STEMM

Research carried out on the working practices in STEMM departments, and reported in publications by the Royal Society of Chemistry and the Institute of Physics[5] make clear that:

1. Good practice benefits all, staff and students, men and women. However, bad practice adversely affects women's careers more than men's.
2. The best departments don't target measures specifically at women because improved working conditions benefit all and make for a happy department: good practice isn't about how many women are in the department, it's about processes that are fair, flexible, accessible and transparent to all.
3. Good practice departments appear able to attract and retain women far better than other departments.
4. There is no evidence that the introduction of good practices adversely affects the excellence of the science carried out. Good practice equates with good science. In contrast the detrimental effects of bad practice build up incrementally over the course of a career resulting in a smaller proportion of women than men reaching their full potential.
5. Leadership from the top, with the Head of Department acting as champion, is critical to changing culture, to making the changes stick, and to changing behaviour. Simple changes to processes, which deliver clear benefits to staff, can start to change policy and behaviour, but without a Head of Department prepared to introduce changes and monitor adherence, little will be different in the medium and longer term.
6. The age profile of the department, and the diversity of its staff, makes a difference. Young men and women with families have different expectations and needs from their older colleagues. The careers of younger staff (and their science) cannot thrive unless the working culture of the department reflects the reality of dual career partnerships.
7. Successful action is based on good planning, which takes account of the department's academic plan and which is based on evidence.

1 http://www.lms.ac.uk/women-mathematics
2 http://www.lms.ac.uk/sites/lms.ac.uk/files/Mathematics/wim_statement.pdf
3 http://www.epsrc.ac.uk/newsevents/pubs/corporate/intrevs/2010maths/Pages/default.aspx
4 http://www.lms.ac.uk/women/good-practice-scheme
5 Planning for Success - Good Practice in University Science Departments, Royal Society of Chemistry, London, 2008 (www.rsc.org/diversity); Women in University Physics Departments, Institute of Physics, London, 2006 (www.iop.org/diversity).

2. The Report

The information in this report summarises the working practices found in UK mathematics departments. In doing so, it highlights good practice.

Section 3 of the report presents an overview of quantitative data relating to mathematics in UK higher education institutes (HEIs).

Section 4 focuses on the good practice found and summarises the general position of the departments that completed the Good Practice Checklist.

Section 5 contains case studies of a number of women mathematicians working in UK HEIs.

2.1 The Case for Good Practice and Positive Action

When departments are thinking about working towards an Athena SWAN award, or just about ways to improve the position of women, they should bear in mind that the approach commended in this report, should improve working practices for all staff. In so doing it should ensure that over time, a more representative proportion of women will progress along the mathematics career pipeline. In no way does the advocated approach involve positive discrimination, but on occasion positive action may be appropriate. As the data in Section 3 illustrate, the proportion of mathematics undergraduate students who are female is 44%. However, the proportion of mathematics professors who are female is 6%. Even taking age into account, women do not progress to chairs in the same proportion as do men.

It is understandable that departments argue that they should, and indeed do, operate in a gender-blind manner. The evidence is that, although individual staff and their managers may feel there is no overt sexual discrimination in the department, there is some mechanism in operation, which results in women on average progressing less than men along the academic career pipeline.

It is difficult to say why the leakage of women from the career pipeline occurs. However, it is clear from the data that the leakage does, in general, occur at each stage. This means that a number of practices and processes need to be examined. These range from the careers advice given to undergraduates, to the opportunities for development afforded to academic staff to help them prepare for promotion.

Everyone has their own views and prejudices and so their dealings with others will be influenced by unconscious bias. This bias might affect individuals' thinking when they make appointments or assess someone's promotion potential.

Positive action might involve a pro-active approach to attracting potential applicants for posts, to ensure that representative proportions of men and women apply. There is evidence that, in general, women are more likely to rule themselves out of the running for a particular post than men. It would be positive action to ensure that at least a representative proportion of visiting speakers were female, or to go further and ensure that women speakers were over represented relative to the proportion of women mathematicians in academia. Some women feel that in doing so peers would wonder if female speakers were not of the same quality as male speakers and had been invited solely on gender grounds.
It is up to the speaker to show this is not the case and that their research is as worthy of being presented as any other. Given that speakers are generally invited in a fairly arbitrary way, typically by those who know them, making a point of including women in the proportion in which they are represented in the profession would surely be no worse a selection method. This would allow female students to see female role models and this might encourage a higher proportion of female students to stay in academia. Another area for positive action might be to ensure that all staff get good opportunities to develop and hence strengthen their cases for promotion.

2.2 How to Use the Report

The departments that completed the Good Practice Checklist are at very different points in their development. These departments are advised to use it benchmark by benchmark (alongside their own individual report), to compare their own position with the overall picture and to identify examples of good practice that they might adopt.

Departments that did not complete/return the Good Practice Checklist can use the checklist at the back of this report as a tool to collect information about the processes and practices they have in place, and to identify areas where changed practices could be introduced. Departments may wish to take the examples of good practice in this report and use them as targets for which to aim.

Departments that are already working towards an Athena SWAN award, or who already have some good practice and or women in mathematics initiatives in place or in plan, will probably choose initially to focus on the section(s) of most direct interest.

All departments, who are considering changes, might find it useful to adopt the following five step approach:

1. Start simple, use common sense and go for some quick wins; the first steps won't cost anything but time. Small changes can make a real difference and will prepare the ground for bigger changes. Celebrate success before moving on to the next challenge.
2. Look around at what quantitative and qualitative data the department can use; for example, data collected by the university under its public sector gender equality duties, the data in Section 3 of this report, and data from ASSET surveys,[6] and look at what the data say about the department.
3. Identify the support the department can get from its university. Find out whether the university is a member of the Athena SWAN Charter. Look at what other departments are doing - has the university's physics department signed up to the Juno Code of Practice?[7]
4. Discuss openly and share the findings with staff at all levels, and seek their views on what to do in terms of both priorities and practicalities.
5. Decide on a small number of actions/activities, set a time scale and some targets, identify individuals to take them forward, and bring this information together in an action plan. Report the plan and progress to the management team, and publish it on the department website. Again ensure that success is celebrated.

6 Reports on the Athena Surveys of Science Engineering and Technology (ASSET) in 2003, 2004, 2006 and 2010 are available on www.athenasurvey.org.uk.

7 Physics Departments can 'sign' up to the Institute of Physics Juno Code of Practice (for advancing women's careers in physics in higher education) at either "Supporter", "Practioner" or "Champion" level. JUNO information is available at http://www.iop.org/policy/diversity/initiatives/juno/index.html.

3. The Gender Statistics of Mathematics

This section presents an overview of the numbers of students studying mathematics, and the number of academic staff in the mathematics cost centres in UK higher education institutions are broken down by gender. The majority of the data used are from the Higher Education Statistics Agency (HESA). Full details of the methodology are presented in Annexe C.

Figure 1 presents a snapshot of the mathematics pipeline, from A level through the study of mathematics at university, and on to researchers and permanent academics in mathematics in UK higher education. At each stage, the proportions of the population who are male and female are plotted. The figure shows non UK domiciled students and staff who are UK nationals.

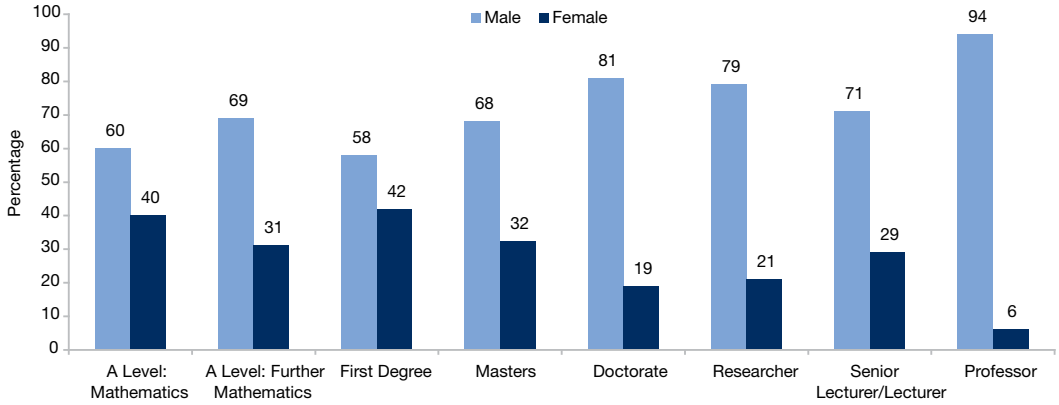


Figure 1: The UK mathematics pipeline - proportions of the populations at different stages who are male and female 2011.

Note: For A level the proportions of UK candidates who are female in 2011 are shown; for students graduating at first degree, masters and doctoral levels, the proportions of the UK domiciled population who are female in 2010-11 are shown; for higher education staff the proportions of UK nationals who are female in 2010-11 are shown.

Figure 2 presents a snapshot of the mathematics pipeline, for those of all nationalities who study mathematics or hold academic posts in mathematics in UK higher education. At senior lecturer/lecturer level, staff have been separated by employment function: those who carry out teaching and research are shown separately from those staff who are in teaching only roles.

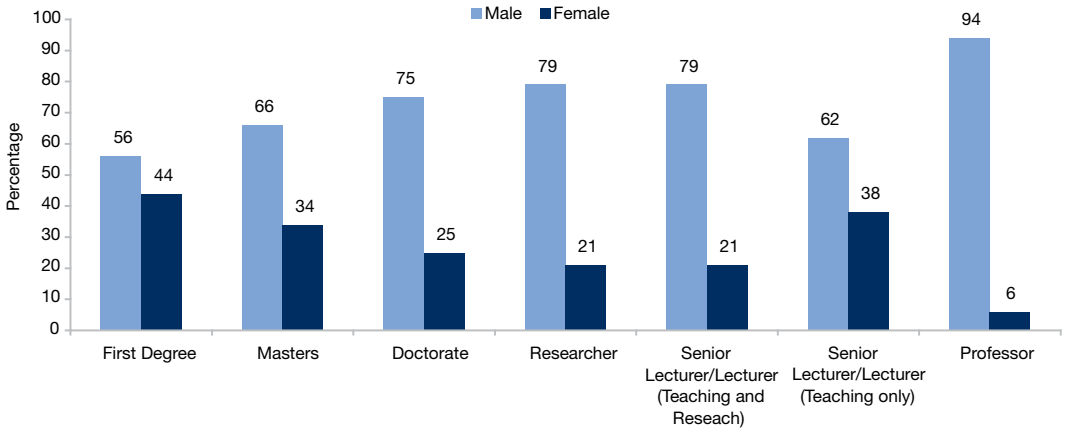


Figure 2: The mathematics pipeline for all nationalities in UK higher education institutions (HEIs) - proportions of the populations at different stages who are male and female 2011.

Forty per cent of UK candidates for A level mathematics in 2011 were female compared with 31% of the UK candidates for A level further mathematics. In 2011 there were 82,995 candidates for A level mathematics and 12,287 for A level further mathematics. At university level there is a clear fall in the proportion of graduates who are female with increasing level of study: 42% of UK domiciled graduates and 44% of all graduates from first degree programmes are female; 32% of UK domiciled graduates and 34% of all graduates from masters programmes are female; and 19% of UK domiciled graduates and 25% of all graduates from doctoral programmes are female. The proportions of graduates who are female are generally higher among non-UK domiciled groups (see Table 1). At doctoral level around a third of non-UK domiciled gradates are female.

Closer examination of the data for mathematics staff shows that among researchers, while the proportion of UK nationals who are female is 21%, 24% of other EU national and 18% of non-EU overseas nationals are female. The overall proportions of UK, other-EU and non-EU national senior lecturers and lecturers in teaching only roles who are female are 37%, 38% and 43%, respectively; the proportions of UK, other-EU and non-EU national senior lecturers and lecturers in teaching and research or research only roles who are female are 22%, 21% and 20%, respectively, and the proportions of UK, other-EU and non-EU national professors who are female are all the same being 6%.

The data illustrate that female students are less likely than male students to progress from first degree programmes to masters or doctoral programmes in UK HEIs. UK domiciled male and female doctoral graduates appear equally likely to go on to contract research posts in UK HEIs.

It is worth noting, as illustrated in Figure 2, that 38% of mathematics teaching only staff in UK HEIs are female, and if only staff whose contracts include research or both teaching and research are considered, the proportion of senior lecturers/lecturers who are female is 21%. In other words, within mathematics, women are significantly more likely than men to have a teaching only role in UK HEIs. The discontinuity in the pipeline illustrated in figures 1 and 2 is explained by the numbers of women in teaching only roles: if teaching only roles are not included then the proportion of researchers and senior lecturers/ lecturers who are female is the same.

Table 1: Proportions of the mathematics graduate population who were female by domicile in 2010-11.

Level of Qualification	UK domiciled		Other EU domiciled		Overseas domiciled	
	Number	% Female	Number	% Female	Number	% Female
Doctorate	265	19	70	31	145	33
Masters	495	32	245	28	520	39
First Degree	6075	42	210	44	1055	51

A key challenge for mathematics is to encourage more women first degree graduates to undertake doctoral training. It may well be that if the proportion of doctoral graduates who are female increases, there will then be a challenge to ensure that a representative proportion of women go on to undertake postdoctoral research.

3.1 Mathematics Students

Figure 3 shows the proportions of those graduating from undergraduate and postgraduate programmes across all subjects over the past 10 years who are female. The proportion of graduates from undergraduate programmes who are female has risen slightly and has been around 58-59% for the past five years. The proportion of graduates from postgraduate programmes who are female has risen steadily from 46% in 2001/01 to 53% in 2010/11.

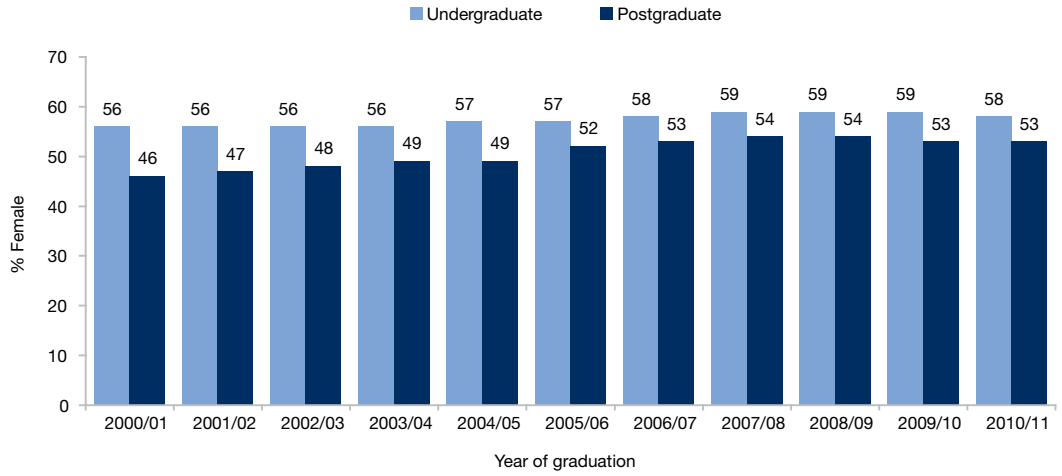


Figure 3: Percentage of graduates who are female in all subjects.

Figure 4 shows the proportions of those graduating from first degree, masters and doctoral mathematics programmes between 2004/05 and 2010/11 who are female. The proportion of first degree graduates who are female has risen from 40% in 2004/05 to 44% in 2010/11. From masters programmes, the proportion who are female has risen from 30% in 2004/05 to 34% in 2010/11, but the proportion of graduates from doctoral programmes has remained at 25% between 2004/05 and 2010/11 although there was variation from year to year.

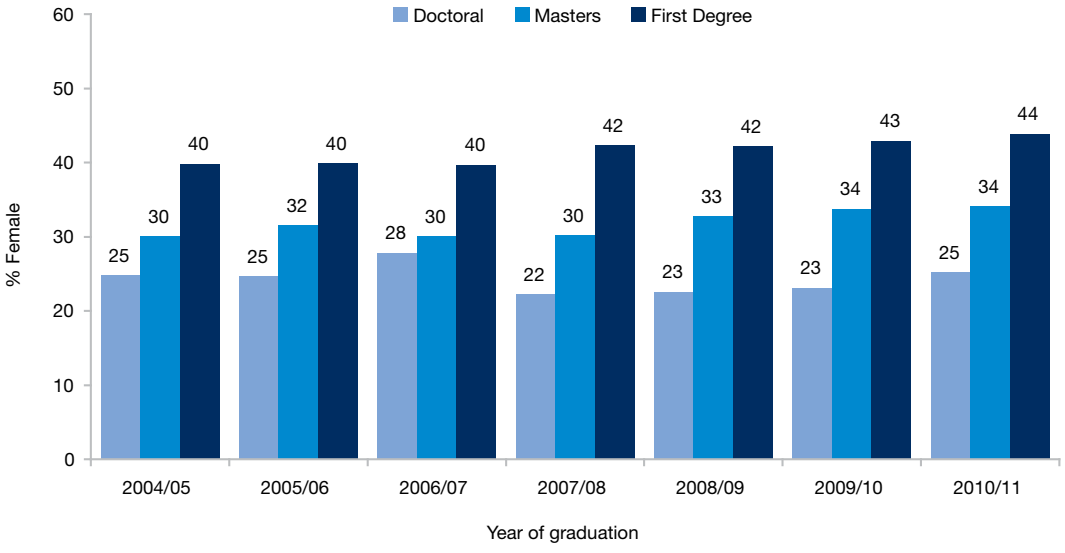


Figure 4: Percentage of all mathematics graduates who are female between 2004/05 and 2010/11.

Over the same time period the number of graduates from first degree programmes has risen from 5215 (3140 men and 2075 women, 42% women) in 2004/05 to 7185 (4125 men and 3060 women, 43% women) in 2010/11. The proportion of all first degree graduates who graduated from mathematics programmes rose from 1.62% in 2004/05 to 1.82% in 2010/11.

Figure 5: Number of men and women graduating from first degree mathematics programmes between 2004/05 and 2010/11.

The current rate of growth in the percentage of first degree mathematics graduates who are female is less than 0.3% a year. The rate of growth of masters graduates who are female is about 0.7% a year. In contrast there is essentially no growth in the proportion of doctoral graduates who are female.

3.2 Mathematics Staff

The gender imbalance for mathematicians employed in HEIs is worse than for HEIs as a whole. Figure 6 presents the proportions of staff who are female by grade in all university cost centres between 2000/01 and 2010/11. The proportions of staff who are female by grade in the mathematics cost centre between 2000/01 and 2010/11 are shown in Figure 7.

In the academic year 2001/02, 2,990 academic staff (professors, senior lecturers, lecturer and researchers) were employed in the mathematics cost centre, of whom 470 were women (15.7% compared with 36.9% in all subjects). In 2010/11, 2,930 staff were employed, of whom 510 were women, with women representing 17.5% compared with 41.7% in all subjects.

In terms of vertical segregation in the academic year 2001/02 the percentage of women fell dramatically in moving from lower to higher grades: 2.5% of professors in the mathematics cost centre were female, 17.3% of senior lecturers, 21.4% of lecturers and 22.7% of research staff. Although the proportion of researchers who are female has not changed significantly over the last 10 years, the proportions of lecturers and senior lecturers who are female has increased. In 2007/08, 26.6% of lecturers were female and 20.4% of senior lecturers. The Higher Education Statistics Agency (HESA) changed the way in which it collected data on staff in 2008/09, leading to some discontinuities in the data series. However, by 2010/11, 28.3% of senior lecturers and lecturers combined were female. Over the 10 years under consideration, the proportion of professors in the mathematics cost centre who were female increased to 6.5%.

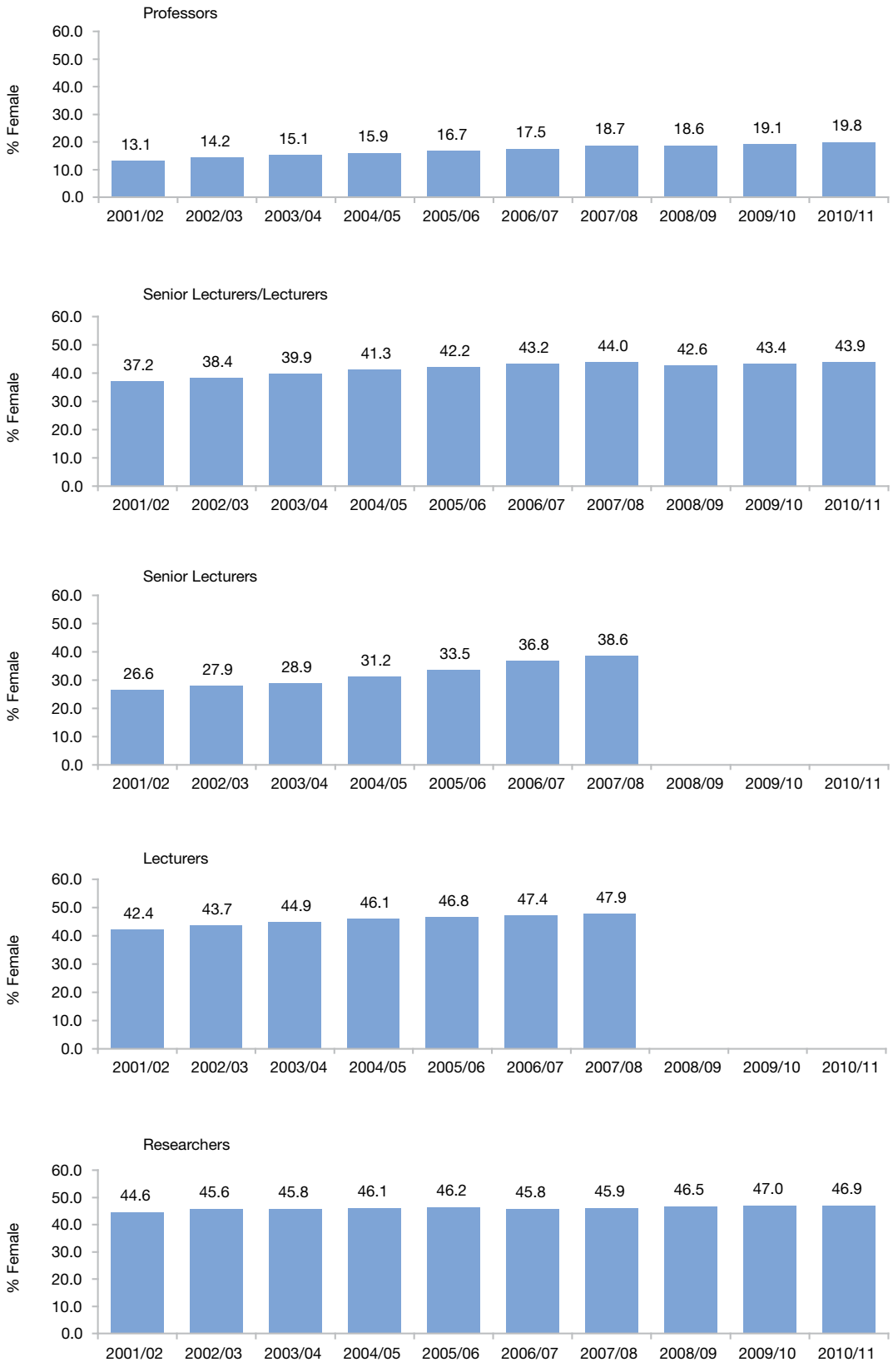


Figure 6: Percentage of staff in all cost centres who are female 2001/02 to 2010/11.

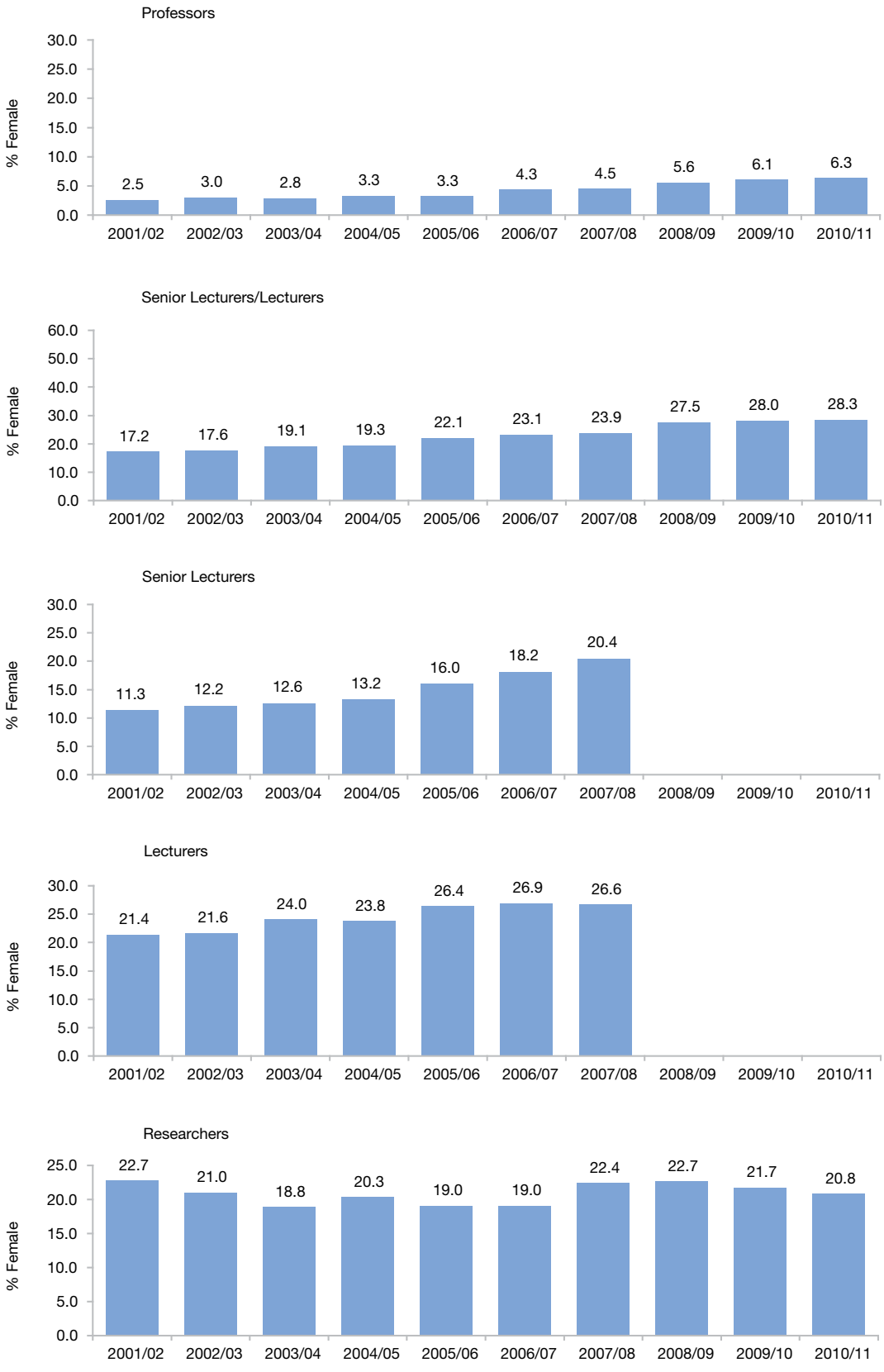


Figure 7: Percentage of staff in the mathematics cost centre who are female 2001/02 to 2010/11.

3.3 Age and Status

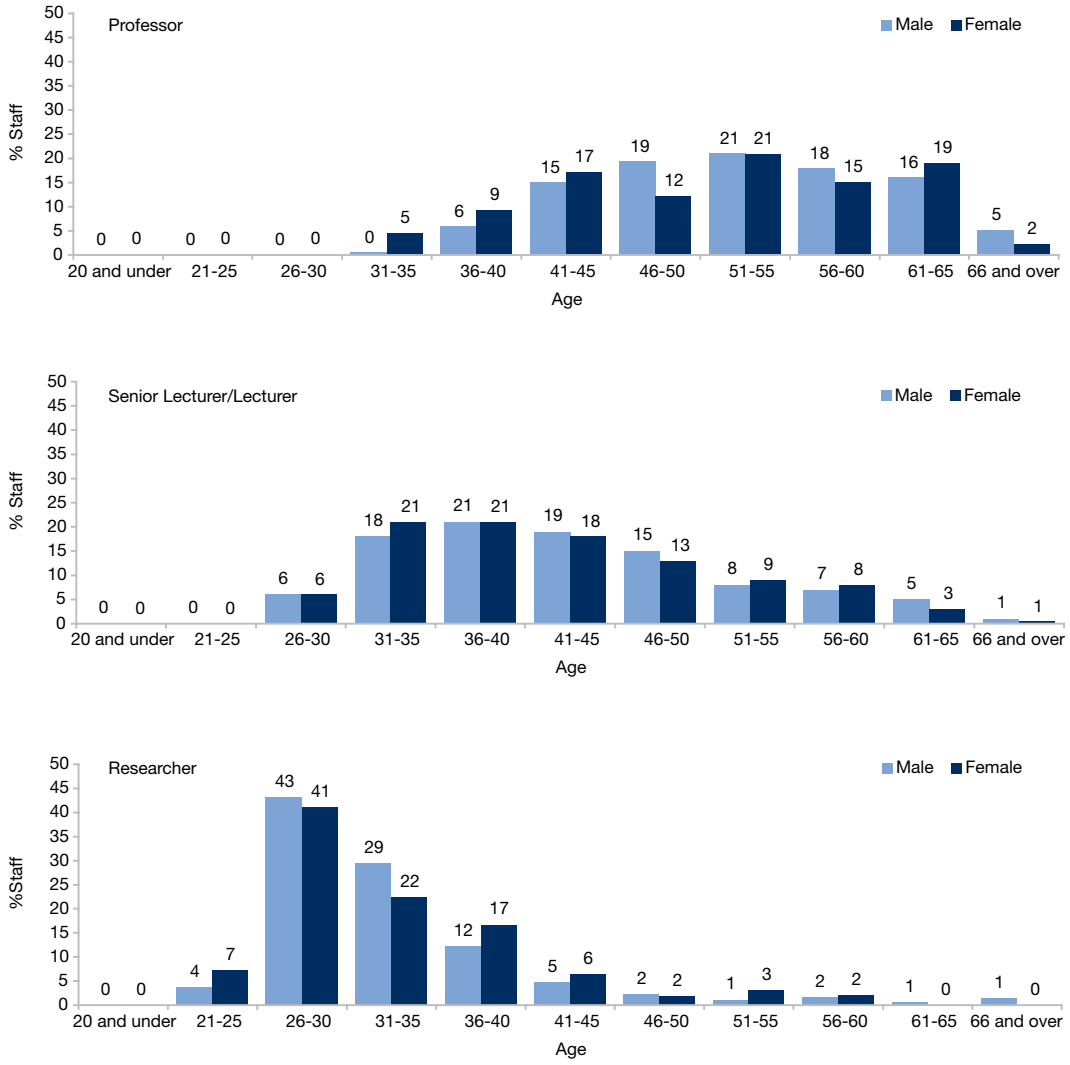


Figure 8: The age distribution of academic staff in the mathematics cost centre by gender and grade 2010/11.

In 2010/11 permanent academic staff (professors, senior lecturers and lecturers) in the mathematics cost centre were on average 46 years old compared with 47 for academic staff overall. Female permanent academic staff in the mathematics cost centre were on average younger than their male counterparts.

- Women averaged 43 years (compared with 45 for all subjects)
- Men averaged 46 years (compared with 47 for all subjects).

There are some differences by grade in mathematics:

- Professors: 42% of women and 37% of men are under 50 years. The average age of women is 51 and of men 52 years.
- Senior lecturers and lecturers: 63% of women and 60% of men are under 45 years. The average age of women is 42 and of men 43.
- Researchers: The average age of women and men is 33.

It is sometimes suggested that the reason for lower proportions of women at more senior academic grades is due to a lower proportion of women graduating in the past. However, as illustrated in Figure 9, within a particular age range, the proportion of female academic staff in mathematics who are professors is much smaller than the corresponding proportion for men. For example, if male and female permanent academic staff in mathematics aged between 51 and 60 years in 2010/11 are considered separately, 58% of the male population are professors compared with 22% of the female population. The implication is that a smaller proportion of professorial-calibre women than men achieve their potential.

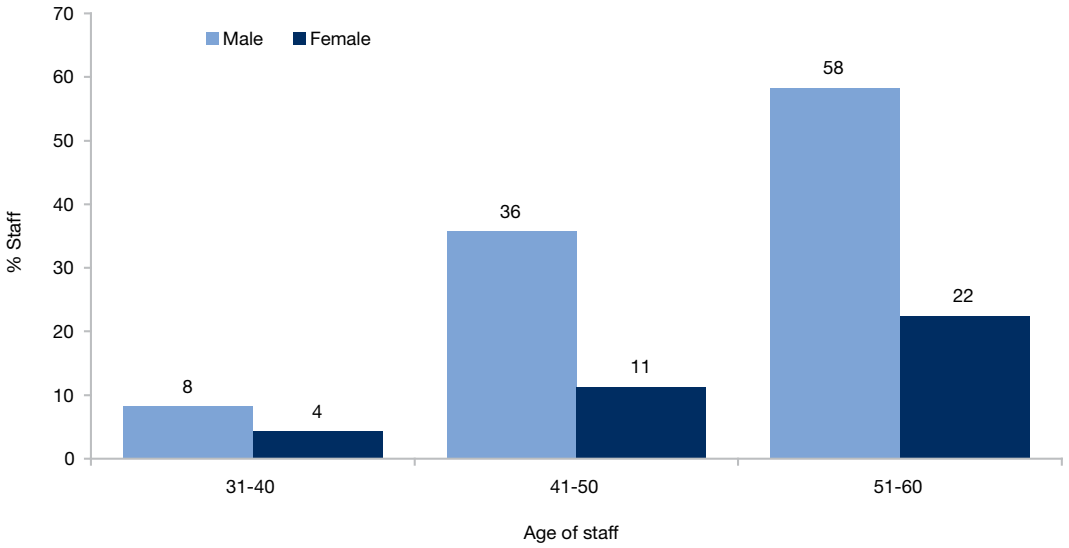


Figure 9: The proportion, by gender, of permanent academic staff in a specific age range who are professors 2010/11.

3.4 Conclusion: towards parity

Across all subjects the proportion of women graduating and in staff positions continues to increase steadily. There has been an increase in the percentage of women in academic grades each year from 2001/02 to 2010/11. The increase is about 0.9% a year.

In mathematics, the proportion of first degree and masters graduates who are female is increasing gradually, but the proportion of doctoral graduates who are female has essentially been steady at around 25% for the past seven years. Similarly, the proportion of researchers who are female has remained steady at around 21%. The proportion of permanent academic staff who are female has been increasing: of senior lecturers/lecturers around 21% are female, and of professors 6.5%. The data suggest that there are two key transition points in the mathematics academic pipeline where the proportion of women drops: the transition from first degree to doctorate, and the transition from senior lecturer/lecturer to professor. This suggests that work is needed to persuade more women studying for first degrees to undertake doctoral research, and that work is also needed to improve the progression of women in academia.

4. Good Practice in UK Mathematics Departments

In the pages that follow, the 30 benchmarks in the Good Practice Checklist are explored. The benchmarks are organised into 10 sections. Each section starts with a brief descriptor and the headings of the three benchmarks in the section. This is followed by a summary of lessons learned from previous work with STEMM departments relating to this section and a brief summary of the overall picture in mathematics. More detailed information is then given under each of the three benchmarks for the section.

Each benchmark starts with a short statement which provides an explanation of the benchmark.

Under each benchmark are three 'indicators'. The text under each indicator describes the overall position in the mathematics departments that completed the checklist. This is followed by examples of the good practice reported by contributing departments.

4.1: Organisation for Action on Women and Mathematics

How established and robust the department's organisational framework is to deliver equality of opportunity and reward.

This section covers:

- **Benchmark 1:**
  Leadership and engagement
- **Benchmark 2:**
  Accountability for women's career progression and good working practices
- **Benchmark 3:**
  Resources for good practice activities/developments/programmes

Lessons from previous work with STEMM departments

Women and science activities and programmes needed to be embedded. Initiatives led by women, but not endorsed or encouraged by senior management, were unlikely to make any long-term difference to department culture, or to key processes and practices. Departments with successful "women and science" programmes, recognised their value, and resourced them. They recognised the staff time involved, and provided administrative support. Success required senior management buy in and involvement. In successful departments the head of department was often heavily involved, and might have chaired the action committee. In contrast, leaving one/two female academics to run women and science programmes, with no administrative support, funding or any recognition of the time taken, usually did not lead to sustainable success, and could be detrimental to the individuals' own career progression.

Overall picture in Mathematics

A few departments did have committees or groups that were involved in Athena SWAN work. The majority supported the development of better working practices and work to support women in mathematics but had not, as yet, done much.

Benchmark 1: Leadership and engagement

The successful development of good working practices and processes and their sustainability is dependent on department senior management. Without their endorsement, support, and active encouragement, women and mathematics/good practice activities and programmes are not sustainable.

Indicator 1A: Head of Department (HOD) and management team champion and endorse

Generally HoDs and department management teams were reported to be supportive. Several departments reported that their HoD sat on the department and/or university Athena SWAN committee, which is good practice. However, generally there were few specific women in science activities reported; although some departments reported programmes and initiatives at faculty/university level. Others referred to HoDs and management teams who recognised the importance of good practice, although stopping short of formal endorsement.

Good practice reported by departments:

- Department management team are champions of the Athena SWAN Charter and as such will take a lead in identifying, formulating and disseminating the Charter and their action programme.
- HoD sits on the departmental Athena SWAN committee thereby demonstrating commitment and shortening the reporting line.

Indicator 1B: Senior staff support and encourage

Some departments reported uneven senior staff support for women in mathematics activities - some senior staff had a lack of awareness of the issues for women in mathematics, and others did not see it as a priority, given the pressures of teaching and research. However, in some departments, the issues were being discussed by small groups, often including the HoD, but the discussion needed to be widened. One department noted that it had a significantly higher than average percentage of female academics, including senior academics. However, it acknowledged that a strategy group was needed to identify and address gender and ethnicity issues at staff and student levels.

Good practice reported by departments:

- Some senior staff (not necessarily heads of sections) encouraged staff to undertake women in mathematics activities.

Indicator 1C: Individual awareness, participation and benefits of activities

The reported level of general awareness was low, including departments that were preparing SWAN applications. There were references to male and female staff involved in LMS women and mathematics activities, and/or women participating in university activities/programmes. Some departments made no mention of their university's SWAN activities. Others reported that they did not have any activities, but were developing some. For others success was mixed with failure, as in the case of a department that funded weekly gatherings of women - although some senior staff did not arrange other meetings which clashed, others scheduled seminars so that some graduate students were not able to participate.

Good practice reported by departments:

- Department meeting had a standing agenda item on equality issues.
- Department SWAN group had recently undertaken a survey, and held in-depth interviews, with all staff.
- Each year women in the department spoke to all new female staff and graduate students, to invite them to the weekly women in mathematics meetings. These attracted a range of junior and senior staff and students, and all women in the department were sent a weekly reminder of the meeting.

Benchmark 2: Accountability for women's career progression and good working practices

For good practice programmes to be successful they need to be managed. What can work well is a committee (with male and female members drawn from all staff and student groups) which reports to the department senior management. Individuals, who may, or may not, be members of this committee need to be identified as responsible for specific initiatives, the progress of which is monitored by the committee.

Indicator 2A: Lead committee

Around half the departments reported they had good practice/Athena SWAN groups or committees. Most of them were recently established and were not yet 'active'. Small departments tended not to have committees.

There were varying views on the effectiveness of university Equality and Diversity committees. They were not always seen as effective in driving change.

[It should be noted that Athena SWAN requires a working group/self assessment team to be established before applying for an award].

Good practice reported by departments:

- Department Athena SWAN committee discussed actions to promote women.
- Department self assessment group was reviewing its action plan and new initiatives.
- Faculty SWAN committee (with representatives from all departments) discussed and implemented actions to promote women, and department assessment groups reviewed their action plan and new initiatives.
- Department Athena SWAN working group would start by exploring what could be learned from this (LMS good practice) exercise.

Indicator 2B: Committees and post holders are accountable

Few departments had established arrangements and were dealing with this on an ad hoc basis. Work in progress was frequently reported, but practice varied and reporting structures were not always robust.

Good practice reported by departments:

- University and faculty SWAN action plans required department based action plans. In the plan that was being developed by the department, each action was 'owned', and progress was reported to the faculty and university SWAN groups.
- Good Practice Scheme committee reported to the department management team and at the termly staff meeting.

Indicator 2C: Individual responsibilities are clear and recognised

Some departments were making progress and reported that the responsibilities for equality issues in general were understood. However, they noted that as yet there had been no formal recognition for responsibilities, e.g, they were not covered in appraisals, although management was reported as being interested in changing the situation. In some departments, work was at an early stage, individuals' responsibilities for good practice were not stressed, and there was little accountability by senior management with responsibilities being passed down to more junior members of staff who did not necessarily have the authority to take action.

Good practice reported by departments:

- University's move towards Athena SWAN was discussed in the latest round of appraisals. It was agreed that days on women in mathematics activities could be counted in workload planning.
- Leadership of Good Practice Scheme and Athena SWAN activities were included in the department's workload planning model.

Benchmark 3: Resources for good practice activities/developments/programmes

For activities and programmes (which make a difference/have an impact on the workplace, its culture and the people who work there) to be successful they need resources, people, expertise, time and money and the certainty of their continuing availability (at an appropriate level). Also, the time taken by individual staff members should be taken into account in determining their workload.

3A: Funding is allocated

For most, the allocation of funding was for the future, and some expressed doubts that any department would have had specific separate funds for such activities. In some departments funding was currently ad hoc. Some departments did, however, report that they were confident that requests for funding would be favourably received. On the other hand, some departments reported a less positive situation and were more doubtful.

Good practice reported by departments:

- Funding was provided for administrative support and initiatives, some internal, and some raised externally.
- Funds in the research budget were set aside to support staff with young children with the additional costs in attending conferences or international travel.
- Staff development funding was allocated according to need/departmental priority and any reasonable request for funds, e.g. to attend events relating to women in science, would be considered.

Indicator 3B: Administrative and expert support is provided

Around half the departments reported that they had support/expertise available to them, from their university or faculty, or from within the department itself. Some referred to the good administrative and expert support that was available from the university, its equality and diversity staff and SWAN working groups. Others had not used the support that was available, or were uncertain how useful it would be. A few departments indicated that expert support was not available.

Good practice reported by departments:

- The university had a family life group which offered support for staff balancing family and work life.
- Department administrators were actively involved in promoting/implementing the work of the department SWAN committee.

Indicator 3C: Time is made available

While some departments did assign time for women and mathematics activities, for most, the allocation of time for good practice initiatives was for the future, or was currently ad hoc. In some departments tasks were added onto workloads, but nothing was removed.

Good practice reported by departments:

- Time was made available for staff to carry out women and mathematics activities and was monitored in appraisals.
- Leadership of Good Practice Scheme and Athena SWAN activities were included in the department's workload planning model.

4.2: Evidence Base for Action

How the department collects, communicates and uses quantitative and qualitative data as the basis for planning and taking action, monitoring progress and measuring success.

This section covers:

- **Benchmark 4:** Student data
- **Benchmark 5:** Staff data
- **Benchmark 6:** Qualitative data

Lessons from previous work with STEMM departments

Accurate data on female and male differences in representation at all career stages, was fundamental to the development of effective plans to tackle inequalities in career progression. Data helped to identify the need for action, and to persuade managers and staff of that need. Often departments made limited use of the data they supplied to their university and/or received from it.

Academics who were not aware of differential female and male representation, the key attrition points for women in their discipline, or how their department compared with others, might not have understood why action was needed. However, in most departments, the turnover of academic staff was low so, in the short and medium term, changes in female staff numbers did not reflect changes in practices/processes. However, measuring the representation of female applicants and short listed candidates, against the proportion of women in their recruitment pool, provided a useful indicator.

Overall picture in Mathematics

Some departments collected data, or had data available to them, but did not use it. A minority reported some use of staff data. Many reported that student and staff surveys were carried out but the data were not always analysed by gender. Few departments were using data as the basis for planning and taking action, monitoring progress and measuring success.

Benchmark 4: Student data

The department uses doctoral student gender disaggregated data (offers, acceptances, drop outs and outcomes) as the basis for planning, for action, for measuring progress and for comparisons with other like departments.

Indicator 4A: Student F/M profile

Around half the departments that returned checklists reported some, or good, use of student data. Most was recent, and directly related to SWAN applications. Other departments reported that data were not made available to them. Some, who discussed/used their data, did not publicise or disseminate it to the department. Several departments indicated that these data were reviewed at faculty or university level but not at department level. One department reported that Programme Leaders had to produce annual reports and to comment on progression and outcomes by gender. These reports came to a department committee and were available on a staff intranet although it was noted that they were little publicised.

Good practice reported by departments:

- Breakdown of F/M student numbers were discussed by the admissions group and figures are presented to the Academic Committee.
- Student data were discussed at department and faculty levels.

Indicator 4B: Student progression

Generally it appeared that student progression data were collected and recorded but seldom considered or used by departments. For some, the issues were different, and one department noted that, in fact, the progression of male students was the problem.

Good practice reported by departments:

- Student progression and completions were reported annually and disseminated to teaching staff and student representatives.
- A recent exercise measured women's progression through degree courses; the findings were discussed at department meetings.
- Postgraduate admissions committees discussed gender balance. If there were two equal candidates, they made the offer to the woman - this was not a formal process but was done on a case by case basis.

Indicator 4C: Use of time series F/M data

Several departments commented on the lack of data to provide an overall picture. Some departments had recently started to collect these data for their SWAN submissions, but often it seemed these were only discussed at Athena SWAN meetings for submission purposes and not reported elsewhere.

Good practice reported by departments:

- Student data had been compiled recently, covering the past three years (for a SWAN submission). Any imbalances would be identified together with the remedial action needed.

Benchmark 5: Staff data

The department uses its gender disaggregated staff data, and data on F/M representation in management and on committees for planning, for action, and measuring progress, and for comparison with like departments elsewhere.

Indicator 5A: F/M staff profile and turnover

A minority of departments reported some use of staff data. Most was recent and directly related to SWAN applications. Some reported that these data were studied by the university Athena SWAN committee, but were not currently reported in the department.

Small departments did not always see the need for formal monitoring. A common view in the small/smaller departments was that this type of 'data' could readily be obtained 'by inspection'. However, discussion of the data appeared to be rare. Other departments reported that staff data were held centrally but were not separated by department or faculty.

Good practice reported by departments:

- The department management team was aware of staff figures. University wide staff statistics were produced and circulated. They were used for comparisons in the department's annual review and annual promotions processes.
- University, faculty and department data had been collated. The department self assessment team would analyse this and make recommendations on action needed, if any.

Indicator 5B: F/M representation in management

Many departments referred to their concerns about overburdening their few women. For one, the issue was different, as the representation in the department's management was decided by (confidential) voting which meant that the percentage of women in the management of the department could not be controlled. Other departments reported that there had been an improvement in female representation on the management team. One indicated that in the next academic year there would be five men and three women on the management team, whereas in the past it was 100% male.

Good practice reported by departments:

- There was female membership on all of the department key decision making committees, encompassing staff at all academic grades not just at professorial level.
- Data on women's representation in university and faculty management was sent to the HoD and/or shared with the management team.

Indicator 5C: Use of time series F/M data

Some departments had tried without success to obtain F/M time series staff data from their university equality and diversity office. Several departments referred to the lack of national available data on mathematics staff.

Good practice reported by departments:

- These data were available from the faculty office and were monitored.

Benchmark 6: Qualitative data

The department uses gender disaggregated data (from internal and external staff and student surveys and external reports) to raise awareness, for comparisons with its own surveys, to identify areas where action is needed, and to assess the effectiveness and impact of changes they have made.

Indicator 6A: Student surveys

Many departments reported regular student surveys by their universities, but with little analysis by gender or by department/discipline.

Good practice reported by departments:

- Student focus groups were being put in place, looking towards their SWAN submission.

Indicator 6B: Staff surveys

References were made to the absence of gender analysis in university staff opinion surveys, and to the difficulty of extracting faculty or mathematics data.

Good practice reported by departments:

- Department members were canvassed for opinions, and it was found that the Athena SWAN meetings were a good source of opinion and ideas on ways to improve practices and progress.
- The department had taken part in a (national pilot) staff survey the previous year. The results had been used to inform the decisions over the choice of levels allocated in this survey, which would in turn inform future work.
- University staff survey results (2011) were broken down into departments and sent to HoDs. A recent project interviewing women had also influenced the future action plan for the department's SWAN application.

Indicator 6C: Use of data

Generally, little reference was made to departments' use of data from external surveys and reports.

Good practice reported by departments:

- LMS and HESA data would be used for the SWAN submission.

4.3: Appointment and Promotion Processes

How the department ensures that its input to, and involvement in, the university's processes, and the decisions taken, are open, transparent and fair.

This section covers:

- **Benchmark 7:**
  Decision making
- **Benchmark 8:**
  Appointment and promotion information and its communication
- **Benchmark 9:**
  Monitor appointments and promotions

Lessons from previous work with STEMM departments

In most departments the major turnover was of postdoctoral research fellows. Here selection was often the responsibility of groups, sections, or individuals. It was not controlled, influenced or monitored by the department. Departments, that had monitored their data, had noted the relationship between the appointment of female candidates and the presence of women on the appointing committee.

Universities who identified problems with academic promotion, sometimes found obstacles and systems at department level which restricted the value of any changes made at university level. In other cases, department processes were transparent and well understood, but were a "black box" at faculty and/or university levels. Departments often did not rely solely on university promotion communications, but made sure themselves that staff were well informed on promotion processes and criteria. Publicising successful promotion case studies did help to demystify the promotions process.

Overall picture in Mathematics

Some departments did include at least one woman and one man on appointment panels. There was a general concern with overloading female staff. Practice on the training of panel members varied, particularly in ensuring that members were aware of issues of unconscious bias. Some departments relied on the university to communicate information on appointments and promotions, while others made sure themselves that communications were timely and effective. Only a few regularly monitored appointments and promotions. There was a common view that the numbers were too small to be meaningful.

Benchmark 7: Decision making

It is good practice for all appointments and promotions (including postdoctoral research staff) to be made by panels that include at least one man and one woman. Training is provided for panel members and is required for panel chairs (so that no candidates are disadvantaged by the process). The department makes sure that individuals who participate in the process at department level are representative of the F/M staff profile of the department.

Indicator 7A: Appointment panels gender balance: at least one man and one woman

While some departments did include at least one woman and one man on all appointment panels, the small number of women (and concerns about overburdening them) was frequently cited as a problem. Several departments referred to the appointment of panel members as gender blind. One commented that the preference was to ensure that panels were understanding of the variety of individual circumstances regardless of gender. Some had found ways around the issues of small numbers of women academic staff. One department reported appointing a female from another relevant department. Alternatively, all members of the department provided input into short-listing, and after presentations by candidates on interview days, even though there might not have been women on the interview panel.

The position on postdoctoral research fellow appointments was often not clear. One department stated that there was no requirement for at least one woman and one man on all appointment panels for postdoctoral research fellow appointments.

Good practice reported by departments:

- University policy that panels include at least one man and one woman was adhered to and monitored.
- Women were appointed to panels from other relevant departments.

Indicator 7B: Representativeness of appointment panel membership

In many departments, the composition of short-listing and interview panels was determined by the university/faculty, and the number of department representatives was limited, often just the HoD, and the relevant head of research group. Some departments reported that panels were appointed for their expertise and experience and according to their positions/status, implying that as women were less likely to fall into these categories there might not be female representation on panels.

Good practice reported by departments:

- The HoD had made a positive decision to include early career people on panels - making it easier to find women to serve on panels.
- All academic staff were encouraged to contribute to an academic selection process (e.g. by making comments on candidates' CVs, participating in a post-presentation discussion, etc).
- All eligible women in the department would be on the department selection and promotion committees for higher level positions until gender balance as routine became feasible.

Indicator 7C: Unconscious bias/no candidate disadvantaged

Overall the general feeling was of goodwill, with departments keen to appoint qualified women, if possible. However, this was not the case everywhere. One department stated that unconscious bias was not considered at any point in the appointment process. Another department reported that although training was compulsory before staff could sit on any selection committee, the issues surrounding unconscious bias were not covered.

One department had concerns that although they were clear about the need to avoid unconscious bias, the panel chairs were typically from outside the department and could often be less sympathetic to these issues, thus emphasising the need for a whole institution approach to issues like unconscious bias.

Good practice reported by departments:

- University HR ensured all panel members were appropriately trained in equal opportunity issues.
- Unconscious bias was covered in internal training - attendance was encouraged for all on panels and is compulsory for panel chairs.
- Panel members were all trained to be aware of unconscious bias.
- Department planned to hold an "Unconscious Bias" in-house training session.

Benchmark 8: Appointment and promotion information and its communication

It is good practice for appointment and promotion processes and criteria (and the information on them that is provided for candidates and panels) to be clear, fair, and appropriate, and for its communication to be timely and effective. Information on advertised posts is useful, attractive, inclusive and reflects the department (members and activities) as a whole, and provides practical, up to date information, of interest to the family unit and attractive to minorities.

Indicator 8A: Information on processes and criteria

One department survey had shown that although there were clear criteria for promotions, not all staff were aware of them. One department reported that the promotion process to reader or professor is obscure and consequently was perceived by some to be unfair. Some post '92 universities had no process for individual promotion and the only way was for the HoD to write a business case for a new role at a higher grade and invite applicants.

Good practice reported by departments:

- Promotion panels always considered if there were extra circumstances such as family or caring responsibilities. This was formalised – there was a box on the form to ensure the committee considered this.
- The promotion process was very transparent – an internal committee assessed all proposals and this included a number of senior female staff (women were very successful in their applications for promotion).
- Job adverts included information on support for family life and women in research.

Indicator 8B: Communication is timely and effective

Some departments appeared to rely entirely on university circulation of promotion information. A department in a post '92 university reported that there were no promotion rounds and what few opportunities were available were rarely advertised in a timely fashion.

Good practice reported by departments:

- University "all staff" communications on promotion and job opportunities were effective and timely.
- University guidance on promotions was followed, which ensured timely and effective communication.

Indicator 8C: Information is useful, attractive, inclusive and representative of the department as a whole

While some departments reported that information was comprehensive, several thought that more could be done, such as providing more practical information (e.g. on living in the area, giving greater prominence to and detail about the university's family friendly policies) and ensuring that further particulars gave full details of the make-up of the department by gender.

Good practice reported by departments:

- Further particulars were approved by the HoD and provided a comprehensive description of the department's activities.
- University gave strong guidance on the information provided and recent job adverts had emphasised the flexible work environment.
- The department had an action plan item to ensure that all adverts appealed to both genders. Adverts already included information on the Athena SWAN award, as well as the university's family-friendly policies.
- Standard text was used in information and further particulars in relation to the benefits of working at the university, family-friendly policies and childcare vouchers, etc.

Benchmark 9: Monitor appointments and promotions

It is good practice to monitor appointment and promotion applications and outcomes (to monitor female applications against the candidate "pool") and to measure progress on female representation.

Indicator 9A: Applications for appointments

Many departments did not formally monitor applications. One department recognised that there was in percentage terms, a minority of women applicants. However, there was informal monitoring often by HoDs. One department felt this was not relevant as no account was taken of candidates' gender during the appointment process - selection was on merit alone. In one university it was policy that only the initials of applicants' given names were requested, so that shortlists were, so far as possible, drawn up in a gender blind manner.

Good practice reported by departments:

- Data had been gathered recently to inform the department's Athena SWAN activities.
- University monitored applications by gender.

Indicator 9B: Promotion monitoring

Some departments felt monitoring was not appropriate as the department was too small. Others were making changes, while still noting the difficulties caused by the generally small number of women academic staff which makes it difficult to measure progress.

Good practice reported by departments:

- This was monitored carefully. The department had been very successful in promoting women in the past three years as a result.
- Women were encouraged to apply in all emails which gave information on promotions.

Indicator 9C: Appointment processes and outcomes monitoring

A common view was that numbers were so small that the results would not be statistically significant. One department, which did not have its own data, was unable to obtain this from the university Equality and Diversity Office.

Good practice reported by departments:

- These data had been gathered recently to inform the department's Athena SWAN activities.

4.4: Levelling the Appointment and Promotion Playing Field

How the department ensures that men and women are equally likely to apply for appointments and promotion, and are equally likely to be successful.

This section covers:

- **Benchmark 10:**
  Identify and encourage candidates
- **Benchmark 11:**
  Support candidates
- **Benchmark 12:**
  Feedback and follow up for candidates

Lessons from previous work with STEMM departments

Individuals who were not given information on their readiness for promotion, or who were not directly approached and encouraged to apply for promotion, might assume they were either not eligible, or not yet ready or, that an advertised post was 'booked' for someone else. Work suggested that women were more likely than men to have made such assumptions. Work also showed that heads of departments often found it difficult to provide positive feedback to candidates and in particular to unsuccessful candidates. Anecdote suggested that women's confidence was knocked back more by failure than men's, and so it was particularly important that they received positive, constructive feedback. Departments, who monitored their data, had noted that women were likely to wait longer than men before applying for an appointment or a promotion, and in consequence regularly reviewed all staff to identify, encourage and support individuals with promotion potential.

Overall picture in Mathematics

Few departments took action to widen the candidate pool for appointments. Similarly, few were pro-active in identifying promotion candidates. Practice on support for promotion candidates varied, from departments that took steps to broaden candidates' experiences, to those who expected this would be addressed during appraisal or that it was down to the individual. In general, feedback was available to unsuccessful promotion candidates.

Benchmark 10: Identify and encourage candidates

It is good practice for the university promotion process not to rely solely on self nomination/personal applications. The department expects/encourages its senior staff to identify potential candidates and inform them of opportunities as they arise. The department holds a positive review of all academic staff including postdocs (for their promotion/career potential) before each promotion 'round'.

Indicator 10A: Widening the candidate pool

This often happened on an ad hoc basis, not as part of the formal process. One department was clear that they could do much more to increase the percentage of women among applicants.

Good practice reported by departments:

- Members of the department were asked to bring job opportunities to the attention of any appropriate people, both internal and external.

Indicator 10B: Positive review of potential promotion candidates

Several departments were in universities where self-nomination was required (rather than having systems where all staff were reviewed as to their potential for promotion, and those who were felt to be ready for promotion were invited to put themselves forward). One department reported that the university had instructed the HoDs to consider deserving cases and look especially carefully at some groups of people. However, often informal systems operated; systematic assessment of all staff was not necessarily carried out, but a fairly general view was that senior management did have a good 'feel' for possible promotion candidates (e.g. through appraisal).

Good practice reported by departments:

- Appraisals took place before the promotion round. Career strategy and potential for promotion were discussed.
- Academics were encouraged at various points in the year to review their performance potential. This was achieved by regular one-to-ones and performance development reviews.
- CVs of all academics were collated annually, and reviewed by two senior members of the department to identify those who should be considered for promotion or a special award.

Indicator 10C: Encourage applications

A fairly general view was that, in the past, practice had been inconsistent, but was now improving, although some sections/groups were more pro-active than others. In one case encouragement from university senior management had grown stronger, but the department wanted to do more of this internally. However, there were still departments where encouragement was sporadic at best, absent at worst.

Good practice reported by departments:

- Annual reviewers proactively suggested that anyone who appeared to meet the promotion criteria was put forward for promotion.
- Part of the review process was to suggest how someone could best work towards meeting the promotion criteria.

Benchmark 11: Support candidates

It is good practice for the university to offer/provide regular training courses on promotion (process, criteria) and preparing a case for promotion. The department monitors the take up of university/faculty provided training. The department offers help (on presenting their case for promotion) and personal support to individuals preparing for promotion.

Indicator 11A: Support promotion candidates' cases for promotion

Practice varied; ranging from departments with formal systems in place to support promotion candidates to those departments in which support was informal. There was a general recognition that practice varied across the department and depended on individual section/group heads.

Good practice reported by departments:

- Mentors, heads of groups and HoD were available to give advice. There was comprehensive and helpful supporting documentation.
- All academics were reviewed before the promotions cycles, to ensure they received the right support, before and during the cycle, usually from a senior academic staff member with experience of the promotions process.
- Experienced staff, who were on the faculty promotions committee, helped with the preparation of cases, they discussed them with the candidates and others who might have had useful suggestions (provided the candidate was happy with this).
- University required a personal statement from candidates. Many staff found it difficult to write, so the statement was usually written by a more experienced staff member.
- Help was offered by the HoD, who had to complete a pro forma for every applicant. This was done in consultation with senior staff at the same or higher grade. Help from outside the decision procedure was also offered by members of the SWAN committee, who had recently served on the university promotion committee.
- There was a departmental system whereby candidates for promotion were shadowed by an experienced academic staff member to help them put together their promotion case.

Indicator 11B: Personal support

A general view was that, although more often than not there were no formal support systems, there was always support available.

Good practice reported by departments:

- Senior members of the department, typically appraisers or the HoD, were available to offer help. The HoD was pro-active in ensuring that help was sought and offered.
- There was good mentoring from the promotions partner as well as the line manager.

Indicator 11C: Advice on gaps and weaknesses

Practice ranged, from departments that took practical steps to broaden candidates' experiences, to some departments where it was expected this would be addressed during appraisal, but checks were not made. However, one department reported that little personal advice or support was given.

Good practice reported by departments:

- During the annual review of CVs any gaps that were identified were fed back to the relevant appraiser in order that some action could be taken to fill the gap.
- Advice was usually provided by the HoD. It had been advantageous to give staff an opportunity to display their administrative skills in a high responsibility post (such as chair of the Board of Studies) to increase their prospects for promotion.
- Candidates were given advice on filling gaps and they were encouraged to discuss the promotions criteria during yearly appraisals to decide on how any weaknesses could be addressed.

Benchmark 12: Feedback and follow up for candidates

It is good practice for the university to provide regular training on 'giving positive feedback' and to monitor its take up. The department offers positive feedback to all candidates. In the case of unsuccessful candidates the department will provide them with unbiased advice and career guidance.

Indicator 12A: Positive feedback

In many departments, feedback was provided just for unsuccessful candidates on the basis that successful candidates did not usually want feedback.

In one department the feedback to be given to unsuccessful candidates by their HoD was discussed in the Faculty promotions committee. However, in another department, the HoD did not know what feedback was given by the Dean of Sciences as part of the university process.

Good practice reported by departments:

- Feedback was given for successful and unsuccessful candidates. This was done by the HoD and was extensive.
- University feedback for academic promotions was given by the Dean who encouraged staff to discuss this with him and the HoD.
- The university registrar provided informal feedback beyond the formal letter.

Indicator 12B: Unbiased career advice and guidance

Many departments relied on career guidance advice given by the supervisor (in the case of postdoctoral research fellows), or as part of the appraisal process, or by a mentor (where there was one), or through the university's staff training and development unit.

Good practice reported by departments:

- Staff who had helped with a promotion case would usually follow up unsuccessful cases, with discussions on ways in which the candidate could improve their chances, and encouraged the candidate to take action accordingly.

Indicator 12C: Activities and opportunities available to candidates

Some departments saw it as the individual's responsibility to seek out activities and opportunities to develop themselves, but would offer support, if requested. Other departments took appropriate action but did not necessarily check what happened. However, in a number of departments little was on offer and little opportunity was provided, for example, to release academics from teaching to gain the experience needed for any promotions.

Good practice reported by departments:

- A wide range of opportunities were offered, e.g., sabbatical leave, conference funding, and administrative roles.
- Candidates had the opportunity to discuss activities etc. needed with the HoD or through the appraisal process.
- The department encouraged its research staff/ postdoctoral research fellows to become involved in different activities which would broaden their careers. Individuals were asked to complete a form which was discussed during their appraisal.
- Staff were encouraged to contribute widely to the department's activities. Opportunities to teach or supervise students were readily taken up by postdoctoral research fellows and there were a number of outreach and knowledge exchange opportunities available.

4.5: Career Development Provision

How the department monitors and ensures the quality and effectiveness of the career development that is provided.
This section covers:

- **Benchmark 13:**
  Staff development and training
- **Benchmark 14:**
  Early Career Researchers (ECR) development
- **Benchmark 15:**
  Appraisal

Lessons from previous work with STEMM departments

Across UK universities the provision of staff development and training, and the regard in which it was held was mixed. Some universities and faculties provided high quality, targeted training valued by departments. Elsewhere perceptions of burdensome, inappropriate and poorly presented training courses, for example for probationary lecturers, made it difficult to persuade the academic community of the value of any central training and development provision. It was therefore important for departments to monitor the take up and utility of training, and where necessary lobby for improvements. While individuals did need to take responsibility for their own careers, the view held by some senior academics (that individuals were intelligent enough to 'push' themselves, and to know what was needed) was unhelpful. Early career staff could have felt that the need to ask/the need for support was an admission of ignorance and uncertainty which might reflect negatively on them. Well managed appraisal systems focused on career development were important to give staff the space to discuss their development needs and readiness for promotion. The best departments monitored the take up of appraisal and periodically assessed its effectiveness. Postdoctoral research fellow requirements were different; for them the key questions to be answered were whether they had the potential for a permanent academic job, and what they needed to do to improve their chances of gaining such a role. Postdoctoral research fellows also needed advice on making a move into another career where they could use their skills and achieve their full potential.

Overall picture in Mathematics

Departments' approaches to meeting the development needs of their staff varied. In some, training needs were identified at appraisal, elsewhere it was more ad hoc. Support for early career researchers differed. Some were well supported by mentors and/or senior colleagues. For others there was little/no specific support. There was little monitoring of the uptake of training, often because the university did not keep departments informed. Some departments felt that centrally provided courses were often not relevant. Some departments ran annual appraisals, which were well regarded, one or two reported full participation. In others experiences were less satisfactory. Generally it was unclear whether postdoctoral research fellows were regularly appraised.

Benchmark 13: Staff development and training

The department provides a comprehensive induction for all staff, and is aware of the development training offered by the university. Junior staff are encouraged to take up what is offered, and where courses are known to be useful, they are recommended.

Indicator 13A: Induction

A number of departments had induction procedures in place, while others were reviewing and improving their procedures. In one, all probationers were required to attend several courses provided by the university - uptake was monitored but the usefulness of the provision was not well monitored. In one or two departments, information about induction was not always communicated to new academics. There was an indication from one department that induction needed attention at both department and university level.

Good practice reported by departments:

- All staff had inductions, with administrative staff and line managers, to discuss their role and go through the practicalities.
- A comprehensive induction process that had to be taken up by all new staff, with input at all levels and feedback collected.
- New staff received a folder of useful information on arrival, and an induction checklist which they went through on their first day.
- New postdoctoral research fellows were allocated a "buddy".
- Induction included meetings with colleagues.
- A faculty health and safety and HR induction for new staff was held once a month.
- There was a comprehensive university induction and the department was sent information on the take-up of university training.

Indicator 13B: Awareness of needs and what is available

Practice varied with some departments identifying training needs at appraisal, while in others Heads of Groups and the HoD did this on an ad hoc basis. A number of departments questioned the usefulness of training. Some indicated that the prevailing culture was not to encourage training, although training was not necessarily actively discouraged. The overall impression was that in a number of universities, better communication between departments and the university about the usefulness of training would have been beneficial.

Good practice reported by departments:

- Group heads undertook appraisals for their staff, they were aware of their development needs, and encouraged take up.
- The department organised regular staff development sessions to cover issues of general interest and need.
- The annual appraisal form includes a section asking about training needs and this was followed up.

Indicator 13C: Encourage and monitor participation

Several departments reported that training run centrally was monitored for uptake and usefulness but no information was fed back to them. In general there was little department monitoring, but it was the responsibility of the faculty to monitor take up. A general view was that, after probation, staff were encouraged rather than monitored. On a wider perspective, one department made specific mention that senior staff encouraged conference participation.

Good practice reported by departments:

- Staff were encouraged via regular emails from the HoD to apply to undertake training and development.
- There was a training budget which was used according to need, the HoD monitored this and reported on use of funds.
- The department had an annual budget for training; section heads were sent an annual return of all staff training.
- Encouragement to take up training and development was a standard part of academic appraisal.

Benchmark 14: Early Career Researchers (ECR) development

It is good practice to provide transferable skills training, to monitor its take up and to check its usefulness with departments. The department offers impartial careers advice and guidance for ECRs. The department makes sure that their ECRs are aware of their personal responsibility for their own careers, and for making informed career decisions and choices.

Indicator 14A: Access to impartial advice

Approaches varied widely from departments in which ECRs were well supported, through mentors or other staff who were not necessarily their project supervisors, to those where there was little specific support. However, some departments seemed content that their ECRs would get impartial advice from their supervisors and/or would access university provided career development training and advice but they had not necessarily checked that this had happened.

Good practice reported by departments:

- ECRs had one-to-one meetings with the Head of Research (in addition to appraisal), and were encouraged to put in collaborative bids, or undertake training.
- ECRs were encouraged to join the faculty research staff forum where career development was discussed, where the department made regular presentations, for example on where to get support for particular areas, and applying for fellowships.
- ECRs had mentors who gave impartial advice. Teaching fellows did not have mentors but did have a staff member who provided teaching advice.
- The university had a development unit dedicated to supporting ECRs.
- Academic leads for ECRs were not their project supervisors, so were well positioned for giving impartial advice.

Indicator 14B: Individual responsibility for career progression

Some departments were clear that ECRs had responsibility for their own careers and for making informed career decisions/choices.

Good practice reported by departments:

- Regular one-to-ones and performance development reviews were held with senior members of staff.
- The university ran a series of workshops designed primarily for ECRs and mid-career staff. ECRs also had their own probation adviser and access to the mentoring programme.
- There were university workshops for ECRs and access to a mentoring programme through which they received lots of advice on how to take control of their own careers.
- There was a new faculty post of director of postgraduate researchers.

Indicator 14C: Transferrable skills training

For one department, feedback from recent Athena SWAN activities had shown that the university provided courses were useful but, like many others, it was not able to monitor individuals' uptake of such training, as this information was not fed back to it by the central providers.

Good practice reported by departments:

- Training was monitored at university level and formed part of appraisal.
- Uptake of training is monitored and internal training was monitored for effectiveness.
- All ECRs were expected to take part in a comprehensive training programme. The HoD received full information on this.
- The uptake was monitored through appraisal.

Benchmark 15: Appraisal

It is good practice to ensure that there are appropriate appraisal arrangements for research staff, including postdocs, to provide training for appraisers, and specific training for appraisers of ECRs. The take up of appraisal is monitored by the department and, where necessary, the department follows up on training needs identified during appraisal.

Indicator 15A: Arrangements and availability

There was a wide range of views and experiences. It was not always clear whether postdoctoral research fellows were regularly appraised. In a number of departments, appraisal ran annually and was well regarded, but in others experiences were less satisfactory. In some cases, where nominally there was regular appraisal, the reality was different, with examples of appraisal running sporadically, or only being used regularly for staff on probation. Views on schemes varied widely; staff in some departments felt that not all aspects of appraisal were appropriate. Careers advice was not always explicitly covered/offered. Appraisal was optional in some departments, and training was not always provided for appraisers.

Good practice reported by departments:

- There were annual appraisals and a six monthly interim review.
- HoD saw all appraisal documentation once it was signed off by the reviewer and the reviewee.
- Appraisals included a discussion of those being supervised by the appraisee, and the support which they were offering.
- Annual appraisals were conducted by the HoD and other professors; the HoD moderated the appraisals for which he was not the appraiser. Those for which he was the appraiser were moderated by the Dean.

Indicator 15B: Monitor participation and utility

There was a range of experiences. In a small number of departments participation rates were very high. In some departments everyone was required to participate in appraisal, but there was no mechanism to comment on how useful the experience was. However, commitment to appraisal was not always strong and low participation rates were reported. One department reported that the new faculty scheme under development appeared to be a step backwards.

Good practice reported by departments:

- Participation was monitored and reported to the management team.
- There was 100% participation last year.
- Regular automatic appraisal was given and senior management received appraisal summaries; any issues were followed up.
- The HoD received weekly updates from HR on upcoming and overdue appraisals.

Indicator 15C: Follow through

In some departments, follow up on appraisal outcomes was automatic, while in others, there was no effective department follow through. In some cases the responsibility lay with the individual. In other cases there was inconsistent application of policy. Sometimes follow through was dependent on the funding being available.

Good practice reported by departments:

- Follow-up was automatic, development needs were identified, and recorded, for follow up in the next year.
- Development needs were noted and sent to the Staff Development Office; all training events were ranked for usefulness at the subsequent appraisal.

4.6: Career Development Activities

How the department ensures that its staff engage in activities, both internal and external, which contribute to their career progression/professional profile.

This section covers:

- **Benchmark 16:**
  Mentoring
- **Benchmark 17:**
  Networks and role models
- **Benchmark 18:**
  Internal and external activities

Lessons from previous work with STEMM departments

Some departments recognised the need to ensure that staff, particularly early career staff, engaged in activities which were valuable for their career development and which would raise their profile. Many had mentoring for new staff, but these were often just a requirement of probation. A few departments had mentors for postdoctoral research fellows. Some departments assessed the effectiveness of mentoring and encouraged their staff to train as mentors and mentees. A few offered mentors for individuals who were preparing for promotion, or returning from maternity leave.

The absence of female role models was often cited as significant for women's career progression and retention. Some departments saw networking and role models as external 'activities', which they encouraged, rather than activities for which they were responsible. The best departments ensured that at least a representative proportion of seminar speakers were women and that ample opportunity was provided for, in particular early career researchers, to meet and network with the seminar speakers. Departments did not always recognise networking across the university/outside their discipline as an important developmental activity for early career staff, and a way to offset the isolation of women in a male dominated environment.

Overall picture in Mathematics

Practice varied in the ways in which departments supported the career development of their staff. Some departments reported that they had effective mentoring schemes in place which were well-publicised, but this was not always the case and schemes were rarely evaluated. In general departments were supportive/recognised the importance of staff raising their profiles internally and externally. Some departments made efforts to encourage female academics to act as role models while others felt this happened implicitly rather than explicitly.

Benchmark 16: Mentoring

It is good practice for the university/faculty to provide training and support for mentors and training for potential mentees. The department offers/supports mentoring schemes for researchers, postdocs and post graduates. It publicises/provides information on schemes (internal and/or external). It encourages its staff to act as mentors and to train to become mentors and it monitors the usefulness of mentoring for mentees and mentors.

Indicator 16A: Availability of information about mentoring

The overall picture was varied, with some departments reporting that they had effective schemes which were well-publicised. However, other departments reported that either they had no scheme, or that it was currently only informal. Where schemes existed they were not always obvious to staff. Some universities had schemes specifically for women in STEMM research, which was certainly better than no scheme at all, but good practice would be to extend this to all staff.

Good practice reported by departments:

- A thriving university-led mentoring scheme was available to all staff.
- Information on the university mentoring scheme for women in research was well disseminated.
- All lecturers on probation had a 'senior colleague' who acted as a mentor and participated in probation review meetings.

Indicator 16B: Academics and postdoctoral research fellows act as mentors.

In general, mentoring was most commonly available for new staff. Some, but not all, universities provided training for mentors. There were a number of examples, particularly for new staff, of the line manager acting as mentor. In some departments only senior staff were mentors, which meant that there were few or no women mentors available.

Good practice reported by departments:

- All academic staff were expected to act in a mentoring role for one or more PhD students within the department.
- All staff were approached for their willingness to become a mentor.
- HoD encouraged participation and mentor training was offered by the university.

Indicator 16C: Monitoring participation and utility

In general mentoring schemes were rarely evaluated.

Good practice reported by departments:

- Monitoring of the mentoring scheme is done and counts toward individual's workload, promotion and appraisals.
- A central record is maintained of all mentors and mentees.

Benchmark 17: Networks and role models

Recognised good practice in this area is that networking and networks at university, faculty, and department levels are supported and encouraged. The department encourages its staff to contribute to internal, external, professional, and special interest networks. The department encourages its staff to use their personal networks, e.g., to identify potential female appointees, mentors, visiting academics, researchers, examiners and seminar speakers. The department encourages its female staff to act as role models.

Indicator 17A: Support and encouragement of networks

Levels of encouragement to staff to become involved in internal and external networks varied. Some departments reported that they actively encouraged their staff to involve themselves in learned and professional societies.

There was some qualification as to the networks which were encouraged. One department commented that members of academic staff were encouraged to contribute to special interest networks in their academic areas but not, for example, to groups like the European Women in Mathematics society.

Most references to the use of networks were confined to identifying seminar speakers. Some departments acknowledged that more support and encouragement was needed.

Good practice reported by departments:

- Many staff were involved in learned and professional societies like the LMS, including ECRs involved in Royal Statistical Society (RSS) Young Statisticians section, and PhD students who had recently set up a new Society for Industrial and Applied Mathematics (SIAM) student section.
- There was strong support for staff to become involved in all areas of research and teaching networking.
- Mathematics group members were encouraged to be members of the LMS.
- Emails were circulated about the University's Women's Network.
- The department offered workload allocation towards such activities.
- All staff were encouraged to participate in external professional networks as part of personal development review (PDR) process (Staff should be aware that there was funding available for this).

Indicator 17B: Use of networks

Some departments acknowledged that more female seminar speakers could be sought, and were making efforts to do so. In these cases some staff members were actively using their networks to identify more female speakers, but it was acknowledged that this should often be more widespread. However, it could be a struggle as it was also reported that in some cases staff make no effort to find and invite women to speak in conferences and seminars and there is no mechanism to monitor this never mind enforce it.

Good practice reported by departments:

- Staff members actively use their networks to identify more female speakers.

Indicator 17C: Role models

There was a range of views and experience. Some departments made efforts to encourage female academics to act as role models while others felt this happened implicitly rather than explicitly. Some departments actively encouraged the invitation of female speakers to give seminars, but others felt strongly that it was better to operate in a gender-blind manner with speakers chosen for their research interests with no gender-bias.

Good practice reported by departments:

- Department was keen to invite eminent women mathematicians to give seminars.
- Invitations to present at meetings and seminars were informally monitored.
- Female academics did act as role models and were encouraged to do so by the department.

Benchmark 18: Internal and external activities

The department encourages its staff to engage in activities, which raise their profile and bring them/their mathematics to the notice of senior staff at department, faculty and university levels.
The department also encourages staff to become involved in professional/learned societies.
It monitors the gender of the nominations/recommendations it makes for professional, representative/management roles and for prizes, awards, and marks of esteem.

Indicator 18A: Internal activities

In general departments saw it as important for staff to raise their profile, but were often concerned about potential extra workloads perhaps falling disproportionately on women.

Good practice reported by departments:

- Internal activities counted toward an individual's workload, promotion and appraisals.
- Staff were actively encouraged to take up faculty/university roles to raise their profile. This was often done through appraisal.

Indicator 18B: External activities

Department opinions varied in respect of the pro-active encouragement of staff to become involved in external activities. Some reported that, while they acknowledged the importance of professional and learned societies, they had not actively encouraged staff to take up roles within them. One commented that given the prominence of accounting models in universities now (which only recognise income-bearing activities such as teaching or funded research) this was likely to be an on-going problem. Another comment was that it was possible that professional and learned societies would need to recognise these issues more generally – they could not rely on university-funded labour any more. Other external (and time-limited) activities such as attendance at conferences and networking events were more generally supported by departments.

Good practice reported by departments:

- An ECR was recently nominated to become the LMS departmental representative.
- The department recognised the importance of conferences for career advancement and offered travel grants to enable all staff to travel, at home or abroad, and to conferences.

Indicator 18C: Department nominations and recommendations

There was enthusiasm for nominating staff for awards and honours, but some suggested that opportunities to do so were limited, and that opportunities were not sufficiently frequent to make monitoring by gender sensible.

Good practice reported by departments:

- The department was proactive in nominating staff, including female members of the department, for awards.

4.7: Effective Management

How the department ensures the administrative and academic contributions of its staff are effectively and fairly managed and resourced.

This section covers:

- **Benchmark 19:**
  Management systems
- **Benchmark 20:**
  Resource allocations
- **Benchmark 21:**
  Workload roles and responsibilities

Lessons from previous work with STEMM departments

Often, what was clear to those who took the decisions in a department was less clear to others. Many early career staff were not well informed about how their department's systems for workload and resource allocation were organised, or the basis on which these allocations were made. Consequently, staff might question their fairness. Uncertainties about who made which decisions, and on what basis, could give the appearance of a 'closed shop'. In contrast the best departments had transparent systems in place and kept their staff informed. Minutes of management meetings were published and the basis on which resources were allocated was clear, and staff workload information was freely available.

In the best departments there was a regular rotation of senior posts. This provided more opportunities for becoming members of the management team, and important committees. It was seen as beneficial for the department if more staff acquired management experience as this helped staff acquire the experience they needed for promotion, and ensured that there were more staff who had the experience necessary for senior management jobs. Some departments appointed staff into assistant or deputy positions to enable them to gain experience prior to taking on major administrative roles. When staff took on major management or administrative roles, this was recognised in the workload model and in consequence they had a reduced teaching load.

Overall picture in Mathematics

The general view was that mathematics departments had "lighter touch" management arrangements than were usual in experimental science departments, and that reporting lines were simple, and hence clear. Some reported effective and open communication, while others were concerned about communications with postdoctoral research fellows and between sections. For many, fairness and openness was the guiding principle in allocating roles and resources, but others reported that some aspects were seen as arbitrary. The effectiveness and coverage of workload modelling varied. Many gave lighter workloads to new academics.

Benchmark 19: Management systems

It is good practice for the university to provide guidance on the accountabilities, reporting and communication responsibilities of heads of departments. The department follows this guidance, and is able to demonstrate that its accountability, reporting and communication arrangements are clear, effective, open, and well regarded by staff at all levels. The department checks to make sure that the views of staff concur on this, and takes action where necessary. The membership and chairs of department committees, heads of research groups/teams reflect the gender profile of the department staff.

Indicator 19A: Accountability and reporting arrangements

Differences in management structures reflected department size. In smaller departments, often the HoD was the line manager for all academic staff and sometimes activities and processes referred to in the checklist only existed informally. There was also a recognition that, as small departments grow, more formal systems would need to be introduced.

Good practice reported by departments:

- Information on the roles of department committees was circulated annually.
- Department published organisation charts; the agenda and minutes of the department management team meetings were on the intranet.
- Department management responsibilities were circulated annually, showing any changes.
- Management positions had job descriptions so new staff could understand these responsibilities.
- Reporting lines were clear, and seemed to be uncontroversial.
- The annual staff survey monitored staff perceptions.

Indicator 19B: Representative management

Many departments commented that it was important not to overburden the small numbers of female staff with administrative roles. The point was also made that in relatively small departments the most important thing was to try to ensure that such jobs were fairly allocated.

Good practice reported by departments:

- The allocation of heavier administrative responsibilities broadly reflected the academic staff gender profile.
- Membership and chairs of committees were monitored carefully to ensure an equal spread through all members of the department, and as a consequence reflected the department's staff gender balance.

Indicator 19C: Communications

A number of departments reported that effective and open communications were in place. Several departments commented on the absence of effective two way communications, the lack of systematic communication to postdoctoral research fellows, and poor communication between groups. One department noted that the absence of a staff common room, or social space, hindered good communications.

Good practice reported by departments:

- There were regular department meetings with representation from all areas.
- Department management team minutes and other documents were now available to all.
- Email was used to disseminate information, plus a termly newsletter helped to keep staff informed.
- The staff survey confirmed that communication was seen as effective and open.
- The department had an 'open door policy' and the HoD was usually around and available to staff.

Benchmark 20: Resource allocations

The department has systems for allocating resources (funding, offices, space, equipment and technical support) that are fair, clear, open, and well understood by staff at all levels. The department checks the views of staff on this, and takes action, where necessary.

Indicator 20A: Systems for allocating resources

Generally systems were not well regarded. Some departments had little control as the budget was held at faculty level, and was subject to stringent university budgetary constraints, which could not be wholly predicted. In most departments, staff had limited involvement in and/or awareness of the allocation system; typically only the department administrator and HoD saw the accounts.
A few reported that the systems were not transparent, and in some cases it was felt that the lack of transparency led to the perception that resources went to the person who shouted loudest.

Good practice reported by departments:

- There was a clear procedure for allocating travel expenditure to research groups (staff travel and for visitors).
- What few free resources there were, were routinely communicated to the department.
- Staff development resources were allocated via appraisals.

Indicator 20B: Allocation of space

For a few departments space was a problem and some had constraints due to the department being spread over more than one site. A number of departments had made efforts to treat staff fairly, even if staff had not always appreciated this. There were examples of departments checking staff perceptions.

Good practice reported by departments:

- Anyone could request to move to an office which becomes empty (professorial offices are larger, the others are much the same size).
- Technical support was available to everyone, and there was a standard specification for computer equipment.

Indicator 20C: Sources of Finance

There was a common view that there was little funding to understand and that department finances were generally not understood, but this was not regarded as a problem. In some departments, things were changing and sources of finance were becoming more transparent.

Good practice reported by departments:

- The headline figures in the budget were publicised to all.

Benchmark 21: Workload roles and responsibilities

Departments have a regular rotation of management roles and committee memberships. This rotation takes account of individuals' management experience, the gender balance, and succession planning. Departments also have fair and open workload allocation systems. Departments check staff's perceptions, and take action where necessary.

Indicator 21A: Monitoring the balance of teaching and research

The picture was mixed, with references to systems in which an individual's full workload, including university responsibilities, was taken into account when allocating new teaching. Many departments gave lighter workloads to new academics and, in some, postdoctoral research fellows were encouraged to teach, though these opportunities had not always been taken up. There were examples where the university had expectations on how a typical academic would split their time between teaching, research and administration. In one department research time had to be bid for in open competition across the faculty - with no specific allowance for newly appointed staff, who also had to bid. Several departments referred to a lack of complete transparency.

Good practice reported by departments:

- New staff were given a lighter teaching load, with smaller higher level courses to teach and minimal administration.
- Within groups there was a balance.
- Department teaching committee monitored and documented the teaching workloads of academics annually; the documents were accessible to all staff.
- The selection of staff for teaching responsibilities was based on several aspects including their current departmental teaching, their administrative/committee load and their University committees/administrative loads.
- Postdoctoral research fellows were given, and encouraged to take on, teaching duties.

Indicator 21B: Rotation of management and administrative roles

There was a range of views, experiences, systems and coverage. In one department rotation was carried out but was not seen as successful. Another reported that although duties changed around quite a bit, this seemed to be on an ad hoc basis. One department reported that only some roles were rotated. Gender was rarely considered; one department saw it as good practice to operate in a gender-blind manner; simply appointing the best person for the job. Another department stated that succession planning was a factor, but gender balance was not specifically considered when rotating management roles. Another department reported that they were beginning to think about succession planning.

Good practice reported by departments:

- Positions were rotated in general every three years.

Indicator 21C: Allocation of workload is fair and open

For some a workload scheme that was manageable was a problem. One department stated that developing a fair comprehensive workload scheme was too large a task. In others, work was in progress to make the workload model more standard and controllable. The coverage of workload schemes varied. For example, in one case, exam marking was allocated separately, which resulted in overloads for some, and activities outside standard department duties were are not taken into account.

The openness and fairness of workload models was disputed by a number of departments, especially where workload models originated from the university, or where individuals could only access information about their own workloads. One department had challenged the faculty on the ground that the role of pastoral tutor had been assigned to a member of staff on the grounds that this job should be done by a woman. This allocation was overridden; the assertion that gender should play no role in the assignation of any jobs in the department has been made and accepted.

Good practice reported by departments:

- There were many discussions before the new workload model was introduced - it would be monitored and any imbalances would be ironed out.
- Staff were able to raise and discuss concerns if they perceived they have been hard done by.
- An annual planning exercise - individuals' workload plans were reviewed by the HoD for reasonableness; particular attention was paid to those whose workloads differed significantly from the norm.
- Department had a well-tried workload model which was flexible enough to account for the activities of the range of staff from ECRs to the most senior.

4.8: Culture and Ethos

How the department ensures that its working environment responds to the ambitions and expectations of staff, recognises their contributions and enables them to enjoy the rewards of a career in academic mathematics.

This section covers:

- **Benchmark 22:**
  Workplace environment
- **Benchmark 23:**
  Collegiality
- **Benchmark 24:**
  Individual contributions valued

Lessons from previous work with STEMM departments

Staff working in 'good practice' departments had a clear view of how they and their colleagues, senior and junior, were expected to behave towards each other, and on the importance of looking out for each other. Some departments articulated their values in terms of a shared responsibility for the quality of the department's research, its teaching, and developing the potential of all its staff.

Senior staff kept open doors. Staff were alert to the potential for conflict between supervisors and those they supervise, and the department had processes in place to deal with conflicts. The department used regular staff opinion surveys to make sure that staff felt the department was inclusive, supportive and well managed. Individual successes, professional and personal, were well publicised.

Overall picture in Mathematics

The overall impression was that mathematics departments were open and friendly, with many members of staff who offered support and encouragement. Departments had various ways of recognising individuals' contributions. Some departments reported that staff perceived that some aspects of their roles were valued more highly than others.

Benchmark 22: Workplace environment

The department sets high standards for the behaviour expected of staff (towards other staff and students) and ensures that all staff are aware of, and respect these standards, and would expect timely and effective action to be taken over any reported 'breach'. The department checks staff perceptions on the openness, friendliness and cooperativeness of their working environment and where necessary takes action.

Indicator 22A: Standards of behaviour

Generally departments did not see staff behaviour as a problem. However, and possibly as a result, several departments reported that their policies and procedures were not clear. There were indications that challenging behaviour was better managed now than in the past, including challenging behaviour of students.

Good practice reported by departments:

- The university dignity at work policy set out standards of behaviour - staff could raise issues, at first informally, and then via formal mechanisms if necessary.
- Swift action has been taken in the past, and the current HoD saw this as a priority.
- There was regular monitoring during performance development reviews with senior members of staff.

Indicator 22B: Open and friendly environment

The overall impression was that mathematics departments were open and friendly, although split sites, no staff common room and limited office space were seen to be the causes of isolation, particularly for postdoctoral research fellows and postgraduates.

Good practice reported by departments:

- Staff were surveyed to check how they feel about working in the department.
- The HoD and management team strove to ensure an open friendly environment. This was checked via university surveys.

Indicator 22C: Co-operative working

No departments admitted to a lack of co operation. However, some suggested that better communication and collaboration between groups was needed. Little monitoring was reported.

Good practice reported by departments:

- Within groups there is good collaboration and there isn't a competitive atmosphere between groups.

Benchmark 23: Collegiality

The department regularly checks whether staff, including postdocs, feel that they, and other members of their group, are supported and encouraged by colleagues (junior, peers, senior, and line manager), that they feel they 'belong', and are included in the work and social activities of the department/their group. Where necessary the department takes action. The department recognises the potential conflict of interest between 'supervisors' and those they supervise and ensures that individuals can access unbiased career advice, in a way that does not damage their career prospects.

Indicator 23A: Support from colleagues

Several references were made to the nature of mathematics research which was typically not carried out in groups/teams. However, departments did report that there were many members of staff who offered support on individual aspects such as teaching, assessment, and writing grant proposals.

Good practice reported by departments:

- Checks were done at appraisal.
- The HoD checked frequently that academics who might have required support received it.
- This was checked by members of department management group via a staff survey.

Indicator 23A: Line management – potential for conflict of interests

It was suggested that conflicts of interest were less an issue in mathematics than in experimental sciences. However, there were several references to the relations between postdoctoral research fellows and their 'supervisor' as a grey area. In some departments, postdoctoral research fellows did have access to a university mentoring scheme. Few departments had formal arrangements, but would take action if problems of this nature became apparent. However, staff had often not been made aware of the possibility of such situations in advance.

Good practice reported by departments:

- HoD and other senior staff were available to offer advice - staff could choose who they approached for advice.
- Many senior staff had "open doors" - people knew who they could approach to discuss issues with if needed.
- Staff on probation had mentors and probationary supervisors who were different and not the Head of Group. The appraisers were not always the Head of Group (line manager).
- PhD students had a second supervisor to balance career advice.

Indicator 23C: Sense of belonging

Comments suggested that in a number of departments social activities were limited. Others saw their formal social functions as important and inclusive. For some, such functions/opportunities was work in progress and one department reported that regular weekly departmental coffee time seemed to have worked well.

Good practice reported by departments:

- There were various department social events throughout the year. Younger staff and post graduates organised informal social events.
- Individual research groups organised seminars, workgroups encouraged a sense of belonging.
- One group met for morning coffee in the common room and lunch in the refectory.
- A group went for lunch together and were sometimes joined by partners/small children.
- Occasional social activities were organised to which families were invited.
- Academics and postdoctoral research fellows were all invited to contribute to discipline meetings and there was a range of informal gatherings and general lectures for all.
- Department was a close knit, supportive team with high engagement at social activities, the venues and times of which were agreed by all.

Benchmark 24: Individual contributions valued

The department makes sure that individuals' contributions (research, management/administrative, university teaching and external professional) to the department are recognised and valued. The department regularly checks the perceptions of staff including postdocs and where necessary takes action.

Indicator 24A: Teaching and research contributions

Departments had various ways in which teaching and research contributions were recognised. One department recognised that rewards could come from prizes (even just being nominated), promotions, lighter teaching/administrative loads. Nonetheless some departments reported that staff perceived that some aspects were valued more highly than others.

Good practice reported by departments:

- Performance in teaching, research (and for example administration and knowledge exchange) were appraised in annual review. More public celebration also occurred, with congratulatory emails sent around the department when someone is awarded a research or teaching, or wins a prize.
- The faculty newsletter celebrated research and teaching successes, including university good teaching awards, new initiatives and research grants.
- There was a general move towards more explicit thanking and praising, by email and in staff meetings.
- Recently new student-led teaching prizes had been organised.
- Teaching was recognised through 'Teacher of the Year' awards and University Teaching Fellowships.

Indicator 24B: Management and administrative contributions

Although there were exceptions, the general view was that research, and to a lesser extent teaching, was given greater recognition than management and administrative duties.

Good practice reported by departments:

- Recognised via appraisal and contribution-based rewards.
- Time was taken at key points in the year to recognise these contributions and included in workload monitoring.
- Administrative and management responsibilities were important parts of academic life, and were built into the workload model.
- Management and administrative responsibilities were highly valued and rewarded in promotion.

Indicator 24C: External contributions valued

Practices varied on recognising and valuing of external activities. Some departments did take account of activities, although in some cases full allowances in terms of workload were not granted, and not all activities were taken into account. In others it was down to individuals to report them. In one department the time for external examining was recognised, but other activities were not. Some departments reported relatively little recognition for external activities which were sometimes seen as a drain on university resources. However, a number of departments recognised that more could be done, or were planning to take more account of such activities.

Good practice reported by departments:

- Contributions were detailed at appraisal, and valued as contributions to the department's external "esteem".
- External commitments of value to the department were recognised and treated as part of the workload allocation. The workload allocation system was public and so there was good opportunity for all staff to see that their contributions had been recognised.

4.9: Flexibility

How the department ensures the flexibility that underpins successful careers.
This section covers:

- **Benchmark 25:**
  Approaches to flexible working
- **Benchmark 26:**
  Take up of flexibility
- **Benchmark 27:**
  Flexibility built into arrangements

Lessons from previous work with STEMM departments

Individuals' needs and priorities changed at different life stages. Staff with young families, living away from their family support network, had different perspectives from those who were more established, and different from those without family responsibilities. Departmental approaches to flexibility seemed to be closely linked with the age profile, as well as the gender profile of the department; younger men wanted to be involved in family life and to share family responsibilities. In some departments, staff felt that they would be 'letting the side down' by taking time out for family events.
In others staff knew that their contribution to the department was measured by the quality of their output, and heads of departments actively discouraged staff from overworking. Departments which had good flexible working practices and arrangements in place did, however, have to accept that in reality the take up was a matter for individuals and for research groups.
It was not something which they controlled and much of it was self driven. It had been noted that in departments where senior staff took up opportunities for flexible working, this 'legitimised' flexible working for all staff.

Overall picture in Mathematics

A general view was that in mathematics most staff work autonomously, hence flexibly, and because of this formal checks are irrelevant. Most departments took a light touch approach, so with little monitoring there was little awareness of the consistency of approach across a department. Generally there was no discouragement if staff wanted to work long hours but no direct pressure to do so. Some departments made efforts to limit meetings and events to "core hours", but with varying success. There were references to part time staff, with some departments trying to accommodate them and others acknowledging that more could be done.

Benchmark 25: Approaches to flexible working

It is good practice for the university to have policies and practices on flexible working which provide practical guidance on managing flexible arrangements. The department is aware of statutory requirements, and what is good practice. The department knows where they/their staff can get advice and information. The department discourages a long hours culture, and checks staff perceptions on this and where necessary takes action.

Indicator 25A: Availability of flexible working

A general view was that most staff worked autonomously, and hence flexibly and that as it was relatively easy to work flexibly, no formal checks were carried out. Departments referred to trying to take account of personal circumstances where possible, but often individual needs had to be balanced against constraints on the availability of rooms and other facilities. In some cases requests had to be prioritised and only some requests could be met. For one department, recent growth had resulted in a large number of people with young children which had brought a growing awareness to the department of the need for family-friendly practices.

Good practice reported by departments:

- The department had staff who worked part time - so everyone was aware of this possibility.
- University guidelines were on the HR website, and staff understood what was acceptable and appropriate. The possibility to limit timetabling because of family and similar commitments was advertised and was taken up.
- The department was good at offering flexible working and this had a high take up with many members of staff working part-time at various points of their career.
- The university operated a policy of "family friendly teaching hours", i.e. no 9am or 5pm lectures.

Indicator 25B: Awareness of individual needs

Some departments reported formal systems for taking into account individual needs, and others referred to a good culture where there was an awareness of needs, but no formal systems.

Good practice reported by departments:

- The HoD discussed flexible workloads with staff as appropriate and had always been willing to listen to suggestions.
- Needs for flexibility were taken into account. For example academics indicated before teaching was timetabled which hours they could not be available for teaching.
- Individual line managers understood the needs of their staff and usually the request for flexible working was made to line managers and then to the department.
- All members of academic staff could ask for preference in timetabling teaching activities, based on the demands of young children, religious observance and 'other reasonable circumstances'. Requests were made on a confidential basis to the deputy HoD who prioritised requests and worked with the undergraduate office to enable them whenever possible.
- Availability forms for teaching allowed requests to be made, which if reasonable were met as far as was possible.

Indicator 25C: Long hours culture discouraged

Some departments accepted that long hours were part of the job, and made references to staff who worked long hours at home. Departments reported that there was no discouragement if staff wanted to work long hours, but no direct pressure on them to do so. One department commented that some staff members reported that basically it was impossible to do the job expected of them within the 40 hours that some were restricted to, by family commitments. In contrast one department had encouraged staff to spend more time in the department, with staff working at home the department was very quiet. Staff were now spending more time in the department and the atmosphere was changing.

Good practice reported by departments:

- Department discouraged a long hours culture/ presentee-ism.
- Senior staff were discouraged from sending emails in the evenings and at weekends.
- Department tried to keep workloads fair and reasonable - the workload model allowed overloaded individuals to be identified, and action was taken.

Benchmark 26: Take up of flexibility

The department checks that their sections/groups make it easy for staff to take advantage of flexibility, and encourages senior staff to lead by example in their own working arrangements.

Indicator 26A: Senior staff lead by example

A fairly general view was that flexibility was assumed as part of the job and that senior staff did lead by example by spending some time working at home. Some questioned the need for senior staff to publicise the fact they worked flexibly given that this practice was so widespread.

Good practice reported by departments:

- HoD took full paternity leave and had to make arrangements to fit in with childcare.
- It was known that a woman professor worked part-time and needed to arrange meetings around childcare arrangements.
- Regularly monitored during one-to-ones and performance development reviews with HoD.
- Most academic staff, senior or not, made use of the flexibility that was available and did not disguise this.

Indicator 26B: Encourage take up

The overall picture was that flexible working is part of the job.

Good practice reported by departments:

- University had flexible working policies which enabled staff to request a reduction in hours on a temporary basis - this was taken up by staff.
- Staff could and did take time off for caring responsibilities at relatively short notice.

Indicator 26C: Monitor take up

A general view that the need to monitor take up of flexibility was just not an issue - flexible working was an integral part of working practices. However, one department reported that they planned to begin monitoring.

Good practice reported by departments:

- The take up of flexibility was monitored for academics, by heads of group and HoD.

Benchmark 27: Flexibility built into arrangements

The department timetables meetings and events so as make sure as many staff as possible can attend. It expects sections/groups to take individuals' needs for flexibility/ circumstances into account when timetabling activities/meetings. The department regularly checks staff perceptions on this, and where necessary takes action.

Indicator 27A: Timing of meetings and events

Although some departments did make efforts to limit meetings and events to "core hours", experiences varied and departments noted that sometimes afternoon meetings did run very late and that some events were in the evening. It was also noted that it was often not possible to schedule a time that all could attend, which did not clash with teaching. Some departments acknowledged that more could be done, such as excluding early/late times that might conflict with school runs or other childcare duties and doing more to publicise events in advance, to allow staff to make alternative arrangements. There were several references to part time staff; some departments tried to accommodate part time staff and others acknowledged that more could be done.

Good practice reported by departments:

- All meetings were in core hours. Many staff had long journeys and it was unusual for meetings to start before 10.30 a.m. Seminars were timetabled to start at 11.30 a.m. to enable as many people as possible to attend.
- Dates for meetings were arranged and publicised well in advance.
- Meetings arranged at short notice were often held on a web system which enabled staff to join in remotely.
- Meetings took place in the middle of the day, often on Wednesdays as these were less heavily timetabled.

Indicator 27B: Timetabling of teaching

While many departments did accommodate individual needs in timetabling teaching, there were several references to external constraints, such as student choices or the effects of centralised timetabling. These sometimes meant that final decisions on granting requests for flexibility were out of departments' hands.

Good practice reported by departments:

- Individuals' needs for flexibility were routinely taken care of in timetabling; senior staff who signed off requests were sympathetic and lobbied the faculty on their behalf.
- Individuals reviewed their timetables well before term started and were able to get changes made when necessary.

Indicator 27C: Sections' arrangements

Sections were generally reported as recognising the constraints that faced some staff although this did not necessarily mean that they had taken action. Others had not seen this as an issue, but when individuals had problems with family commitments, they were dealt with, case by case.

Good practice reported by departments:

- Meetings were held in core hours only.
- Seminars and working groups were arranged to ensure availability of majority of staff.

4.10: Career Breaks and Interrupted Careers

How the department ensures that the arrangements made for career breaks can enable individuals to maintain a career trajectory which meets their circumstances, abilities and ambitions.

This section covers:

- **Benchmark 28:**
  Supportive approaches to career breaks
- **Benchmark 29:**
  Career breaks - before and during
- **Benchmark 30:**
  Career breaks - on/after return

Lessons from previous work with STEMM departments

Good practice departments saw managing maternity leave and other, planned and unplanned career breaks, as a responsibility to be shared. They did not leave individuals to find their own cover and/or to make arrangements to catch up on their return. They had developed 'procedures' which could swing into action smoothly. They kept in touch and made sure that individuals were updated, via email with important news and changes. Staff on career breaks, who wished to be kept in the social loop, were welcomed to social and other events. Some universities offered reduced teaching and/or administrative workloads on return. Departments had formal progress reviews for returners to ensure that they were getting the support they needed both to make a smooth transition back into work and to get their research career back on track.

Overall picture in Mathematics

Some departments had little/no recent experience of career breaks, some relied on their university, others approached this case by case, and a few had more formal and organised approaches. Some reported university schemes to release returners from teaching and administration. Others were reliant on goodwill and supportive colleagues. Some took a formal approach to planning cover and staged returns with good support to make sure returners' careers got back on track.

Benchmark 28: Supportive approaches to career breaks

It is good practice for the university to provide practical guidance on support for staff. The department demonstrates its ability and willingness to support staff to cope with the practicalities before, during and after a career break or unplanned career interruption. The department provides easily accessible advice and information, and checks that section heads are aware of what the department can/does provide.

Indicator 28A: Aware and supportive

Several departments had no experience of staff taking career breaks and referred more generally to support and care. A number of departments provided support on an informal basis; they felt that as few individuals were likely to be affected it was more appropriate to deal with them as they arose, rather than by a fixed policy. However, some departments acknowledged that this area might need to be approached more formally.

Good practice reported by departments:

- The department was currently checking the user friendliness of all its systems, under the banner of "Systems Thinking". The department believed this would produce some benefits.
- The department worked closely with individuals undertaking career breaks to ensure that they were given appropriate support.

Indicator 28B: Practical advice and information

A number of departments referred to university policies on career breaks, childminding expenses, etc. Views varied on the quality of the guidelines; a specific comment was that guidelines for career breaks other than for maternity and paternity leave were less publicised, and that although information was given by central HR, it was not shared with line managers.

Good practice reported by departments:

- University had a dedicated administrator who was happy to help.
- Department had maternity leave guidelines which were distributed to individuals taking parental leave and to their line managers.
- Formal documentation was provided by HR and further information could then be obtained by speaking to the HoD or deputy HoD.
- Department planned to produce a fact sheet for staff taking maternity or adoption leave.

Indicator 28C: Role models and case studies

Understandably some departments had no internal role models available. Views varied among those departments that did have staff with experience of career breaks. Some recognised that informal mechanisms would operate. One department noted that mentoring by senior female staff was likely to lead to a sharing of experiences. However, some departments saw this as an unreasonable expectation of 'busy' women.

Good practice reported by departments:

- Department had a number of role models, staff who had taken career breaks and a HoD who visibly promoted flexible working.
- Department was setting up a website with case studies to show people what was possible/what worked.
- Department had a Parents' Networking Lunch once a month with social activities organised for families.
- As a small department, individuals who had taken career breaks were well-known.

Benchmark 29: Career breaks - before and during

The department arranges a meeting to check that individuals are getting the support, advice and information they want. The department helps with, advises on, and/or makes the support arrangements (for administration/teaching/research responsibilities) before, during and after the career break.

Indicator 29A: Personal choice

For some departments this was outside their experience. In others it was often dealt with informally in routine discussions and meetings with the section head, HoD or at appraisal.

Good practice reported by departments:

- HoD was always willing to discuss needs and possibilities; if necessary, assistance was available from HR.
- Staff taking career breaks were given full choice to decide how it should be taken - they met up with the HoD before and after the break to decide how to work.

Indicator 29B: Cover arrangements

A few departments had formal arrangements for cover during a career break, some left it to the individual,
and others dealt with it informally - reallocating responsibilities to others in their group. Sometimes, there was uncertainty as to exactly what was needed. Some departments felt that systems would improve,
as maternity leave became more common.
One acknowledged that more could be done such as introducing a checklist.

Good practice reported by departments:

- The department received a budget from the university, for cover from sessional lecturers either during the maternity leave or for the period just after maternity leave. This was discussed in advance with the individual.
- Cover for supervision and research management was arranged internally, by colleagues in advance; sometimes formal cover was used to relieve these staff members of teaching responsibilities, to recognise the additional workload. Staff covering could be rewarded by lump sum payments.

Indicator 29C: Keeping in touch

A number of departments reported that staff used email to keep in touch during leave periods and that as most departmental information was available online, staff could keep in touch easily, should they wish. Other departments encouraged some contact with line managers during leave. The use of keeping in touch (KIT) days was also reported.

Good practice reported by departments:

- During leave period the line manager and the individual are encouraged to make reasonable contact with each other - the frequency/mode of communication was agreed before the leave started.
- Individuals were encouraged to use Keeping in Touch (KIT) days, which were paid if taken in the period when the individual was not receiving full pay.
- Weekly lunches organised by women in the department were a way of keeping in touch; staff on maternity leave often took part in them.

Benchmark 30: Career breaks - on/after return

The department recognises returners' needs (flexibility, personal support, mentoring, training and development to facilitate a smooth return). The HoD/section/group holds a meeting some weeks after their return, to discuss with the individual what is needed to get their career back on track, and over what time scale.

Indicator 30A: Support to facilitate smooth return

Practices varied among departments. Some departments reported university schemes to release returners from teaching and administration. However, not all schemes provided funds for teaching replacements. Some departments noted that their university or faculty was considering introducing a returners' scheme, including reduced administration and teaching commitments. Other departments described more informal approaches, which relied on goodwill and supportive colleagues.

Good practice reported by departments:

- Individuals taking parental leave were expected to have a staff development review on their return.
- University had recently produced a good practice document on maternity returners. Each case was dealt with on an individual basis and all appropriate and realistic allowances were made.
- Department allocated a period equivalent to a term for academic staff to have a reduced workload to encourage them to get back up to speed with their research after the career break.
- Department worked closely with individuals to ensure that they were given appropriate support.
- Staff taking career breaks were given a term's grace from teaching responsibilities to allow them to readjust to the workplace and to catch up with research work. For staff on teaching contracts, recommendations would be made, to their line manager on suitable equivalent treatment on a case-by-case basis.
- Returning staff were encouraged to meet up before their return to discuss arrangements with their line managers, as well as the HoD. They were invited to take on a mentor and to participate in the department's Parents lunches held once a month. Other staff were made aware of returners.
- Academic staff would be granted a period of study leave immediately following a period of maternity or adoption leave.
- Department would provide a private office to postdoctoral researchers and PhD students for the purpose of breast feeding.

Indicator 30B: Flexibility after return

Some departments took a formal approach including holding discussions before an individual returns to work. However, informal systems also were described with flexibility being negotiated on a case-by-case basis. Some departments acknowledged that there could be problems accommodating needs while other departments left it to the individual to take the initiative.

Good practice reported by departments:

- The working environment was very flexible and staff returning from breaks were able to take full advantage of this. Many had returned part-time and gradually increased their working hours over a number of years.
- Information on flexibility after returning was discussed before individuals took a career break. Agreements on work patterns were always discussed before the return.
- This could be done formally with a "Request for Flexible Work", or informally with the line manager.

Indicator 30C: Career progression

Practice varied widely from formal systems, and weekly meetings, to more informal approaches such as occasional meetings to ensure that the returner is progressing well. Some departments had no recent experience of maternity leave.

Good practice reported by departments:

- The returner was encouraged to have a development review with their line manager a month after their return to discuss this and other issues.
- During the phased return the HoD would meet the member of staff weekly, to assess progress and identify any problems and to discuss future career progression.

5. Case Studies

This section contains five case studies of female mathematician at various career stages. The pen portraits give brief details of their careers and outline the support from their departments and family which have helped to make their careers possible.

Noel-Ann Bradshaw

Principal Lecturer in Mathematics and Operational Research at the University of Greenwich

Noel-Ann became interested in teaching and learning mathematics while teaching numeracy to adults in 2003. She completed her undergraduate degree at the University of Greenwich as a mature student in 2007 and has worked at the university ever since, initially as a part time lecturer, while undertaking research in evolutionary algorithms. She has taught a variety of subjects: currently she lectures on operational research and uses her mathematical modelling techniques in her role as admissions tutor for her school. Noel-Ann has initiated several innovative projects designed to encourage students to think mathematically, improve their communication skills and thus increase their employment prospects. One such project is the Maths Arcade which now runs in several other universities. She also initiated the first ever UK undergraduate mathematics conference, Tomorrow's Mathematicians Today, which ran in Greenwich in February 2010 and was repeated in February 2013. She is on the Council for the Institute of Mathematics and its Applications (IMA) and the British Society for the History of Mathematics (BSHM). She is currently researching Florence Nightingale's statistical modelling.

Noel-Ann has enjoyed several European holidays to Paris, Crete and Venice and is never happier than when lying on a beach in the sun. Her other interests include trips to the theatre and London's many art galleries, and, when she cannot get away to warmer climates, looking after her garden in South London. She also enjoys recreational mathematical games and puzzles.

Cathy Hobbs

Head of Department, Engineering Design and Mathematics at the University of the West of England, Bristol

Cathy completed her undergraduate studies at the University of Warwick and a PhD in mathematics at the University of Liverpool. She worked for two years as a Teaching Fellow at the University of Nottingham; then moved to Oxford Brookes University in 1994 as a Lecturer in mathematics. In 1997 she was promoted to Senior Lecturer, then Principal Lecturer in 2002. She became Head of the Department of Mathematics in 2004 on return from her first period of maternity leave, and then became Associate Dean for Research in the School of Technology in 2007. In 2010 she moved to the University of the West of England, Bristol, as permanent head of the newly combined Department of Engineering Design and Maths.

During her time at Oxford Brookes University Cathy had two periods of 'sabbatical leave', spending one year at Auckland University and one year as a Visiting Fellow at the University of Bristol. Although Oxford Brookes had no formal sabbatical scheme she negotiated unpaid leave from her job on both occasions and found funding to support herself (and family) during these periods, which were very fruitful both personally and academically.

Cathy has two primary school aged children. Support from her husband, who is also a mathematics graduate and is currently a free-lance IT consultant, has been key in her ability to maintain a career during the time when her children were very young. In her spare time Cathy enjoys music and tending the family allotment.

Nina Snaith

Reader in Mathematics at the University of Bristol

After being born in the UK, Nina grew up in Canada as her father, an academic mathematician, got a job in London, Ontario. Nina's first degree was obtained at McMaster University. This degree was in theoretical physics rather than mathematics as at the age of 7 she had already seen too many mathematicians and had vowed not to follow in her father's footsteps!

However, the draw of mathematics was inevitable and she returned to England in 1996 to do a PhD in the School of Maths at the University of Bristol. After completing her PhD in 2000, Nina's research was supported by a Royal Society Dorothy Hodgkin fellowship and then an EPSRC Advanced fellowship and she became a Reader in 2007. She makes the most of her background by applying random matrix theory, an area with its origins in physics, to answer deep and long-standing questions related to prime numbers.

Nina met her husband, also a mathematician, in Bristol where they are happily settled with two children, aged 5 and 2. Nina had six months maternity leave after the birth of her first child and about seven months after her second. On both occasions she returned to work full time. Life with

two working parents and small children has to be streamlined, so home, school, nursery and work are all within 10 minutes walk, making it possible to continue doing the job she loves full time as well as enjoying the children who bring her incalculable delight. Whatever else is going on, heading out to pick up the children at the end of the day is a joy that never diminishes.

Apart from spending time with family and friends, when the opportunity arises, Nina also loves reading and hiking.

Gwyneth Stallard

Professor of Pure Mathematics at the Open University

Gwyneth followed her undergraduate studies in mathematics at Cambridge with a PhD in complex dynamics at Imperial College London which she completed in 1991. By this point she was married and looking to find work within commuting distance of her husband's work. She wrote round to suitable universities and ended up teaching mathematics to engineers at the University of Southampton. This was followed by temporary lecturing positions at Southampton for a couple of years and in 1994 she secured a postdoctoral position at the Open University. She was appointed to a lectureship in 1995 and has remained at the OU, being promoted to senior lecturer in 2002 and professor in 2009. She was awarded an LMS Whitehead Prize in 2000 and was featured in the Faces of Mathematics exhibition in 2001. She became a member of the LMS Women in Mathematics Committee in 2003 and has chaired the committee since 2006.

Gwyneth has two children born in 1998 and 2001 and has found the flexibility offered by the OU extremely helpful in enabling her to combine work and family commitments. She had two periods of maternity leave of 9 months and returned to work part-time, gradually increasing her hours from 0.5 to 0.6, 0.7, 0.8 and finally returning to full-time work in 2012, when her youngest child started at secondary school. Switching from full time to part time work was challenging and finding time for research in the early days was particularly difficult. Increasing her hours has made life much easier. Being awarded a prize in 2000 significantly increased her confidence in her research ability and her determination to protect her research time. Gwyneth is very grateful to both her husband (who is a professor of medical statistics at Warwick University) and her parents for flexibly taking on a large share of the commitments at home and to colleagues at the OU who have supported her career in many ways, including nominating her for prizes, helping with promotion cases and keeping her in touch with her research community during the years when her children were small and she was unable to travel. Gwyneth enjoys walking and cakes and finds both conducive to coming up with good maths ideas.

Ruth Williams

Reader in the Department of Applied Mathematics and Theoretical Physics at the University of Cambridge

After reading mathematics at Cambridge, Ruth did a PhD in Theoretical Physics at Imperial College, and held a postdoctoral research fellow position at the University of Miami and then back at Imperial. She had a Temporary Lectureship in Bristol and then moved back to Cambridge, to a Research Fellowship at Girton College in 1974. Both the Teaching Fellows in mathematics at Girton moved elsewhere at around that time, and within 2 years Ruth was appointed the Applied Mathematics Teaching Fellow and the Director of Studies in Mathematics at Girton, posts which she held until her retirement in 2012.

When the late David Crighton was Head of the Department of Applied Mathematics and Theoretical Physics at Cambridge, he realised that formal attachment to the Department would be of mutual benefit to the Department and to Ruth and other College Fellows. Ruth had held a Temporary Lecturer post since 1991, but in 1994 the post of Assistant Director of Research was created for her, funded jointly by the Department and College. This made her eligible for promotion within the University and she eventually became a Reader in 2002.

Ruth says that she owes her survival in academia to Girton College, both for financial support and also for providing a balanced, relaxed and caring community, which was particularly important when there were very few women in the Department of Applied Mathematics and Theoretical Physics at Cambridge.

Contact with students was one of the most interesting parts of Ruth's job:

"It is endlessly fascinating to watch those just out of school develop into accomplished mathematicians. I am especially concerned that women should not be deterred from reaching their potential as mathematicians. To this end, I started the British Women in Mathematics Day, an annual event where young women mathematicians from all over the UK, meet to give talks about their research interests and to provide mutual support and encouragement."

Ruth married a Pure Mathematician in 1979, and they have a daughter who had to endure dinner table mathematical gossip and always knew when her mother was thinking about mathematics! The whole family loves hiking, and collaborations and sabbaticals have often "happened" in places near mountains. Ruth's cello gathered dust for a long time, but retirement means renewed musical activity, as well as more time for her granddaughter and gardening, even though she still teaches a little and has some ongoing research.

Annexe A: The Good Practice Checklist

The Good Practice Checklist originated from work by Caroline Fox and Sean McWhinnie in 2003/4 on a joint Athena Project and Royal Society of Chemistry programme. Since then, there have been a number of changes to the checklist in response to the uses made of it by a wide range of university departments across the STEMM disciplines. This version of the checklist, developed by Caroline and Sean, who now work as Oxford Research and Policy (ORP), is structured to meet the needs of the London Mathematical Society's (LMS) Good Practice Scheme. The Scheme aims to help departments of mathematics take practical actions to improve the participation of women and to share examples of good practice with other departments. The Scheme will also offer support in applying for an Athena SWAN award.

The checklist is based on the five Athena Action Areas:

Fundamentals for Action
Appointment and Promotion
Career Development
Department Organisation and Culture
Sustainable Careers

For each action area there are two sections, ten in all:

1 **Organisation for action**
2 **Evidence base for action**
3 **Appointment and promotion processes**
4 **Levelling the appointment and promotion playing fields**
5 **Career development provision**
6 **Developmental activities**
7 **Effective management**
8 **Workplace culture**
9 **Flexibility**
10 **Career breaks and interrupted careers**

The first section is on department information needed for the project - staff and student data followed by a short description of the department. Please complete the data section with the most up to date information you have to hand. Please use headcounts rather than FTEs. You will find instructions of how to complete the checklist after the data section.

We do realise that the checklist is long and will take some time to complete. We have found that it can be helpful to get a small group of staff to work together to complete it.

Departmental Information and Data

University:		
School/Faculty:		
Department:		
Departmental Contact:	**Name:**	
	Post held:	
	Email:	
	Telephone:	
	Postal address:	

Mathematics Students (Headcount of those registered for courses in the department)	**Male**		**Female**		**% Female**		**Total**		
	Full time	**Part time**	**Full time**	**Part time**	**Full time**	**Part time**	**Full time**	**Part time**	
Undergraduates									
Masters students									
Doctoral students									

Staff	**Full Time**				**Less than Full Time**				**Overall % Female**
	Male	**Female**	**% Female**	**Total**	**Male**	**Female**	**% Female**	**Total**	
Administrative staff									
Technical staff									
Post Doctoral Researchers on open ended contracts									
Post Doctoral Researchers on fixed-term contracts									
Lecturers (Assistant Professors - Probationers)									
Senior Lecturers (Associate Professors)									
Readers									
Professors									
Other staff – Fixed-term Individual Fellowships (such as EPSRC, Marie Curie)									
Visiting Fellows									

Departmental Description

Please provide a brief description of the department making the return, including its teaching and research structures.

Please describe briefly the line management of academic staff in the department.

Completing the Checklist

- We would be grateful if you or a member of your staff, or better still a small group of staff, could take the time to complete the checklist.
- Please could you assign a "level" (see below) to each statement and please provide as much information as can easily on your practices and systems - "how it's done" and "who does it". We are particularly interested to learn about the good practice that you have in place.
- We will be following up a small number of returns with telephone interviews in order to learn more about the good practice you have in place.

NOTES ON LEVELS IN THE CHECKLIST:

For each statement the Levels take account of the following:

- The coverage and robustness of the practices, processes, systems and arrangements that are in place;
- Review and reporting on the practices, processes, systems and arrangements;
- How well the practices, processes, systems and arrangements are regarded.

Levels

A All the elements of the Statement (the practices, processes, systems and arrangements) are well established across the department's disciplines, groups and units. Their effectiveness is regularly reviewed and reported on. Academic and research staff at all levels recognise their importance for the wellbeing and success of the department.

B Most elements of the Statement are in place, in the majority of department disciplines, groups and units, and are regularly reviewed and reported on. They are generally robust and well organised and seen by most staff as useful.

C Some elements of the Statement are in place in some department disciplines, groups and units. However, they generally lack supporting structures systems and resources to underpin them and/or may be fragile. They are seen as important by some senior staff. Their review and their reporting is occasional and or infrequent.

D A few elements of the Statement may be inconsistently applied in parts of the department. They tend to depend on individuals' interests and goodwill. They are not subject to review or included in school reporting arrangements. Their value and contribution is not well understood.

E Not in place, of little interest to the department /its management, not on their radar & not seen as relevant to future of the School.

Action Area 1: Fundamentals for Action

Section1: Organisation for Action

Benchmark 1 Leadership and engagement	Comment/Notes/Description of arrangements	Level
1. HOD and management team champion and endorse HOD and management team champion and endorse the department's women and science/good practice activities and programmes. Individually they contribute to and take part in them.		
2. Senior staff support and encourage Senior staff support and encourage the department's women and science/good practice activities. They demonstrate their understanding and encourage their staff and students to participate.		
3. Individual awareness, participation and benefits Individuals are aware of women and science/good practice activities and programmes. Academics and post docs across all sections take part in, and benefit from the programmes and activities.		

Benchmark 2 Accountabilities	Comment/Notes/Description of arrangements	Level
4. Lead Committee A committee has the lead responsibility for the progress of women and science and good practices (This may be the management team). The committee has the progress of women and good practice as a standing agenda item. It reports to HOD or management team.		
5. Committees and post holders Committees and individual post holders are held accountable for tasks/projects allocated to them. They are responsible for disseminating information on, and reporting the progress of women and science and good practice.		
6. Individuals' responsibilities The responsibilities held by individuals, for women and science/good practice, are clearly identified. They are fully recognised and well understood in the department. The responsibilities are covered in their appraisals.		

Benchmark 3 Resources	Comment/Notes/Description of arrangements	Level
7. Funding is allocated The department allocates funding as appropriate for women and science/good practice, programmes and initiatives.		
8. Administrative and expert support The department has/accesses both administrative and expert support for its women and science/good practice, programmes and initiatives.		
9. Time is made available Time is made available to staff who manage and lead activities related to women and science/good practice, programmes and initiatives. This work is taken into account in workload allocations.		

Section 2: Evidence Base for Action

Benchmark 4 Student data	Comment/Notes/Description of arrangements	Level
10. Student F/M profile UGs and PGs F/M numbers, and course of study is discussed by the appropriate department committee. The data are reported to the management team. They are used to measure the representation of women and are available on the department web.		
11. Student F/M progression F/M UG and PG (taught and research) applications, offers, acceptances, degree classifications and outcomes) are monitored by the appropriate department committee. The data are reported to the management team. They are used to measure and monitor the progression of women and are available to staff.		
12. Use of time series F/M student data F/M UG and PG time series data are compared against the national picture, faculty profile, and like departments in other universities part in, and benefit from the programmes and activities.		

Benchmark 5 Staff data	Comment/Notes/Description of arrangements	Level
13. F/M Staff profile and turnover Data, including grade and contract type, are monitored by the appropriate department committee. They are reported to the management team and are used to measure progress. The data are accessible to staff and are summarised on the web.		
14. F/M Representation in management Data on academics in management roles (including committee membership) at university, faculty, and department, levels, are monitored and reported to the department management team.		
15. Use of time series F/M staff data Changes are compared against the national picture, faculty profile, like departments in other universities. These data are reported to the management team and are used to measure and report progress.		

Benchmark 6 Qualitative Data	Comment/Notes/Description of arrangements	Level
16. Student surveys Surveys are used by the department to identify F/M differences/ similarities, to assess good practice, to measure its impact, to identify what action is needed to improve practices and to assess progress.		
17. Staff surveys Surveys are used by the department to identify F/M differences/ similarities, academic/post-doc similarities/differences, and to assess good practice, to measure its impact, to identify what action is needed to improve practices, and to assess progress		
18. Use of data Data from surveys and reports external to the department, e.g. from Learned and Professional Societies, are used and are shared to raise awareness and to inform actions		

Action Area 2: Key Career Transitions

Section 3: Appointment and Promotion Processes

Benchmark 7 Decision makers	Comment/Notes/Description of arrangements	Level
19. Appointment panel gender balance Panels for academic and post doc appointments and promotions include at least one man and one woman.		
20. Representativeness of appointment panel membership The individuals who participate in selection processes and activities for academic appointments are representative of the department's female and male staff and student profiles.		
21. Unconscious bias/no candidates are disadvantaged Panel members are aware of female and male differences in how individuals present themselves. Panel Chairs ensure that no candidates are disadvantaged by the processes and activities.		

Benchmark 8 Information	Comment/Notes/Description of arrangements	Level
22. Information on appointment and promotion processes and criteria The processes and the criteria used are clear and fair. The information provided to candidates and to panels, is clear, fair, and appropriate. Checks confirm this.		
23. Communication is timely and effective Information on job opportunities is timely and effective. Communications (on timing, process, criteria), at the beginning of promotion rounds is timely and effective. Checks confirm this.		
24. Information is useful, attractive and inclusive The information and further particulars for posts advertised reflect the department (members and activities) as a whole. It includes practical, up to date information, of interest to the family unit and is attractive to minorities.		

Benchmark 9 Monitor Appointments and Promotions	Comment/Notes/Description of arrangements	Level
25. Applications for appointments Applications are monitored, shortlists are referred back by the HOD if the proportion of women is not representative of the proportion of women in the recruitment 'pool'. Further information is required before the process continues.		
26. Promotion monitoring The HOD monitors the list of candidates for promotion put forward by the department. Final outcomes are monitored by gender and compared with like departments, the faculty and the university and are reported to the management team.		
27. Appointment processes and outcomes monitoring Gender data on applications, shortlists, offers and acceptances are monitored and reported to the department management team.		

Section 4: Levelling Appointment & Promotion Playing Fields

Benchmark 10 Identify and encourage candidates	Comment/Notes/Description of arrangements	Level
28. Widen the candidate pool Academics in the department identify potential candidates (both internal and external) and inform them of job opportunities as they arise.		
29. Positive review of potential promotion candidates All academics are positively reviewed for their promotion potential, in the lead up to, or at the beginning of each promotion round. Candidates do not have to self-nominate themselves for promotion. However, there is provision for personal applications.		
30. Encourage application HOD and Heads of sections encourage individuals to apply for posts and for promotion. If individuals, who have potential, do not apply the HOD and Heads of sections actively suggest they do apply.		

Benchmark 11 Support for promotion candidates	Comment/Notes/Description of arrangements	Level
31. Support promotion candidates' cases for promotion Individuals who are preparing their cases for promotion are able to access help to present themselves and their cases in the best way possible.		
32. Personal support Individuals can access personal mentoring and support during the promotion process.		
33. Advice on gaps and weaknesses: If gaps and/or weaknesses in candidates' CVs are apparent during the departmental consideration, candidates are offered advice on filling gaps at the earliest possible opportunity.		

Benchmark 12 Feedback and follow up for promotion candidates	Comment/Notes/Description of arrangements	Level
34. Positive feedback Successful and unsuccessful candidates are offered and take the opportunity for positive feedback. Check confirm this.		
35. Unbiased career advice and guidance Unbiased career advice and guidance is available to unsuccessful candidates to improve their chances of promotion in the future.		
36. Activities and opportunities available to candidates Candidates who receive feedback on the experiences, skills, activities, and opportunities they need are provided with the opportunity to gain these, and checks are made to ensure this happens.		

Action Area 3: Career Development

Section 5: Career Development Provision

Benchmark 13 Development needs and take up	Comment/Notes/Description of arrangements	Level
37. Induction All new academics and post docs, are provided with a comprehensive induction at department, as well as University level. The take up and usefulness of department, faculty and university provision is monitored.		
38. Awareness of needs and what is available Head of sections are aware of the development needs of their staff, and the training that is available. They facilitate participation in training to meet those needs.		
39. Encourage and monitor participation Senior staff encourage junior colleagues to take up training and development provision, and recommend courses they know are useful. The department monitors participation rates.		

Benchmark 14 Early Career Researchers' (ECRs') development	Comment/Notes/Description of arrangements	Level
40. Access to impartial advice ECRs have access to impartial advice on career development and access to ways in which their needs can be met.		
41. Individual responsibility for career progression ECRs are made aware that they are personally responsible for their own careers and for making informed career decisions and choices.		
42. Transferrable Skills Training The uptake, and the usefulness, of the training provided is monitored.		

Benchmark 15 Appraisal	Comment/Notes/Description of arrangements	Level
43. Arrangements and availability There are appropriate appraisal schemes for academics and for postdocs. The schemes ensure regular and automatic appraisal. Those who appraise ECRs receive appropriate and useful training. Staff who 'supervise' others are asked in their own appraisal about the career development support they provide.		
44. Monitor participation and utility Participation in appraisal, by academics and post docs, is monitored and reported to the HOD and management team. Where participation is low, or there are concerns on the usefulness, value or appropriateness of the appraisals, these are followed up.		
45. Follow through Checks are made to ensure that the development needs of academics and post docs, which are identified at appraisal, are met and that they are followed up at the next appraisal.		

Section 6: Developmental Activities

Benchmark 16 Mentoring	Comment/Notes/Description of arrangements	Level
46. Availability information and contact Information on schemes (university/department and/or external) for academics, post docs and post graduates is easily accessible. It is well publicised, and up to date, with named scheme contacts available.		
47. Academics and postdocs act as mentors Heads of groups/sections encourage staff to become mentors, and to train as mentors.		
48. Monitoring The department monitors the take up of mentoring, and its usefulness, for mentors and for mentees, is monitored.		

Benchmark 17 Networks and role models	Comment/Notes/Description of arrangements	Level
49. Support and encourage networks Heads of sections encourage staff to contribute to external professional and special interest networks (regional, national and international), and to join and/or form internal support networks (university, faculty, and department).		
50. Use of networks Academics use their personal networks on behalf of the department, and its women and science activities (for example to identify potential mentors, female visiting academics, external examiners and seminar speakers).		
51. Role models Female academics act as role models and are encouraged to do so by the department. The department encourages visits from women scientists, with the opportunity to present their science and meet staff, including ECRs. The activities are monitored across sections and further encouragement is given if needed.		

Benchmark 18 Internal and external activities	Comment/Notes/Description of arrangements	Level
52. Internal activities Heads of sections encourage their staff to undertake activities in the department, faculty and university, which raise their personal profile and which bring them, and their science, to the notice of senior staff.		
53. External activities Senior staff encourage staff, including ECRs, to get involved in professional and learned societies. Where appropriate, they put them forward for positions.		
54. Department nominations and recommendations The HOD/management team monitor by gender the nominations and recommendations made by the department for professional roles, functions, prizes, awards, marks of esteem.		

Action Area 4: Department organisation and culture

Section 7: Effective Management

Benchmark 19 Management systems	Comment/Notes/Description of arrangements	Level
55. Accountability and reporting arrangements The accountabilities (and the reporting lines) of the HOD, the management team, and heads of sections, are clear, effective, and are well regarded by academics and postdocs. Checks confirm staff perceptions.		
56. Representative management The HOD/management team ensures that the membership and chairs of committees and heads of functions and sections reflect the department staff and student gender profile.		
57. Communications The department and its sections communicate effectively and openly with academics and post docs. The process is two way, regular, timely, and is valued by academics and post docs. Checks confirm this.		

Benchmark 20 Resource allocation	Comment/Notes/Description of arrangements	Level
58. Systems for allocating resources The systems for allocating resources used by the department, and its sections, are clear, and open, and understood by academics and post docs. Checks confirm this.		
59. Offices/labs/equipment/technical support Academics and post docs perceive that the way these are allocated is fair and that the share they, their team and/or group has, is fair. Checks confirm this.		
60. Finances Academics and post docs understand the different sources of department and section funding. They perceive that the way the department and sections allocate available funding is fair. Checks confirm this.		

Benchmark 21 Workload roles and responsibilities	Comment/Notes/Description of arrangements	Level
61. Monitoring the balance of teaching and research: The HOD/management team monitor the balance of teaching and research to ensure that it reflects both individuals' career stage and department's needs, that it provides fair teaching opportunities for post docs and that the teaching load for newly appointed academics is fair.		
62. Rotation of management and administrative roles The HOD/management team makes sure that management roles and committee memberships are rotated. The rotation takes account of individuals' level of management experience and their need for experience, and the needs for gender balance, new blood and succession planning.		
63. Allocation of workload is fair and open Academics perceive the workload allocation system to be fair and open. They believe that they, their team and their peers receive equitable treatment and that they would be heard fairly if they raised concerns. Checks confirm this.		

Section 6: Developmental Activities

Benchmark 16 Mentoring	Comment/Notes/Description of arrangements	Level
46. Availability information and contact Information on schemes (university/department and/or external) for academics, post docs and post graduates is easily accessible. It is well publicised, and up to date, with named scheme contacts available.		
47. Academics and postdocs act as mentors Heads of groups/sections encourage staff to become mentors, and to train as mentors.		
48. Monitoring The department monitors the take up of mentoring, and its usefulness, for mentors and for mentees, is monitored.		

Benchmark 17 Networks and role models	Comment/Notes/Description of arrangements	Level
49. Support and encourage networks Heads of sections encourage staff to contribute to external professional and special interest networks (regional, national and international), and to join and/or form internal support networks (university, faculty, and department).		
50. Use of networks Academics use their personal networks on behalf of the department, and its women and science activities (for example to identify potential mentors, female visiting academics, external examiners and seminar speakers).		
51. Role models Female academics act as role models and are encouraged to do so by the department. The department encourages visits from women scientists, with the opportunity to present their science and meet staff, including ECRs. The activities are monitored across sections and further encouragement is given if needed.		

Benchmark 18 Internal and external activities	Comment/Notes/Description of arrangements	Level
52. Internal activities Heads of sections encourage their staff to undertake activities in the department, faculty and university, which raise their personal profile and which bring them, and their science, to the notice of senior staff.		
53. External activities Senior staff encourage staff, including ECRs, to get involved in professional and learned societies. Where appropriate, they put them forward for positions.		
54. Department nominations and recommendations The HOD/management team monitor by gender the nominations and recommendations made by the department for professional roles, functions, prizes, awards, marks of esteem.		

Action Area 4: Department organisation and culture

Section 7: Effective Management

Benchmark 19 Management systems	Comment/Notes/Description of arrangements	Level
55. Accountability and reporting arrangements The accountabilities (and the reporting lines) of the HOD, the management team, and heads of sections, are clear, effective, and are well regarded by academics and postdocs. Checks confirm staff perceptions.		
56. Representative management The HOD/management team ensures that the membership and chairs of committees and heads of functions and sections reflect the department staff and student gender profile.		
57. Communications The department and its sections communicate effectively and openly with academics and post docs. The process is two way, regular, timely, and is valued by academics and post docs. Checks confirm this.		

Benchmark 20 Resource allocation	Comment/Notes/Description of arrangements	Level
58. Systems for allocating resources The systems for allocating resources used by the department, and its sections, are clear, and open, and understood by academics and post docs. Checks confirm this.		
59. Offices/labs/equipment/technical support Academics and post docs perceive that the way these are allocated is fair and that the share they, their team and/or group has, is fair. Checks confirm this.		
60. Finances Academics and post docs understand the different sources of department and section funding. They perceive that the way the department and sections allocate available funding is fair. Checks confirm this.		

Benchmark 21 Workload roles and responsibilities	Comment/Notes/Description of arrangements	Level
61. Monitoring the balance of teaching and research: The HOD/management team monitor the balance of teaching and research to ensure that it reflects both individuals' career stage and department's needs, that it provides fair teaching opportunities for post docs and that the teaching load for newly appointed academics is fair.		
62. Rotation of management and administrative roles The HOD/management team makes sure that management roles and committee memberships are rotated. The rotation takes account of individuals' level of management experience and their need for experience, and the needs for gender balance, new blood and succession planning.		
63. Allocation of workload is fair and open Academics perceive the workload allocation system to be fair and open. They believe that they, their team and their peers receive equitable treatment and that they would be heard fairly if they raised concerns. Checks confirm this.		

Section 8: Workplace Culture

Benchmark 22 Working environment	Comment/Notes/Description of arrangements	Level
64. Standards of behaviour Staff respect the(high) standards of behaviour towards other staff and students that the department sets. They would expect timely and effective action to be taken over any reported incidence of poor or intimidating behaviour. Checks confirm this.		
65. Open and friendly environment The HOD, the management team and heads of sections work hard to ensure an open and friendly environment. Checks confirm the perceptions of academics and posts docs.		
66. Co operative working Groups and sections ensure that their members recognise the problems that can be created by an overly competitive environment and/or the relentless pursuit of personal professional ambitions, and the department checks this.		

Benchmark 23 Collegiality	Comment/Notes/Description of arrangements	Level
67. Support from colleagues The department checks to ensure that academics and postdocs, perceive that they personally, and members of their group and/or team receive support and encouragement from colleagues (junior, peers, and senior).		
68. Line management The department recognises the potential conflict of interest between 'supervisors' and those they supervise. There are arrangements in place which ensure that individuals can access unbiased career advice, in a way that doesn't damage their career prospects.		
69. Sense of belonging The department checks that all staff feel they 'belong' from their first day onwards, and are included in the work and social activities of department and their section.		

Benchmark 24 Individual contributions valued	Comment/Notes/Description of arrangements	Level
70. Teaching and research contributions The department expects that individuals' teaching and research contributions are valued by their sections and by the department, and that their contributions are recognised, rewarded and celebrated. Checks confirm this.		
71. Management and administrative contributions The department expects that individuals' contributions to the running of department and section are valued, recognised, and rewarded. Checks confirm this.		
72. External professional contributions The department ensures that it is aware of individuals' external professional contributions. The value of these external contributions to individuals' sections and the department is recognised, as is the time taken in carrying out these activities. Checks confirms this.		

Action Area 5: Sustainable Careers

Section 9: Flexibility

Benchmark 25 Approaches to flexible working	Comment/Notes/Description of arrangements	Level
73. Availability of flexibility Information on the flexible working arrangements offered by the department is well publicised. Checks are made to ensure that sections' working arrangements reflect the importance the department places on flexible working for all.		
74. Awareness of individual needs The department expects, and checks that sections are 'aware' of the individual needs for flexibility of its academics and postdocs and that they demonstrate a willingness to try to meet those needs.		
75. Long hours culture discouraged The department discourages manifestations of a long hours culture/ presenteeism and expects sections to be proactive in their management of working time.		

Benchmark 26 Take up of flexible working	Comment/Notes/Description of arrangements	Level
76. Senior staff lead by example Senior staff are expected to lead by example in their own working arrangements and to go public, within their section and in the department, on the use they make of flexibility.		
77. Encourage take up The department expects sections to make it easy for academics and post docs to take advantage of flexibility (for example, by not requiring long notice and not asking why an individual needs flexibility on particular occasions).		
78. Monitor take up Section heads are expected to 'monitor' the take up of flexibility by academics and post docs in different research groups. The department checks to ensure this and follows up on groups with apparently low take up of flexible working.		

Benchmark 27 Flexibility built into arrangements	Comment/Notes/Description of arrangements	Level
79. Timing of meetings/events The department timetables meetings and events (academic and social) to ensure as many as possible can attend. Dates of important events are publicised well in advance. The department checks its arrangements to enfranchise staff including those working less than full time.		
80. Timetabling of teaching The department checks that individuals' needs for flexibility, such as personal and family circumstances, are taken into account when teaching is timetabled.		
81. Sections' arrangements The department checks that sections arrange meetings and events to meet the working patterns and flexibility needs of their staff, so as to maximise attendance and allow the majority of staff to participate.		

Section 10: Career breaks and interrupted careers

Benchmark 28 Supportive approaches to career breaks	Comment/Notes/Description of arrangements	Level
82. Aware and supportive The department demonstrates its ability and its willingness to support staff to cope with the practicalities before, during and after a career break or unplanned career interruption. The department expects, and checks, that section heads are aware of what the department can and does provide.		
83. Practical advice and information The School has well publicised and easily accessible arrangements for providing advice and information, which can be used by all, including potential users, line managers and group heads. Checks are made on the user friendliness of what is provided.		
84. Role models and case studies Individuals with personal experience of career breaks and career interruptions are identified; some provide case studies which are on the intranet. Some act as points of contact in the department and provide practical and career progression advice.		

Benchmark 29 Career breaks before and during	Comment/Notes/Description of arrangements	Level
85. Personal choice The department's approach reflects the awareness that individuals' needs and wants (for advice, support, contact, flexibility) are a personal choice. Section heads are expected to arrange for a meeting with individuals to check they are getting the support, advice and information they want and need.		
86. Cover arrangements The department can and does help with, advise on, and/or make the support arrangements (for administration/teaching/research responsibilities) before, during and after the career break. These are agreed with the individual and their line manager (preferably in advance).		
87. Keeping in touch The department has arrangements to keep individuals informed of events and changes while on leave. Sections are expected to communicate group news. If an individual wishes it, colleagues visit, and/or the individual comes into the department, using, e.g., "keeping in touch days".		

Benchmark 30 Career breaks on/after return	Comment/Notes/Description of arrangements	Level
88. Support to facilitate a smooth return The department recognises returners' need personal support and mentoring to facilitate a smooth return. Returners are offered a personal mentor and training and development to get them back up to speed. Section heads are expected to "look out" for returners and check they are getting the support they need.		
89. Flexibility available after return Information on the flexibility (hours, days, pattern of work over a period) that is available, on and after their return, is provided and discussed before the career break. Meetings to agree the pattern of return are held prior to the return.		
90. Career progression The HOD/head of group holds a meeting with the returner, some weeks after their return to discuss their career progression, what is needed to get their career back on track, and over what time scale. This is followed up at subsequent meetings or at appraisal.		

Annexe B: Contributing Departments

The checklist was completed by 30 departments.

School of Mathematics, University of Birmingham
School of Computing, Engineering and Mathematics, University of Brighton
School of Mathematics, University of Bristol
School of Information Systems, Computing and Mathematics, Brunel University
Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge
Department of Pure Mathematics and Mathematical Statistics (DPMMS), University of Cambridge
Centre for Mathematical Science, City University London
Department of Mathematical Sciences, University of Essex
Mathematics and Computer Science, University of Exeter
School of Mathematics & Statistics, University of Glasgow
Department of Mathematics, King's College London
School of Mathematics, Statistics & Actuarial Science, University of Kent
School of Mathematics, University of Leeds
Department of Mathematics, University of Leicester
Department of Mathematical Sciences, Loughborough University
Department of Mathematics and Statistics, The Open University
Mathematical Institute, University of Oxford
Department of Statistics, University of Oxford
School of Mathematical Sciences, Queen Mary University of London
Department of Mathematics & Statistics, University of Reading
Department of Mathematics, Royal Holloway, University of London
School of Mathematics and Statistics, University of Sheffield
School of Mathematics and Statistics, University of St Andrews
Department of Mathematics and Statistics, University of Strathclyde
Department of Mathematics, University of Surrey
Department of Mathematics, UCL
School of Mathematics, University of East Anglia
Department of Engineering Design and Mathematics, University of the West of England
Informatics Department, University of Wolverhampton
Department of Mathematics, University of York

Of the 30 departments, 13 are in Russell Group universities and 3 are in post '92 Universities.

27 departments are in Universities who are members of the Athena SWAN Charter, and of these 21 are in universities that hold Athena SWAN Bronze university awards. Two departments hold Athena SWAN Silver department awards.[8]

8 The Faculty of Mathematics and Physical Sciences, University of Leeds, and the School of Mathematical and Physical Sciences, University of Reading, hold Athena SWAN department Silver awards.

Annexe C: Data Methodology

Section 3 presents an overview of academic and research staff in UK Higher Education Institute (HEI) mathematics and all cost centres and an overview of the students on mathematics first degree, masters and doctoral programmes and all subjects in UK Higher Education Institutions (HEIs).

The data source is the Higher Education Statistics Agency (HESA). HESA is the central source for the collection and dissemination of statistics about publicly funded UK higher education.

Staff Data

Cost Centres

HESA require staff data to be returned with staff assigned to cost centres. The list of cost centres includes mathematics. Institutions are required to map their constituent departments/schools to cost centres, and they can apportion departments across a number of cost centres. This can lead to anomalies: in some cases, HEIs report mathematics staff although there is no recognised mathematics department. In other cases staff numbers may not match those in a specific mathematics department as staff from other departments may have been counted as belonging to the mathematics cost centre, and/or staff working in a mathematics department may be assigned to another cost centre.

Staff Grades

Until 2007/08, HESA reported staff data categorised into professors, senior lecturers (including readers), lecturers, researchers and other grades. The definitions of staff grades are shown below:

Professors includes heads of departments, professors, researchers (former UAP scale grade IV), clinical professors, and those appointed professors on a locally determined scale.

Senior lecturers & researchers includes principal lecturers, senior lecturers (former UAP/CSCFC scales), researchers (former UAP scale grade III), clinical senior lecturers and those appointed senior or principal lecturers on a locally determined scale.

Lecturers includes lecturers, senior lecturers (former PCEF scale), clinical lecturers and those appointed lecturers on a locally determined scale.

Researchers includes all research grades (former PCEF/CSCFC/UAP scale) not listed above and those researchers appointed on a locally determined scale.

Since 2008/09 this breakdown of grades has not been used, although professors are identifiable through a specific marker. In order to identify grades of staff the following methodology has been used. For staff who are not identified as professors, the employment function field is used as follows: staff identified as teaching and research are classified as "senior lecturers/lecturers"; staff identified as teaching only are classified as "senior lecturers/lecturers"; staff identified as research only are classified as "researchers"; and staff identified as neither teaching nor research are classified as "other grades". It is likely that some staff will be classified incorrectly using this methodology, in particular senior researchers may be assigned to the "researcher" category rather "professors" or "senior lecturers/lecturers" and some teaching only staff may be assigned to the "other grades" category rather than "senior lecturers/lecturers". Nonetheless the data compared well with previous years'. It was not possible to distinguish between senior lecturers (readers) and lecturers.

Staff numbers are presented as full time equivalents (FTEs) not as headcounts. HESA requires that where numerical totals are published they are rounded to the nearest 5. Any totals less than 5 may not be published. All proportions and ratios presented in the report are calculated using unrounded figures.

In the data section a number of different terms are used to signify different groupings of academic grades. The term *permanent academic staff* refers to professors, senior lecturers, and lecturers; the term academic staff refers to professors, senior lecturers, lecturers and researchers.

Student Data

The Data

HESA holds data on students registered for courses in UK HEIs. Individual students are recorded as FTEs split between the subjects which they study: a full time mathematics student is recorded as 1.0 FTE, while a student splitting their time equally between mathematics and another subject will be recorded as 0.5 FTE mathematics.

The **HESA standard registration population** records students registered on a course in the period 1 August to 31 July of a particular year.

The population splits the student experience into 'years of study'. The first year is deemed to start on the commencement date of the student, with second and subsequent years starting on, or near, the anniversary of that date.

The **HESA qualifications obtained population** is a count of students associated with the award of an HE qualification (excluding HE institutional credits) during the period 1 August to 31 July of a particular year, which were returned to HESA by 31 October in that year. This includes qualifications awarded from dormant, writing-up and sabbatical status students.

HESA implements a strategy in published and released tabulations designed to prevent the disclosure of personal information about any individual which has been followed in this report. This strategy involves rounding all numbers to the nearest multiple of 5.

A summary of this strategy is as follows:

- 0, 1, 2 are rounded to 0
- All other numbers are rounded to the nearest multiple of 5.

So, for example, 3 is represented as 5, 22 is represented as 20, 3286 is represented as 3285 while 0, 20, 55 and 3510 remain unchanged.

Definition of a mathematics student

For the purposes of this report a mathematics student is defined as a student who spends 50% or more of their time studying the single subject mathematics (subject code G1). In other words, mathematics instances are only counted where a student is recorded against mathematics as 0.5 FTE or more. Data in the report are presented as headcounts of such students. To take specific examples, HEIs code students based on how much time they spend studying particular subjects. A student registered on a mathematics and physics course may be recorded as 0.5 FTE physics and 0.5 FTE mathematics. In this case that individual will count in the mathematics data. Alternatively, a student registered on a physics with mathematics course may be recorded as 0.67FTE physics and 0.33FTE mathematics in which case they will not be included in the count of mathematics students.

It should be noted that as a consequence of the definitions used, the figures reported in this report may not match the numbers reported in other publications. In some cases authors report total FTEs reading a specific subject, in others authors may report a headcount of students who are reported as studying a subject for any amount of their time.

The London Mathematical Society
De Morgan House
57-58 Russell Square
London WC1B 4HS

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