University of Surrey Mathematics Department Application

Bronze Award

April 23rd 2020

Name of institution	University of Surrey
Department	Mathematics
Focus of Department	**STEMM**
Date of application	April 30 2020
Award Level	**Bronze**
Institution Athena SWAN award	**Date: November 2017**
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Athena SWAN Charter
Equality Challenge Unit
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Jan 27th 2020

Dear Madam

Application for Athena Swan Bronze Award

On becoming Head of Department in March 2015, I felt a deep sense of privilege in assuming leadership of a team that recognises the value of mutual support in promoting equality and diversity among all staff and students.

My predecessor led our first Athena SWAN Bronze Award application, and we were among the first departments to make such an application within our university. Unfortunately that was unsuccessful, but our determination to pursue the goals and to work on weaknesses, thereby taking the Department to a point where a second application would be timely, was undiminished.

A hallmark of my incumbency has been to encourage staff to focus on career development, and to support colleagues who have significant administrative roles, taken maternity leave, or coped with exceptional circumstances. Our permanent academic FTE is 27.8 and since 2015, there have been 20 promotions, with 3 colleagues being promoted twice. Female staff have been promoted to Professor (1), Reader (2), Senior Lecturer (1), and Teaching Fellow B (2). The gender balance of the department is broadly in line with the sector but as recruiting opportunities present themselves, we will aim to grow the proportion of women.

Our Department works well as a team, but supporting colleagues on maternity leave, or are carers, is invariably achieved through sharing additional workloads. This is not satisfactory, and I have lobbied the University for further resources. In response, 4 fixed-term positions were made permanent in 2017, and we appointed a new professor in 2018. To ameliorate imbalances between individual responsibilities, I revised job descriptions of key roles, which resulted in a more equitable division of labour. Our female colleagues are well-represented in these roles, but without over-burdensome commitments.

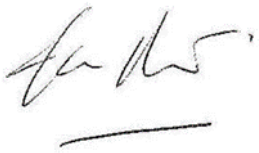
A surprise that emerged from our analysis of data was the relatively low proportion of female students by comparison with our sector. In response, we are ensuring that outreach activities and events connected with open days and applicant days are enticing to all. A new facility in the department – a study/common room for our students – has been equipped with furniture and fittings based on the recommendations by a committee with both female and male student representatives.

In the near future a school structure incorporating the Mathematics and Physics Departments will be established. Physics is a Project Juno practitioner, actively working to become a Juno champion. As these awards are reciprocal with Athena Swan, this creates a strongly supportive environment in which to implement our action plan.

I can attest that all the information presented in this application, including qualitative and quantitative data, is to the best of my knowledge, an honest, accurate and true representation of the Department.

The self-assessment exercise has clearly identified areas for concern and I believe that our action plan will go a long way to deal with them. I am stepping down in July 2020 and my successor will drive this plan forward with at least as much vigour as me.

Yours faithfully



Prof. Ian Roulstone

[520 words]

List of abbreviations used in this report	
AS	Athena SWAN
ASIT	Athena SWAN Implementation Team
ASL	Athena Swan Lead
DC	Doctoral College
DLT	Director of Learning & Teaching
DoR	Director of Research
E&D	Equality and Diversity Unit
ECC	Employability and Careers Centre
ECR	Early Career Researcher
EWC	Expected Week of Childbirth
FEPS	Faculty of Engineering and Physical Sciences
FT	Full-time
FTE	Full-time equivalent
HoD	Head of Department
HoG	Head of Group
HR	Human Resources Department
KIT days	Keeping in Touch days
L/SL	Lecturer / Senior Lecturer (teaching-and-learning academic staff)
MEQ	Module evaluation questionnaire
OfS	Office for Students
NSS	National Students Survey
PGR	Postgraduate research students
PGT	Postgraduate taught students
PT	Part-time
PTY	Professional Training Year
RF	Research Fellow (University term for research staff)
RIS	Research and Innovation Support
SAT	Athena SWAN Self-Assessment Team
SSLC	Student-Staff Liaison Committee
TF/STF	Teaching Fellow / Senior Teaching Fellow (teaching-only academic staff)
UGR	Undergraduate students

2 Description of the department [402 WORDS]

The Department of Mathematics at the University of Surrey is part of the Faculty of Engineering and Physical Sciences (FEPS), one of the University's three faculties.

Faculty of Engineering and Physical Sciences		
Departments	Academic headcount	Total headcount
Centre for Environmental Strategy.	18	23
Chemical and Process Engineering	34	39
Chemistry	25	32
Civil and Environmental Engineering,	30	34
Computer Science	29	34
Electrical and Electronic Engineering	155	204
Mathematics	39	40
Mechanical Engineering Sciences	64	81
Physics	51	55

Figure 1 FEPS departments and staff headcounts December 2019

Mathematics is a small department, nonetheless the fourth largest in the faculty. The academic staff comprise 11 different nationalities.

For line management, all academic staff and the administrator report to the Head of Department. Research Fellows report to a member of academic staff, normally the principal investigator or co-investigator on the research project on which they are employed.

Research organisation

Research activities are organised into five groups as shown in figure 2, each headed up by an academic (in one case two share the role). Of these six individuals, two are women.

Research Group	Academic	Postdoc	Total
Data Science and Dynamics Group	1	0	1
Dynamical Systems and PDEs	5	2	7
Dynamical Systems and PDEs,Mathematics of the Life and Social Sciences	2	0	2
Fields, Strings, and Geometry	4	1	5
Fluids, Meteorology, and Symmetry	6	1	7
Mathematics of the Life and Social Sciences	5	0	5
Total	**23**	**4**	**27**

Figure 2 Mathematics research groups

There is significant overlap between the research groups and several academics associate themselves with more than one group.

There is a high degree of collaboration within the Department, and (on multidisciplinary projects) with researchers from other Surrey centres and Departments. We have long-standing industrial links with the Meteorological Office, the National Centre for Earth Observation, the National Physical Laboratory and the pharmaceutical industry. The Department is part of the University Global Partnership Network (UGPN), an international network of universities with strong research student exchange links.

Undergraduate degree programmes

The Mathematics undergraduate degree programmes offered consist of the following:

undergraduate degree programmes
BSc Mathematics
BSc Mathematics with Statistics
BSc Financial Mathematics
BSc Mathematics with Music
MMath Mathematics
MMath Mathematics with Statistics
Mathematics and Physics (jointly with the Department of Physics)
Economics and Mathematics (jointly with the Department of Economics)

Figure 3 Undergraduate courses

The total number of undergraduates is currently 379 comprising 117 women (31% of the total) and 262 men.[1]

All of these programmes can also be extended by an additional year for a professional training placement in industry (after year 2 for BSc and after year 2 or year 3 for MMath). This year is assessed but does not count towards the degree class. Typically, around 50 students take the placement option each year.

Postgraduate degree programmes

The postgraduate degrees offered are

- MSc Mathematics – taught one-year Programme
- PhD Mathematics – research degree.

There are currently 4 MSc students (including 1 woman) and 24 PhD students (including 5 women).

[1] ***A note on the Department statistics presented in this report***

Consistent and complete data is provided across the three academic years 2016/17, 2017/18 and 2018/19. In some cases, data from the current academic year 2019/20 is available and has been included to ensure that the most recent trends can be identified. Additionally, data prior to 2016/17 has been commented on where relevant to improving our understanding of the Department's current position. Sector comparison data is always not available after 2017/18

3 The self-assessment process [1143 WORDS]

(i) The Self-Assessment Team (SAT)

Description of the Self-Assessment Team [140 WORDS]	
John Rayman (SAT Lead)[2] 	• PT Teaching Fellow • MA Chemistry Oxford 1967 • Thirty years in industry in HR • BSc, PhD Mathematics University Surrey
David Lloyd 	• Reader • BSc, PhD Mathematics University of Bristol • Married and has recently become a father
Natalie Douglas[3] 	• Teaching Fellow/Research Fellow • MMath, PhD University of Surrey • Built successful business in local Mathematics tuition and home schooling
Carina Dunlop[4] 	• Senior Lecturer • MA, DPhil Oxford, postdoc Heidelberg and Oxford • Undergraduate Admissions tutor

[2] Married to a former Daphne Jackson fellow who returned to science after a 20-year gap bringing up a family and is now a Distinguished Professor of Nutrition at Surrey.
3 In August Natalie went on sick leave, subsequent to which she resigned.
[4] Since joining Surrey she has had two children who are now aged 3 and 6, for which she took a combined maternity leave of 15 months.

Janet Godolphin[5] 	• Reader • BSc, PhD Royal Holloway, University of London • Has been DLT
Jane Lyle 	• PhD student • BSc Medical Science University of Newcastle • 10 years in industry as a project manager • BSc Mathematics Open University whilst at home with two young children
Dorje Brody 	• Professor • MSc, PhD Theoretical Physics Imperial College • Married with two young daughters
Anne Skeldon  *Anne has requsted that no photo be published*	• Professor • BA, DPhil Physics, Oxford • Has two adult children (18 and 21)
Georgie Coop 	• MMath student • Georgie is currently studying in year 3
Amber Benham 	• BSc Financial Mathematics student • Amber is in her final year

[5] Janet was co-opted in September 2019 to replace Natalie Douglas

Michael Hassell 	• Equality and Diversity Adviser • Athena SWAN coordinator
Kate Sheen 	• HR Advisor in FEPS • Flexible working arrangements including working from home • Particular interest recruiting and retaining more female staff

Figure 4 The self-assessment team

(ii) The Self-Assessment Process

In December 2018 the Head of Department (HoD) and AS lead (ASL) began to consider the structure of the SAT.

The initial selection criteria were:

- A broad spread of representation with undergraduate and postgraduate students, academics at different stages in their careers, part time and full-time staff members and both teaching fellows and researchers/teachers
- Individuals with
    - direct personal experience of key gender equality issues
    - genuine enthusiasm for the goals of the AS charter
    - caring responsibilities and experience of flexible working
- The HoD as a member, to lend credibility and signal the importance of the SAT and his personal commitment to women's development
- A good gender balance
- Faculty HR and University Equality and Diversity representation.

The Athena Swan award application process in general and the formation of the SAT in particular was an item discussed at the Staff Student Liaison Committee and the student representatives were given the responsibility to decide how to nominate undergraduate student members. Two (female) students were selected in this manner.

At the first meeting in January of the SAT it was agreed that the SAT (which then consisted of 3 men and 7 women as a result of the student member selection) needed more male members. Two further, male academics were co-opted.

SAT Meetings

Given the heavy work commitments in a small department, it was decided that the number of formal meetings of the whole SAT would be minimised and the working process would be focussed on small groups working with the ASL and the circulation of the continually updated draft document.

(1) In January 2019 the SAT was briefed about the project and the outline plan of work was agreed In March 2019 the SAT agreed the setting up of three smaller working groups to focus on the "picture of the Department" as shown in figure 5.

Picture of the department		IR	DB	AS	CD	JG	DL	JL	AB	GC	JFR
UG	UG application, offer and acceptance by gender nos. of UG by year and gender split UG progression and degree class by gender PTY participation by gender MMath/BSc split	X			X				X	X	X
PGR and PGT	PG applications, offer and acceptance by gender nos. of PGs by year and gender split PG progression by gender	X				X		X			X
Academic Staff	grade, contract type, gender split for post docs grade, contract type, gender split for teaching onl grade, contract type, gender split for lecturers recruitment application, interviews, offers leavers split by level and gender promotions applications and success by	X	X	X	X	X	X				X

Figure 6 three working groups for "picture of the department"

Section 5 Policies and practice supporting and advancing women's careers											
Staff topics		IR	DB	AS	CD	JG	DL	JL	AB	GC	JFR
Key transition points	recruitment	X									X
	induction		X								X
	promotion	X					X				X
	REF submission		X				X				X
Career development	training		X		X						X
	appraisals	X			X						X
	support for career progression				X	X					X
	support for research grant application		X				X				X
Flexible working and managing career breaks	maternity and paternity ploicies and practice before, during and after				X		X				X
	flexible working			X	X						X
	part time working			X	X						X
	working from home	X	X								X
	transition from one level / type of working to another			X			X				X
Organisation and culture	culture			X			X				X
	HR policies			X		X					X
	internal committees			X		X					X
	external committees			X		X					X
	allocation of admin and mgt roles and responsibilities	X									X
	workload model	X					X				X
	timing of meetings and social activities		X								X
	visibility of role models		X		X						X
	outreach activities				X	X					X
students topics											
	recruiitng more women UGR					X			X	X	X
	recruiting more women PGR					X		X			X
	mentoring and support					X		X			X
	UGR to PGR transition							X	X	X	X
	PGR to post doc transition		X					X			X
	total	6	7	7	8	8	7	3	2	2	26

Figure 5 sub-groups for section 5

(2) In October 2019 the SAT considered the work of the three subgroups and further subgroups were assigned as shown in figure 6 to produce the draft of section 5, informed by the results of the culture surveys run in the Department and the Department responses to the university wide attitude survey run in 2019. Figure 7 shows the sub group process flow.

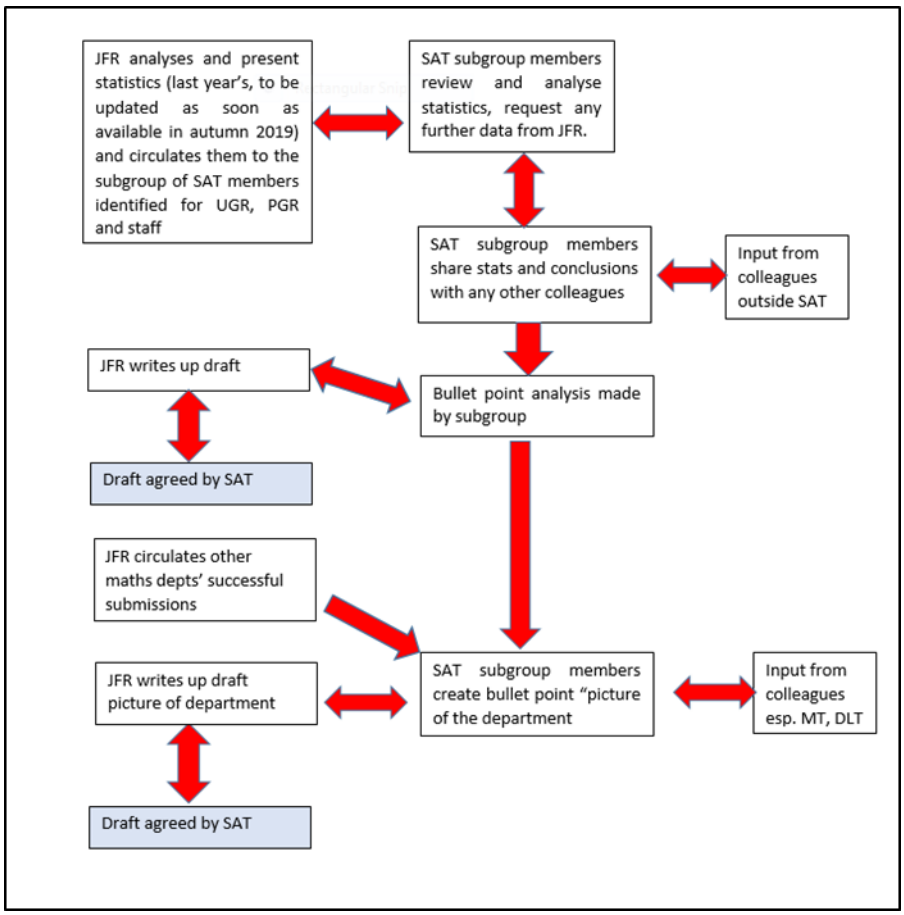


Figure 7 sub group process flow

(3) December 2019 the SAT considered the draft text of the submission and work began on the draft action plan.

(4) In January 2020 the submission in its entirety was agreed by the SAT and forwarded to the University's Athena Swan coordinator for initial review. The document was also sent to two external senior academics for their review and critique as well as to all the members of the academic staff who were not members of the SAT for their input.

Staff Meetings

The ASL gave verbal reports on progress with the Athena Swan submission at each monthly staff meeting from March 2019 onwards.

Management Reporting

The HOD and the ASL held weekly catch-up meetings to ensure that progress was tracked, and issues identified early.

One to ones

It was decided that ASL would conduct confidential one to one meetings with all the academic staff, as a means of identifying issues and getting the widest possible involvement. The first one to one, with an early career woman member of the SAT was used to test out and refine the structure of the meetings.

A total of twenty 45 to 60 minute one to one meetings were eventually held, with all those staff who were willing to participate, leading to valuable input for the design of the staff culture survey and suggestions for action points.

Culture surveys

Four separate, targeted surveys were created and run.

(i) staff

The response rates from the staff survey are shown in figure 8, we have analysed the results in percentages, but we should be aware that the absolute numbers are small and so be careful about the conclusions we draw.

Staff culture survey										
job role	respondents				academic staff count			percent response		
	women	men	prefer not to say	Totals	women	men	Totals	women	men	Totals
Professor	1	2	1	4	2	6	8	50%	33%	50%
Reader	1	5	0	6	1	7	8	100%	71%	75%
Senior Lecturer	1	3	0	4	1	6	7	100%	50%	57%
Lecturer	0	0	0	0	1	1	2	0%	0%	0%
Teaching Fellow	3	2	1	6	3	3	6	100%	67%	100%
sub total	*6*	*12*	*2*	*20*	*8*	*23*	*31*	75%	52%	65%
Post-doc	1	0	0	1	4	5	9	25%	20%	22%
Research Fellow	0	1	0	1						
No answer	1	1	0	2						
Totals	**8**	**14**	**2**	**24**	12	28	40	67%	50%	60%

Figure 8 response rate to staff survey

(ii) All the women PhD students responded to their survey, 50% of the men.

(iii) None of the four MSc student responded to their survey125 undergraduates (29%) responded. The response rate to the undergraduate survey is shown in figure 9. The response rate for women was almost twice that of men.

survey response rate			
year	men	women	total
first	10%	31%	16%
second	44%	66%	51%
PTY	4%	0%	2%
third	23%	44%	29%
fourth	33%	100%	46%
Total	**25%**	**44%**	**31%**

Figure 9 UGR survey response

III. Plans for the future of the self-assessment team

The Vice Chancellor has taken responsibility for the governance of the Athena SWAN activities within the University and has set a target for every department. The Department is expected to build on its work for a Bronze Award and progress so that it is able to apply for a Silver Award in due course.

To this end, following our submission for the Bronze award, the SAT will become the Department's Athena SWAN Implementation Team (ASIT), responsible for coordinating and monitoring the implementation of the action plan (**Action point 3.1**). The Department Administrator, Jemma Park, will join the SAT, bringing awareness of support staff issues and administrative processes. She will provide administrative support, including data collection and taking meeting minutes. Her workload planning will ensure that this work is not simply added to her current responsibilities and her appraisal will reflect achievements in the new rôle. The action plan will be driven by John Rayman, ASL, who will initially take the role of ASIT Chair.

The ASIT Chair will continue to liaise with the University Athena SWAN team to raise issues that need to be addressed at the institutional level, and to share experiences with other departments going through the Athena SWAN process.

Actions will be implemented as far as possible through working with regular and existing channels, such as Student Recruitment/Admissions and HR, to engage all responsible staff in its implementation and embed actions in the day-to-day processes of the Department.

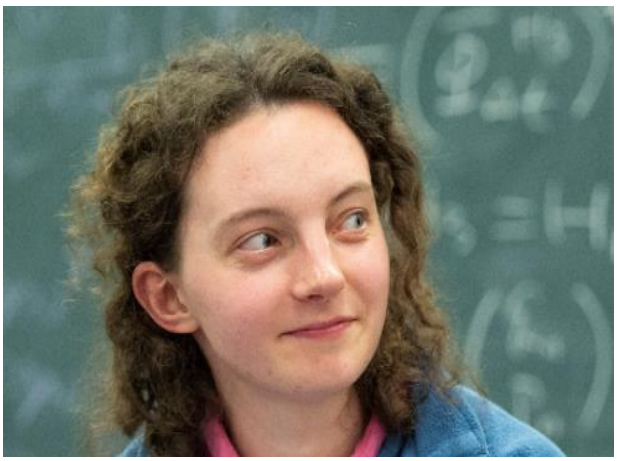
Academic staff will be updated on ongoing work through a regular item at monthly academic staff meetings. A regular newsletter will be produced and circulated by e-mail to all staff, undergraduate and research students and included as a news item on Student-Staff Liaison Committee meetings. (**Action point 3.2**)

The ASIT membership will be reviewed annually: we plan to renew one third of the membership each year. The criteria for membership will be the same as applied to the construction of the SAT and we will ensure a continuing balance and spread of gender, grades and roles. New taught student members will be invited from current or past student representatives.

The first review will take place in October 2020.

Action point 3.1 Create an Athena SWAN Implementation Team to monitor and coordinate the implementation of the action plan.

Action point 3.2 Produce and distribute a regular Athena SWAN update newsletter.



Staff and students at a recent seminar

4. A picture of the department [1829 WORDS]

4.1 Student data

(i) Foundation courses

In 2020/21 15 students will start on a foundation course in FEPS. There have been no Mathematics foundation courses for the past twelve years.

(ii) Undergraduate students

Applications and admissions

Figure 10 shows that applications from women have run at approximately 35% of total applications for a number of years. Women applicants receive a slightly higher offer rate than men applicants but over the past three years were three percentage points less likely than men to convert the offer into enrolment. (Women's three-year average was 13%, men's 16%.) (**Action point 4.1.1**)

undergraduate recruitment - raw numbers	women			men		
	2016/17	2017/18	2018/19	2016/17	2017/18	2018/19
applications	349	314	304	628	577	548
offers	310	275	289	548	509	496
acceptances	284	238	277	495	448	452
starts	46	41	25	99	91	56

Figure 10a Numbers of women in recruitment process

undergraduate recruitment - women as percent of total	2016/17	2017/18	2018/19
applications	36%	35%	36%
offers	36%	35%	37%
acceptances	36%	35%	38%
starts	32%	31%	31%

Figure 10b Proportions of women in recruitment process

undergraduate recruitment - ratios	women			men		
	2016/17	2017/18	2018/19	2016/17	2017/18	2018/19
offers/applications	89%	88%	95%	87%	88%	91%
acceptances/offers	81%	76%	91%	79%	78%	82%
starts/acceptances	16%	17%	9%	20%	20%	12%
starts/applications	13%	13%	8%	16%	16%	10%

Figure 10c Recruitment ratios by gender

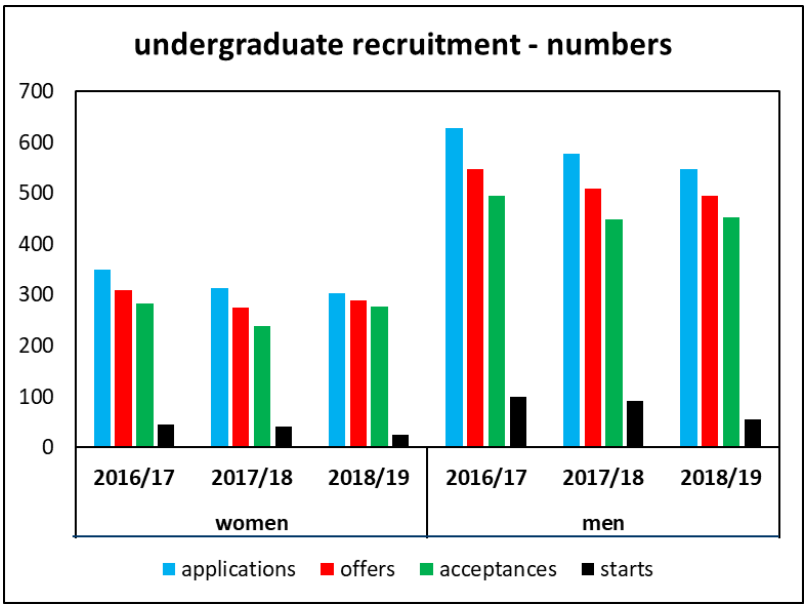


Figure 11 offers, acceptances and starts

Figure 11 shows the data in figure 10a in graphical form. Women have been only 31% of starts despite being 35% of applications.

Overall, a woman receiving an offer is about two thirds as likely to actually enrol as a man receiving an offer. **(Action point 4.1.3)**

The Department has seen a considerable decline in numbers of applications and hence in admissions over recent years, which is continuing at an accelerating rate this current year. **(Action point 4.1.3)** We believe this decline to be due to

- Increasing competition amongst universities for high calibre Mathematics students at the same time as a decline in the size of the applicant cohort.
- The decline in the University's and the Department's position in league tables.
    - The University has fallen from 4th (in 2016) to 26th (in 2019) in the Guardian league table. Much of this fall can be ascribed to the pressure on facilities and resources associated with the expansion in the university student population by 21% from 2014 to 2017.
    - During the same period the Mathematics Department ranking fell from 4th (2017) to 31st (2019) out of 68 university mathematics departments
- This decline in our position is due in part to a deterioration in NSS scores. As figure 12 shows, overall satisfaction fell from a high of 100% in 2015/16 to 80.3% last year. There is a relatively small proportion of students who, while having an A in Mathematics A level are otherwise relatively weak and quite quickly become dissatisfied, stopping attending lectures and becoming generally disengaged from the course. Most of these disengaged students are men. (Which correlates with men's representation being around 70% of year 1 intake but only 60% of year 3 graduates, because of withdrawals.)

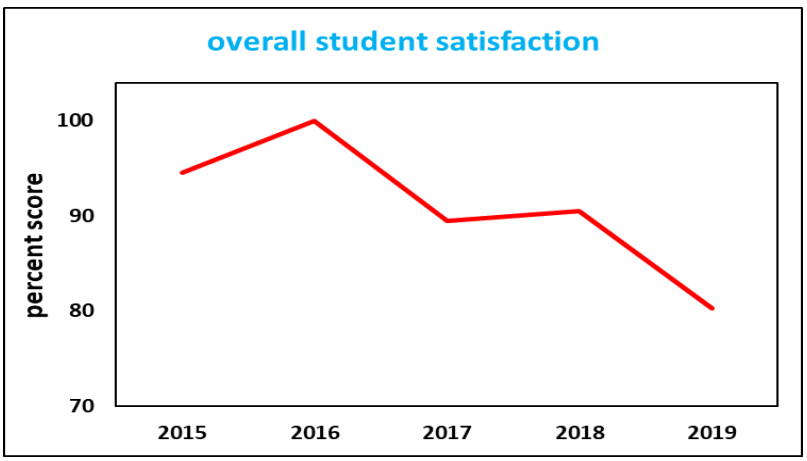


Figure 12 NSS score trend

Action point 4.1.1 Review the effectiveness of our post-application activities, including open days and applicant days, for female applicants.

Action Point 4.1.2 Redesign our website to include descriptions of our women mathematicians' careers and illustrating what women actually do while studying at Surrey, both in their Mathematics course and more broadly

Action point 4.1.3 Determine the reasons applicants, particularly women, reject our offers, using survey methods

We have required our entrants to have an A or A* in A level Mathematics, or the equivalent in other qualifications for many years. While this means that we are limiting the group of men and women from whom we recruit, the data in figure 14 shows that there is a large pool of women candidates available[6].

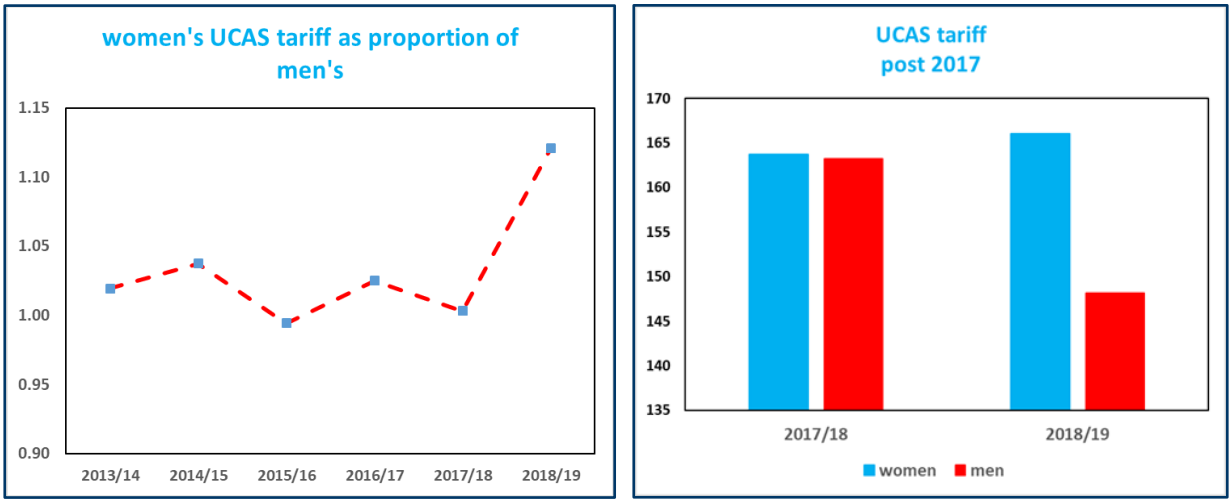


Figure 13 Mathematics Department UCAS Tariffs

	A*	A	A* or A	
men	17.3	42.9	60.2	percent of all Maths A level
	10,254	**15,173**	**25,427**	numbers of students
women	29.1	57.9	87.0	percent of all Maths A level
	11,162	**11,047**	**22,209**	numbers of students

Figure 14 A level A and A 2018*

[6] Data from Cambridge Assessment

Not all of these women will want to read Mathematics at university: there are around 3000 women studying Mathematics in the UK. If we were willing to accept a B in Mathematics at A level this would only add 7,326 girls to the cohort – an increase of one third. We do not intend at this stage to change our admissions criteria, not least until we have understood the reasons for the current low level of applications from women and lower uptake of offers. (**Action point 4.1.4**)

The result of all these factors is that the proportion of women in year 1 admissions is unsatisfactorily low and indeed falling, although it is not very different from local universities' mathematics departments as shown in figure 15.

percentage of women in first year intake			
	2017/18	2018/19	2019/20
Southamption	33	31	32
Portsmouth	27	28	39
Queen Mary College	40	49	37
Surrey	31	31	28

Figure 15 local universities' year 1 intake

The UCAS tariffs of women entrants have historically been slightly higher than those of men entrants, however, in 2018/19 women students' tariffs jumped to 13% more than men as figures 13 and 14 demonstrate.

At every stage in the recruitment process we make great use of female role models – women undergraduates staffing the stand on open days and showing students around the campus, female academics giving "mock" lectures and images of women students on our print material and website.

When asked for a freeform response to "Why did you choose Surrey", 39 of the women responding (75%) mentioned closeness to home, convenient access to home or location, compared to 9 men (14%). This suggests a recruiting drive in local schools would likely lead to an increased number of female applicants.

- **Action point 4.1.4 Improve the appeal to women of all our admissions processes and marketing**
  - **Conduct a survey among current undergraduates to establish among other things, a good understanding of their views of the admissions process.**
  - **Review all undergraduate marketing activities for balanced gender representation in student profiles and other marketing materials, sourcing and creating new content as appropriate**
  - **Increase contact and engagement with local schools (see action point 5.1.5)**

Undergraduate population

The size of the undergraduate population has been fairly stable in recent years but as we have seen in the previous section, the substantial drop in admissions (40% between 2018/19 and 2019/20) and expected continuation of this trend for the next few years, will have a substantial impact on the size of the undergraduate body.

In recent years the proportion of women students in the Department has been slightly over 30%, significantly less than the sector average of around 37%, but quite comparable to local universities' mathematics departments.

Total undergraduate headcount				
year	**men**	**women**	**total**	**percent women**
2016/7	301	150	451	**33%**
2017/8	304	138	442	**31%**
2018/9	294	137	431	**31%**

Fig 16a undergraduate headcount

Total overseas undergraduate headcount					Total home undergraduate headcount				
Year	**men**	**women**	**Total**	**percent women**	**Year**	**men**	**women**	**Total**	**percent women**
2016/7	31	33	64	**52%**	**2016/7**	270	117	387	**30%**
2017/8	32	35	67	**52%**	**2017/8**	272	103	375	**27%**
2018/9	36	38	74	**51%**	**2018/9**	258	99	357	**28%**

Figure 16b Home and overseas population trends

percentage of women in undergraduate population			
	2017/18	**2018/19**	**2019/20**
Southamption	34	33	32
Portsmouth	30	31	33
Queen Mary College	47	46	42
Surrey	31	31	28

Figure 17 Local universities' Mathematics departments headcounts

The most recent HESA data for the proportions of women undergraduates in all Mathematical Sciences departments in the UK were:

HESA Mathematics Sector data	
year	**pecentage of women in undergraduate headcount**
2015/16	37.20%
2016/17	37.10%
2017/18	36.90%

Figure 18 Sector data for women mathematics undergraduates

It is noticeable that the percentage of women among UK nationality undergraduates is stable at around 27% – 30%, compared to women among overseas students at around 50%, as in figure 20. This very encouraging level implies that our offer is attractive to these students. Overseas applications are the result of the actions of the University's representatives' visiting schools and colleges in-country and promoting Surrey: many of these representatives are women. It is of course true that in many Asian countries (from which we recruit substantial numbers) a high percentage of Mathematics undergraduates are women.

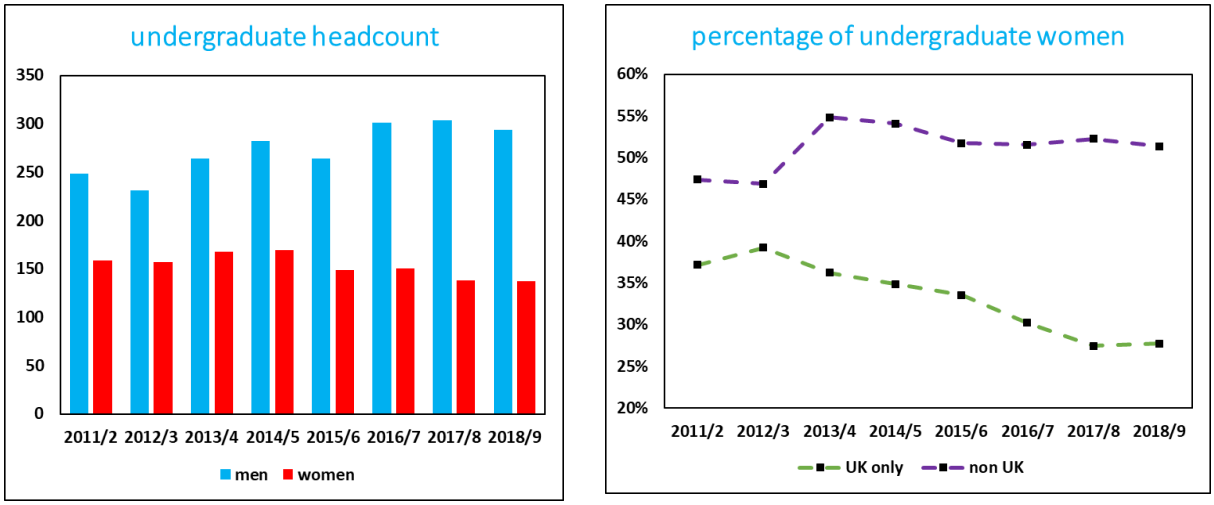


Figure 19 Undergraduate headcount and nationality

The numbers and proportions of women following the major course options is shown in figures 20, 21 and 22.

All undergraduates by course	2016/17			2017/18			2018/19		
	Women	Men	Total	Women	Men	Total	Women	Men	Total
Financial Mathematics BSc	20	33	53	13	36	49	16	36	52
Mathematics and Computing Science BSc		10	10		6	6		2	2
Mathematics and Physics MMath				1	3	4			
Mathematics BSc	83	151	234	78	148	226	78	165	243
Mathematics MMath	17	60	79	18	65	83	17	52	69
Mathematics with Music BSc	3	6	9	3	5	8	3	4	7
Mathematics with Statistics BSc	27	41	68	26	44	70	22	35	57
Total	150	301	453	139	307	446	136	295	431

Figure 20 Course headcount breakdown

percentage of women	2016/17	2017/18	2018/19
Financial Mathematics BSc	38%	27%	31%
Mathematics BSc	35%	35%	32%
Mathematics MMath	22%	22%	25%
Mathematics with Statistics BSc	40%	37%	39%
Total	33%	31%	32%

Figure 21 Percentages of women by course

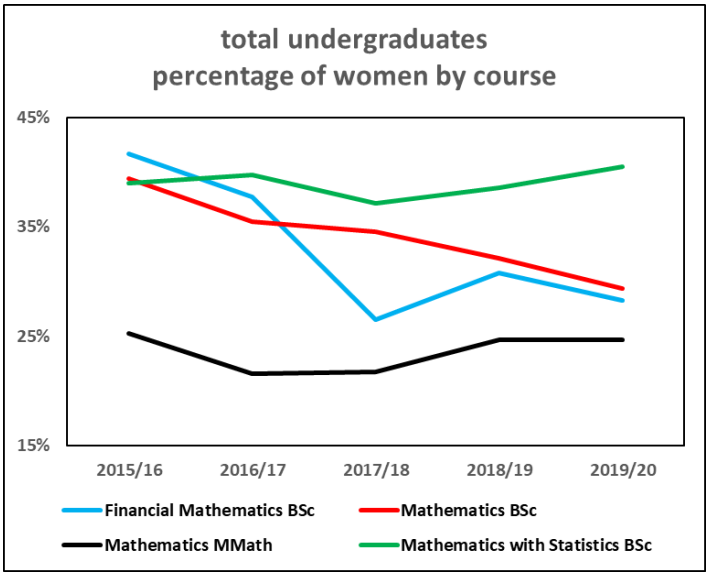


Figure 22 proportions of women by course

Women have tended to predominate in Mathematics with Statistics BSc but underrepresented in MMath. The Mathematics with Statistics proportion who are women for the current year is 40%.

First year MMath	2016/7			2017/8			2018/9		
	women	men	% women	women	men	% women	women	men	% women
Total	4	15	21%	6	19	24%	4	10	29%

Figure 23 MMath admissions

The data for year 1 admissions to the MMath programme shows that while the proportion of women choosing this degree had been lower than that for other degree programmes, it is now roughly at the same level (and 30% in 2019/20) – figure 23. Students may switch from a BSc to an MMath programme during the course of their studies provided their results are sufficiently strong.

(iii) Part time undergraduates

A very small number of undergraduates in the Department are registered as part time students – these will be students retaking part of a year: all our undergraduate courses are intended to be followed full time. The small numbers of women reflects their better progression rates than men.

part time undergraduate headcount					
Year	men	women	percent women	Total	percent of total headcount
2016/7	2	2	50.0%	**4**	0.9%
2017/8	6	2	25.0%	**8**	1.8%
2018/9	5	1	16.7%	**6**	1.4%

Figure 24 Part time undergraduates

At the time of writing there are 17 men students and four women students who are repeating a year.

(iv) Undergraduate progression and degree attainment

Women achieve substantially better academic results than men, although the gap in attainment has reduced a little in recent years as figures 25 and 26 show

undergraduate degrees									
numbers	2016/7			2017/8			2018/9		
	Women	Men	total	Women	Men	total	Women	Men	total
First	30	40	70	25	47	72	14	23	37
2 i	18	27	45	10	21	31	17	24	41
2 ii	7	13	20	3	7	10	6	13	19
3	0	1	1	1	1	2	1	3	4
Pass	1	0	1	0	6	6	2	2	4
Fail	0	0	0	0	0	0	2	8	10
Total	**56**	**81**	**137**	**39**	**82**	**121**	**42**	**73**	**115**
percentages									
First	54%	49%	51%	64%	57%	60%	33%	32%	32%
2 i	32%	33%	33%	26%	26%	26%	40%	33%	36%
2 ii	13%	16%	15%	8%	9%	8%	14%	18%	17%
3	0%	1%	1%	3%	1%	2%	2%	4%	3%
Pass	2%	0%	1%	0%	7%	5%	5%	3%	3%
Fail	0%	0%	0%	0%	0%	0%	5%	11%	9%

Figure 25 Undergraduate degree results

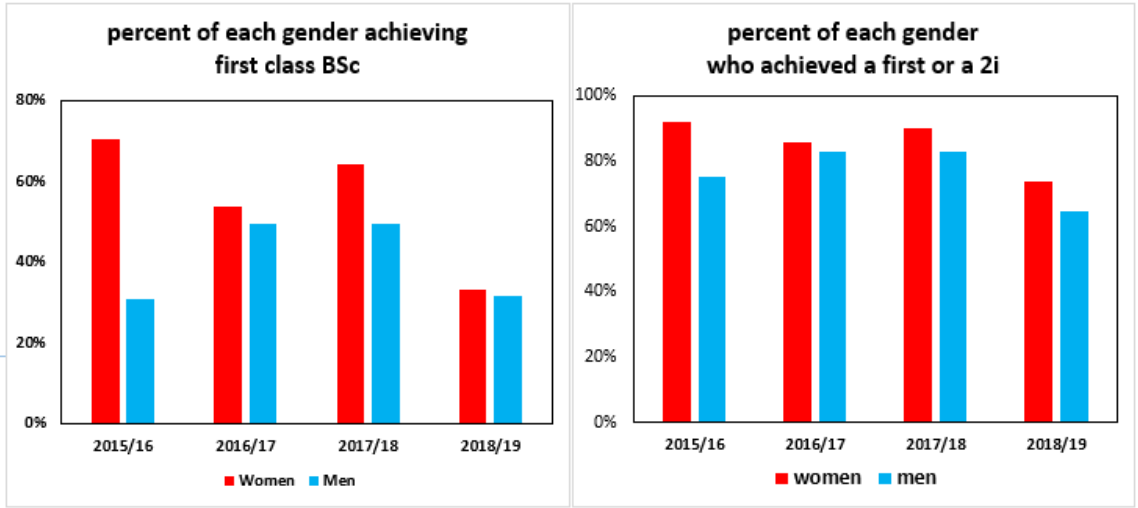


Figure 26 First and upper second-class BSc degrees

Women are more likely than men to progress directly from year 1 to year 2 and from year 2 to year 3 as shown in figure 27

	progress from year 1 to year 2		progress from year 2 to year 3	
year	women	men	women	men
2016/7	89%	88%	96%	84%
2017/8	84%	80%	87%	75%
2018/9	88%	82%	82%	81%

Figure 27 Progression rates

Women are less likely to withdraw for academic reasons than men. Over the past 4 years women undergraduates have comprised only 18% of the 39 withdrawals.

Figure 28 shows the rates of graduation for BSc students in their final year. The percentage of women who actually graduate is far greater than their share of the overall Mathematics undergraduate population. These numbers are close to the sector average of 40%.

BSc final year	women			men			total			percent of BSc graduates who are women
	BSc	fail	percent success	BSc	fail	percent success	BSc	fail	percent success	
2016/7	55	1	98%	81	7	92%	136	8	94%	40%
2017/8	39	1	98%	76	8	90%	115	9	93%	34%
2018/9	38	4	90%	63	10	86%	101	14	88%	38%

Figure 28 Graduation rates

(v) Postgraduate taught students

We have a very small number of students each year on a one-year full time taught MSc programme, which started in 2015/16. Such numbers do not lend themselves to statistical analysis, although we note that the proportion of women on average over the past three years was 27%, somewhat below the proportion of women students in the undergraduate population in the Department and the sector average of 34%. The MSc course draws on modules that are taught at Levels 6 and 7.

headcount			
	2016/17	2017/18	2018/19
women	0	2	1
men	2	3	3
total	2	5	4
women %	0%	40%	25%

Figure 29 PGT students

(vi) Postgraduate research students

We offer a range of research opportunities and place an emphasis on research at the interface between pure and applied Mathematics.

Recruitment

Figures 30 and 31 show the recruitment statistics in the Department for recent years. The level of PhD applications from women has been disappointing for a number of years and admissions of women to study for PhDs is showing a declining trend, both in the proportion of women receiving offers and the proportion of student intake they represent.

PhD applications									
	applications			offers			offer/applications		
	2016/17	2017/18	2018/19	2016/17	2017/18	2018/19	2016/17	2017/18	2018/19
women	14	9	8	**4**	2	1	29%	22%	13%
men	50	59	54	4	7	11	8%	12%	20%
total	64	68	62	**8**	9	12	13%	13%	19%
women %	22%	13%	13%	50%	22%	8%			

Figure 30 PhD recruiting

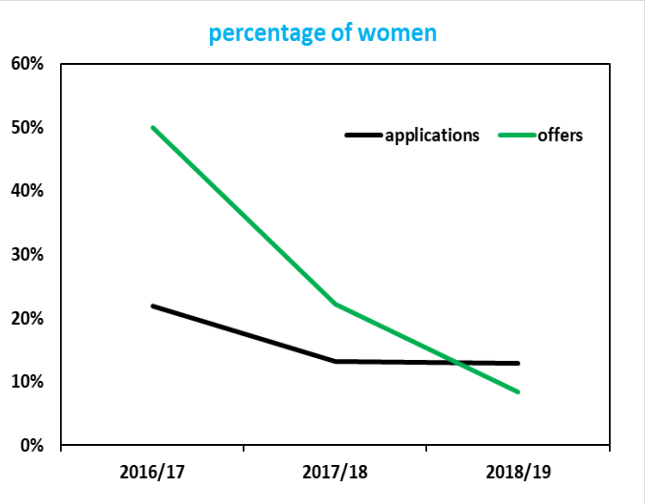


Figure 31 Percentages of women PhD applicants and offers

It is striking to see how few PhD applications are received from UK/EU women, down from 36% of female applications three years ago to 25% last year as shown in figure 32. (**Action point 4.2.1**)

PhD applications							
Overseas				UK/EU			
	2016/17	2017/18	2018/19		2016/17	2017/18	2018/19
women	9	7	6	women	5	2	2
men	16	23	24	men	34	36	30
total	25	30	30	total	39	38	32
women %	36%	23%	20%	women %	13%	5%	6%

Figure 32 PhD application by origin

This low level of PhD applications and admissions has been reflected in the proportion of women in the postgraduate population in recent years. At 21% we are well below the sector average of 28%. One-woman PhD student and one man are part time.

headcount			
	2016/17	2017/18	2018/19
women	5	5	5
men	17	18	19
total	22	23	24
women %	23%	22%	21%

Figure 33 PhD Headcount

The historical trend is clear as shown in figure 34 and 35.

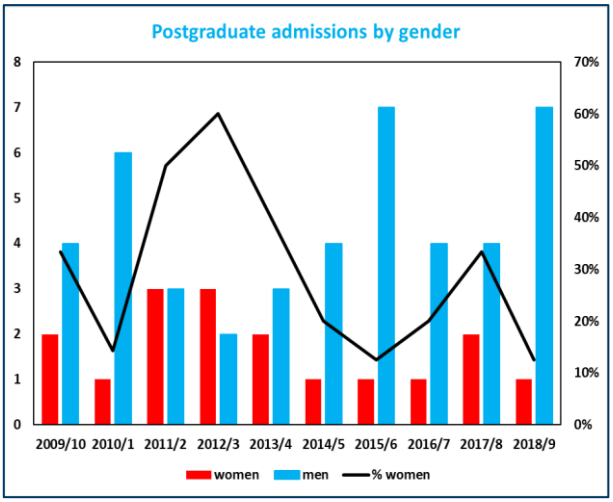


Figure 34 historical trend of women PhD admissions

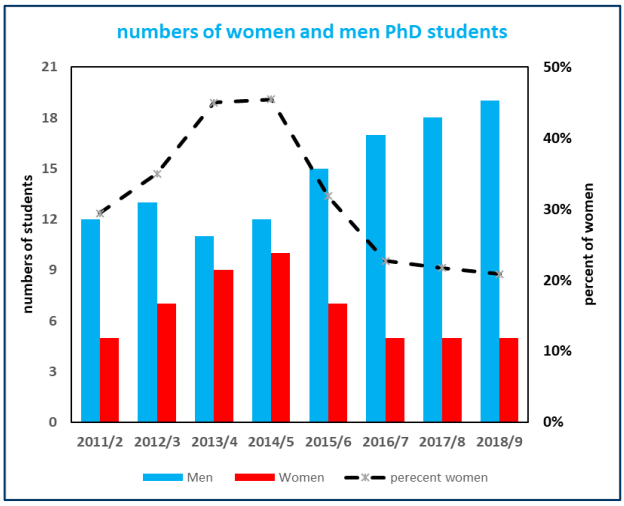


Figure 35 Historical trend of women PhD headcount

Current students are divided among the research groups as shown in figure 37, the preponderance of women is in the Mathematics of the Life and Social Sciences group. The requirements of the Field, Strings and Geometry research group are for a very strong Physics background as well as an excellent Mathematics undergraduate degree. Few UK graduates meet this profile and thus the positions are typically filled by students from the EU, from where we have fewer female applicants.

assignment of PhD students		
research group	**women**	**men**
Fields, Strings and Geometry	0	6
Fluids, Meteorology and Symmetry	1	9
Mathematics of the Life and Social	3	8
Dynamical System and PDEs	0	2
Dynamical Systems and Data Science	0	1

Figure 36 Assignment of PhD students

Successful submissions by women and men within four years have been broadly similar and no PhD student has withdrawn in the past three years.

submission within 4 years		
start	**Men %**	**Women %**
2009/10	100	50
2010/1	80	100
2011/2	100	100
2012/3	100	67
2013/4	100	100
2014/5	100	n/a
2015/6	80	100

Figure 36 Successful submissions within four years

We have consistently tried to ensure that our recruiting material shows women postgraduates and academics, and that women staff members and students feature prominently in PhD open days. Talks are given about PhD opportunities to all students from year 2 onwards and high performing final year students are contacted directly.

An important selling point is that while PhDs are a prerequisite for an academic career, they can also be a very important qualification for employment in senior positions in many industrial and commercial sectors. The opportunity cost of studying for a PhD by comparison with starting employment is largely defrayed by the stipend.

Action point 4.2.1 Increase the numbers of women PhD students

We need to improve the attractiveness of our PhD offer to women, particularly those from the UK, by finding out why the level of applications from them is so low and identify what can be done in our marketing methods

(vii) Progression pipeline between undergraduates and postgraduate student levels

Very few of our women PhD students have completed their undergraduate degrees at Surrey, the majority of women final year students who go on to study for higher degrees do so at other universities, despite strenuous efforts made to persuade our best students to remain at Surrey. In practice the attractiveness of the many neighbouring institutions and the relatively high cost of living in Guildford, especially housing, present a significant challenge. Of the present PhD population 55% of the men and none of the women did their first degree at Surrey.

When asked “If you plan to study for a higher degree elsewhere, what were your reasons for not staying at Surrey?” survey, respondents gave two principal reasons, showing a striking difference by gender, figure 37. Women reported wanting a change of scene, men seemed to prioritise a more prestigious institution.

If you plan to study for a higher degree elsewhere, what were your reasons for not staying at Surrey?	numbers mentioning each reason		percent mentioning each reason	
	women	men	women	men
Surrey's decline in position in league tables	2	8	13%	42%
wanting a change of scene	9	4	56%	21%

Figure 37 Reasons for not studying higher degrees in Surrey

Action point 4.2.2 Encourage more Surrey undergraduates to stay on for their PhD

- **Aim to recruit at least one Surrey undergraduate woman to study a PhD each year. Through focus groups and analysis of surveys we will understand our barriers to appealing to women to study for PhDs in Surrey.**
- **We will implement effective tracking of our final year students’ further degree destination and improve communication with our high performing students in order to understand better why our students are reluctant to continue their postgraduate studies at Surrey.**

4. 2 Academic and research staff data

- **Headcount**

Broadly speaking, the proportions of women at all levels in the Department are similar to the sector averages. With a small department, statistical comparisons are unlikely to be meaningful. Thus, 25% of our professors are now women, up from 14% through one promotion. Figure 38 shows the data, in terms of headcount, not FTE.

Job title	2015/16				2016/17				2017/18				2018/19			
	W	M	total	%W	W	M	total	%W	W	M	total	%W	W	M	total	%W
Professor	1	6	7	14%	1	6	7	14%	1	6	7	14%	2	6	8	25%
Reader	3	2	5	60%	2	4	6	33%	2	4	6	33%	1	7	8	13%
Senior Lecturer	1	5	6	17%	1	6	7	14%	1	6	7	14%	1	6	7	14%
Lecturer	1	6	7	14%	1	4	5	20%	1	4	5	20%	1	1	2	50%
total research & teaching	6	19	25	24%	5	20	25	20%	5	20	25	20%	5	20	25	20%
Research & Analogous	1	6	7	14%	3	3	6	50%	4	4	8	50%	4	5	9	44%
Teaching Fellow	3	3	6	50%	2	4	6	33%	3	3	6	50%	3	3	6	50%
Professional Services	3	1	4	75%	2	1	3	67%	1		1	100%	1		1	100%
Grand Total	**13**	**29**	**42**	**31%**	**12**	**28**	**40**	**30%**	**13**	**27**	**40**	**33%**	**13**	**28**	**41**	**32%**

Figure 38 Staff headcount

The comparison with the sector data in figure 39 suggests that in all categories we compare reasonably well. That is not to say that we should not aim to continue to improve, as recruitment allows.

occupation	Surrey								Sector					
	2015/16		2016/17		2017/18		2018/19		2015/16		2016/17		2017/18	
	women %	men %	women %	men %	women %	men %	women %	men %	women %	men %	women %	men %	women %	men %
professor	14	86	14	86	14	86	25	75	10	90	11	89	12	88
teaching and research	24	76	20	80	20	80	20	80	23	77	23	77	23	77
research only	14	86	50	50	50	50	50	50	22	79	23	77	23	77
teaching only	50	50	33	67	50	50	50	50	50	50	36	64	33	67
mode of employment														
full time	60	82	80	83	80	82	77	89	59	78	59	79	62	77
part time	40	18	20	17	20	18	23	11	41	22	41	21	39	23

Figure 39 11 Staff comparison with sector

- **Contracts of employment**

All of our teaching fellows have now been moved from fixed term to permanent contracts from2018/19, the comparisons with the sector are shown in figure 40.

terms of employment		Surrey								Sector					
		2015/16		2016/17		2017/18		2018/19		2015/16		2016/17		2017/18	
		women %	men %	women %	men %	women %	men %	women %	men %	women %	men %	women %	men %	women %	men %
research only	fixed	100	67	67	33	100	33	100	100	80	84	79	84	78	85
	open ended	0	33	33	67	0	67	0	0	20	16	21	16	22	15
teaching and research	fixed	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	open ended	100	100	100	100	100	100	100	100	100	100	100	100	95	95
teaching only	fixed	100	67	67	75	0	67	0	0	79	71	76	70	75	74
	open ended	0	33	33	25	100	33	100	100	21	29	24	30	25	26

Figure 40 12 Staff terms of employment

- **Attrition**

The leavers in the past four years are shown below (we exclude from this table post docs who left at the end of their contracts)

Academic leavers 2016/7 to 2018/9	women		men	
	voluntary	involuntary/ redundancy	voluntary	involuntary/ redundancy
Professor	**1**	**0**	**1**	**0**
Senior lecturer	**0**	**1**	**0**	**1**
Lecturer	**1**	**0**	**0**	**0**
Teaching fellow	**0**	**1**	**0**	**0**

Figure 41 Attrition

The numbers are small, so any statistical inference needs to be treated with care, but we see that four women and two men left over the period. Given that the ratio of women to men is 1:3 that represents a turnover of women that is six times that of men. (**Action point 4.3.1**)

Action 4.3.1 – HoD to conduct formal exit interviews with each member of staff and understand the reasons for departure.

Women have been represented increasingly proportionally to the Department gender balance in the major job responsibilities within the Department in the past few years. Figure 45 shows in graphical form the gender of the three most recent position holders, with the current positions in the left-hand column.

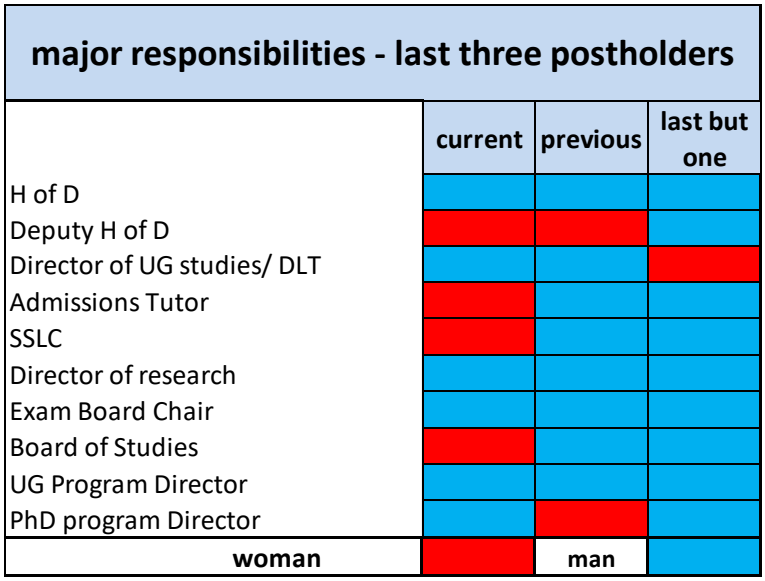


Figure 42 Management positions

Giving a seminar

Relaxing in the sunshine

Explaining the results

Graduation day

5. Supporting and advancing women's careers [5907 WORDS]

5.1 Key career transition points: academic staff

(I) Staff Recruitment

In the past four years three women and one man have been recruited as shown in figure 43. The proportion of applications for the lecturer position from women was disappointingly low. Interestingly, all the newly recruited research fellows were women. There was no recruitment activity in 2018/19. (One (male) professor was appointed on a special initiative by the Vice Chancellor.)

Interestingly, when they did apply women were noticeably more successful than men in getting interviews and converting interviews to offers. (**Action point 5.1.1**)

Recruitment 2015/16 to 2018/19	women	men	total	of which percent women
Senior Lecturer/Reader				
Applied	3	15	18	17%
Interviewed	0	2	2	0%
Offered	0	1	1	0%
Appointed	0	0	0	0%
Lecturer				
Applied	9	40	49	18%
Interviewed	2	2	4	50%
Offered	0	1	1	0%
Appointed	0	0	0	0%
Teaching Fellow				
Applied	7	1	8	88%
Interviewed	1	3	4	25%
Appointed	1	1	2	50%
Research Fellow				
Applied	3	16	19	16%
Interviewed	2	3	5	40%
Offered	2	1	3	67%
Appointed	2	0	2	100%
All posts				
Applied	22	79	105	21%
Interviewed	5	10	15	33%
Appointed	3	1	4	75%

percent of	women	men
applicants who were interviewed	23%	13%
interviewed who were offered	60%	10%

Figure 43 Staff recruitment

Action point 5.1.1 Understand whether the way we advertise, the media we use, the job specifications etc. in some way inhibit women's applying for research and teaching roles.

Our recruitment and selection processes follow the University's equal opportunities policies (Equality, Diversity and Inclusion Strategy) to ensure equality of opportunity for all applicants. Recruitment panels include no more than 75% of one gender, and panel members are required to complete Equality and Diversity Training and Face to Face Unconscious Bias Training. Candidates invited to interview are given opportunities for informal discussion with members of academic staff, including current women academic staff. We believe that these processes help ensure fair recruitment once people have applied, but we will continue to monitor to ensure compliance.

Application data indicates that we need to work much harder to encourage female applicants. To address the issue of wording of advertisements possibly having a masculine bias, we use a web-based language checker and will also ask HR to review advertisements to guard against unconscious bias or gender specific wording. (**Action point 5.1.2**) We also now ensure that the Athena SWAN logo is displayed on all advertisements on the University website, and we clearly state that we encourage applications from female and BAME candidates. We will work with HR to pilot a "Mathematics Department recruitment checklist" to remind recruiters of Athena SWAN principles and processes.

Action point 5.1.2 Work with HR to pilot a departmental "recruitment checklist" to capture and remind recruiters of best practice in recruitment. Make checklist available on the Department Mathematics Hub and send to recruiters when posts are approved. Monitor compliance by gathering completed checklists.

In the current academic year we will be recruiting at least two lecturers, which will give us the opportunity to apply these initiatives.

(ii) Induction

Newly recruited staff are given a reduced teaching and administrative load in their first few semesters, which allows junior new staff members to take the Graduate Certificate in Learning and Teaching, which is delivered centrally by the University.

New staff are assigned a mentor to help integrate them into the Department.

New staff members should also attend a University Induction Programme. (**Action point 5.1.3**) This includes a range of presentations given by members of the Executive Board to highlight the objectives of the University and show the new staff members where their role fits in with these objectives. This induction event is a good networking opportunity for new staff to meet other new staff across the University. Presentations include information about the University's commitment to good employment practice, including Athena SWAN principles.

Women will be specifically made aware of women-specific leadership opportunities within the university including the Women's network

Newly appointed staff report in one-to-ones that these policies are followed and are found to be useful.

Action point 5.1.3 Monitor the uptake and effectiveness of the induction processes through ongoing culture surveys

(iii) Promotion

The annual appraisal process gives staff the opportunity to flag up their achievements, enabling line managers to identify which staff are ready for promotion.

Ultimately, it is the responsibility of the Head of Department to identify those staff who are ready for promotion (based upon the appraisal reports). The promotion procedure from Lecturer to Senior Lecturer and teaching fellows are handled at Faculty level, while promotions to Reader and Professor are handled at University level, after proposals by the Department and initial sifting within the Faculty. Men are much more positive about the promotion process than women[7] as demonstrated in figure 44. (The staff culture survey is described in the self-assessment process section.)

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
I believe that both women and men are actively encouraged and supported by the Department to apply for promotion	1	8	11	3	5	8	1	1	2	0	0	0	50%	93%	79%	13%	7%	8%
The Department values the full range of an individual's activities when carrying out performance appraisals and when recommending promotions	0	5	6	1	5	7	3	0	3	0	0	0	13%	71%	54%	38%	0%	13%
I understand the promotion process and criteria in the University	0	5	6	3	6	10	0	1	1	2	0	2	38%	79%	67%	25%	7%	13%

Figure 44 staff attitudes to promotion

The only way to change women staff members view of the promotion process is to implement the action plan described in this submission. The culture survey will be strong indicator of the effectiveness of the action plan.

[7] In all of the tables of results from the Staff culture survey "positive" means "strongly agree" or "agree" and negative means "strongly disagree" or "disagree", except for questions asked in the negative when the definitions of "positive" and "negative" are reversed. "Neutral" responses were ignored

A senior colleague is normally available to advise a promotion candidate on their application. This, like much of what is done in the Department for staff development, is an informal process. In such a small Department it had been felt that we do not need formal processes to ensure that staff development and progression is effectively managed, since the HoD is able to provide effective monitoring and intervention as needed. However, it is now becoming clear that our procedures do need to be formalised. (**Action point 5.1.4**)

Action point 5.1.4 Formalise all staff development processes in the Department and ensure that they are clearly explained to all staff members, monitor through ongoing culture surveys

It does also need to be acknowledged that there are both women and men for whom promotion is not an objective and who are quite content to remain, performing well, in their current position and role. Such individuals must not be made to feel that their not wanting promotion threatens their positions.

The promotion data for the past five years is shown below[8]

from / to		Professor			Reader			Senior Lecturer			Teaching Fellow B		
		No	Yes	Total	No	Yes	Total	No	Yes	Total	No	Yes	Total
Reader	Men		1	1									
	Women	2	1	3									
Senior Lecturer	Men				1	5	6						
	Women				1	2	3						
Lecturer	Men					1	1		7	7			
	Women								1	1			
Teaching Fellow A	Women											2	2
Total		2	2	4	2	8	10		8	8		2	2

Figure 45 Staff applications and promotions

promotion applications and results					
	applications	succeeded	refused	success rate	rejection rate
women	7	4	3	57%	43%
men	11	10	1	91%	9%

Figure 46 promotion success

Women have been significantly likely to be promoted than men. They were more than four times more likely to be refused than men.

[8] All FT staff with the exception of one Teaching Fellow A

The promotion procedure is clearly laid out in University documentation, which is available on the University website. The criteria for promotion to every grade are based upon demonstrating a level of excellence in research and either teaching or administration, but only 40% of Department staff in the 2018 University Staff Survey agreed that "the promotion process is conducted fairly".

One to one discussion discovered that it is a widely held view that little account is taken by the University in the promotion process of any activity apart from research, that there is a bias towards the quantity rather than the quality of research output and that no account is taken of the impact of career breaks for maternity and part time working for childcare on research output.

The impact on promotion prospects of this relative decline in the rate of research output of women who took time off to have their children is a seen to be the real issue, as exemplified in the Department's data.

A significant reason for women's impaired promotion prospects is as fundamental as the institutional design of the very academic promotion process itself – relying on individuals to put themselves forward. Research has consistently shown that women are more cautious and thus less likely to boost their own case than men.[9] In industry and commerce promotion is typically awarded by the organisation's management, based on staff members' performance or increased responsibilities. In academia it is the staff member who is required to drive what many see as a very onerous process of "building the case".

When writing academic papers, recent research[10] shows that women are significantly less positive about the importance of their results than men.

This implies the critical need for a proactive approach to encourage women in particular to apply for promotion and to coach and counsel them through the process.

It is felt that part-time staff are disadvantaged in promotion, through not having time for research nor writing grant proposals: figure 47.

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
Staff who work part-time or flexibly are offered the same career development opportunities by the Department as those who work full-time	0	2	2	2	4	6	2	2	6	0	3	3	25%	43%	33%	25%	36%	38%

Figure 47 part time working and promotion

Having a senior colleague as a "champion" of one's promotion application, both for encouragement of the individual and promoting the case with the faculty was seen as very important. (**Action point 5.1.5**)

Promotion timeline

Over the past five years the average length of time in years spent at a job level before promotion (for those who were promoted) is as shown in figure 48.

[9] Harvard Business Review (HBR) blog post, "Why Women Don't Apply for Jobs Unless They're 100% Qualified," Tara Sophia Mohr

[10] "Gender differences in how scientists present the importance of their research: observational study." Marc J Lerchenmueller, Olav Sorenson and Anupam B Jena, BMJ 2019;367:l6573

Promotions 2014 – present			
Length of time in grade prior to promotion (years)	Lecturer to senior lecturer	Senior lecturer to reader	Reader to Professor
Women	7.5	6.5	3
Men	5.7	4.1	7.5

Figure 48 time in grade before promotion

- Not all of women's additional length of time in grade before promotion can be correlated with maternity leave. Women with no caring commitments also tend to have a slower rate of progression than men. Only one woman was promoted to professor in this time, for the other two steps women who were promoted were spending around 50% longer in grade than men before promotion. The age structure of the Department in figure 49 reflects women's being promoted later in their careers.

average age		
	women	men
Professor	55	55
Reader	50	48
Lecturer and Senior Lecturer	48	40

Figure 49 Department Staff age structure

Action Point 5.1.5 Implement the following process: The appraiser notifies the HoD that they consider an appraisee to be a candidate for promotion. The HoD nominates a senior member of staff to act as mentor and champion for the individual's promotion process – encouraging and advising the individual, helping them to prepare their case and acting as their advocate.

(iv) Department submissions to the Research Excellence Framework (REF)

Figure 50 shows the numbers of staff submitted to the RAE and REF

	2008 RAE Submission[1]	2014 REF Submission	2014 REF Eligible Staff
women	6	6	8
men	16	23	23
Total	22	29	31

[1]RAE submission - the number of eligible staff was not collected

Figure 50 REF and RAE submissions

Two women were put forward by the Department to the REF but not submitted by the University. One of those women subsequently took ill-health retirement. The other has since been promoted.

There are a number of measures in REF 2021 to encourage transparency and fairness in the decisions made by Higher Education Institutions to represent the excellent work of all their staff with significant

responsibility for research in their submissions. The University of Surrey has outlined how it will deliver on these measures in the University's code of practice.

All Units of Assessment leads were given REF specific Unconscious Bias Training by the Equality and Diversity Adviser

5.2 Career development: academic staff

I. Training

A range of development opportunities is open to all staff covering courses such as: leadership and management, personal skills, teaching and learning, research, career development, coaching and mentoring, health and safety. The central programme is updated regularly, based on organisational context and feedback from the annual Appraisal process. Training Programmes for female staff include Spring Board and the Aurora Leadership Programme: one of our female academic staff members has already taken the Aurora Programme

.

The annual appraisal for all staff includes a development discussion, covering career aspirations and learning requirements.

Women are almost twice as likely as men to attend training courses, figure 51 shows the last three years data.

Training course or workshop title	women	men
Appraisee effectiveness		1
Aspiring Academic Leaders	2	
Engaging with Industry & Innov		1
HR Policies for Line Managers		1
Induction to Research @ Surrey		1
Induction to the University	2	2
Leverhulme Trust Visit	1	1
PaCCS Overview		1
Personal Tutor Training	9	9
RDS SE and NIHR Overview		1
Total	**14**	**18**

Figure 51 training courses

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
I consider that both women and men are actively encouraged by the Department to take up training opportunities	1	6	9	2	5	7	1	0	1	0	0	0	38%	79%	67%	13%	0%	4%

Figure 52 attitudes to encouraging training

While women are almost twice as likely to take up internal training courses as men, they are also more likely to report that the Department does not encourage men and women equally to take up training opportunities, which warrants further investigation.

iii. Appraisal/development review

It is widely felt (from one to one interview data in particular) that there has been an excessive reliance on relatively simplistic metrics– such as research income and MEQs, in appraisals in recent years.

Staff are divided on their view of the usefulness of the appraisal, with men much the more positive as figure 53 shows.

Within the appraisal process there is considered to be very little visibility of administrative responsibilities or of the thoroughness in which they are carried out. Further, there is a suggestion that many men are likely to put minimal effort into these activities.[11]

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
I find that the annual appraisal is very helpful	1	4	6	2	4	6	3	4	8	0	1	1	38%	57%	50%	38%	36%	38%

Figure 53 Usefulness of appraisal

Professors and the departmental administrator are appraised by the HoD, lecturing and research staff by the head of their research group and teaching staff by the DTL.

The Department runs a peer observation teaching scheme in which each member of staff is observed by a colleague, who comments on the effectiveness of the teaching delivery and highlights any opportunities for development.

The quality of the appraisal is seen to be very dependent on the individual appraiser i.e. the seriousness and the thoroughness with which they conduct the appraisal. (**Action point 5.2.1**)

Appraisal training is available as part of the core development programmes: there are workshops available for appraisees and appraisers. However, data on training uptake identifies only one (male) member of staff (who is recorded as taking taken appraisee training). (**Action points 5.2.2 – 5.2.3**) (Other staff may have taken training earlier, although that data is not available in the current record system.) The Department will ensure that all staff who are responsible for appraisals, including line managers of research staff, have undertaken appraisal training. Such training is not a university requirement, we intend to make it obligatory in the Department.

We should encourage appraisees to ensure that the full range of their job is documented on the appraisal form and that they use the space provided to be as forthcoming as they can about their future plans by sending them a checklist at appraisal time.

Action point 5.2.1

Ensure that appraisers focus effectively on and give credit for administrative responsibilities in appraisals.

[11] HR Magazine, Rachel Muller-Heyndyk, April 2, 2019

Ensure that all appraisers are adequately trained and have a checklist of topics that must be covered during the appraisal meeting, including promotion prospects

Action point 5.2.2

Ensure that appraisees have a checklist of topics that they should cover during the appraisal meeting, document fully their job roles and fully describe their future plans on the appraisal forms

Action Point 5.2.3

The moderators of the appraisals comment fully on the forms and ensure that appraisers take account of the full range of duties of the appraisee

Faculty HR should monitor the quality of appraisal and follow up to verify that identified training is done.

iv. Support given to academic staff for career progression

The University has a range of training opportunities for staff to explore career progression, including career coaching, mentoring, transitioning from research student to staff, and researcher five-year plan. Career progression should also be part of the discussion in the annual appraisal, and the allocated Senior Colleague can assist with discussions on career progression.

Staff can also request individual discussions on career progression with their Head of Group or the Head of Department.
Attitudes to career development in the Department as shown in figure 54 suggest that there is a significant level of dissatisfaction, particularly among women, with the way career development processes are implemented and communicated. (**Action point 5.2.4 and also action point 5.1.4**)

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
I have regular meetings with my line manager to discuss my development and career progression	2	3	5	2	5	7	3	0	3	0	1	1	50%	57%	50%	38%	7%	17%
I am clearly aware of my career path in the Department	2	8	12	2	4	6	3	0	3	0	1	1	50%	86%	75%	38%	7%	17%
Staff who work part-time or flexibly are offered the same career development opportunities by the Department as those who work full-time	0	2	2	2	4	6	2	2	6	0	3	3	25%	43%	33%	25%	36%	38%

Figure 54 attitudes to career development

Despite this, only 8% of staff agreed that those who had caring responsibilities were not offered the same career development opportunities in either (a) research, (b) teaching or (c) administrative and managerial roles by the Department as those who do not have caring responsibilities.

Support for postdoctoral research staff (early career researchers, ECRs) is provided by the Doctoral College (DC). Support available includes mentoring, professional skills training and careers support.

ECRs are able to access a range of transferable skills through the Training Framework. If ECRs are unable to attend face-to-face sessions or feel they need extra support, one-to-one coaching appointments are available on demand, as are one-to one presentation and interview practice sessions.

Action point 5.2.4 Make a discussion about career progression a specific item in appraisal meetings

v. Support given to students (at any level) for academic career progression

Undergraduates

One of the teaching fellows is Tutor for Employability.

Career support for undergraduates is mainly provided through the Employability and Careers Centre (ECC). The ECC provides tailored career guidance to students and assists them with all aspects of the application process for internships, placements, graduate jobs and postgraduate studies.

The Department encourages outstanding undergraduate students to undertake (paid) summer research projects; these have proved popular with female students. In recent years 5 women and 11 men have carried out such projects: figure 58. This is clearly a very effective introduction to Mathematics research, as also are final year projects (one third of current final year BSc project students are women). Projects are advertised within the Department and students apply – this year we have proactively approached good students.

summer research projects		
	women	men
2017	2	5
2018	3	3
2019	0	3

Figure 55 Undergraduate summer research projects

We have not been successful in attracting undergraduate women to study for a PhD in the Department. (Although we do not have data on women graduates who go on to study for a postgraduate degree at other institutions). Of our current PhD cohort, 55% of the men did their first degree at Surrey, 0% of the women. When asked about their main motivation to do a PhD, over half our current PhD students cited interest in the research project itself, which might suggest that understanding which projects are likely to appeal to women would be helpful in recruitment.

Research[12] suggests that women underestimate their capacity to succeed in Mathematics and, by extension to succeed in obtaining a PhD, by contrast with men, who may have a more positive view of

[12] Institute for Fiscal Studies, 2018

their own abilities. Women are usually good planners and they may reflect that the opportunity cost of a PhD for those not intending to enter an academic career is too high. In practice since funding is available for all fees and a stipend which in net terms is close to graduate starting salaries, this Is a misconception we need to dispel.

The very male dominated Mathematics PhD community does not present high performing women undergraduates with an attractive picture, and this is likely to reinforce the problems we have in recruiting women. An initiative which encouraged more mixing of women PGR students from all departments across the university would generate a larger and more visible group as well as improving the environment for current woman PhD students themselves.

45% of women undergraduates surveyed said that they were "very likely or likely to study for a higher degree in Mathematics", compared to 25% of men. Of those students who were likely or very likely to do a higher degree only 35% of women had discussed the subject with staff (compared to 44% of men) and only 30% of women were likely or very likely to choose to study at Surrey, figure 58. (The survey did not ask explicitly about PhDs so a number of responses will have been about a specialist master's degree which we do not offer.)

likely/very likely to do higher degree			
		men	women
discussed with staff	no	56%	65%
	yes	44%	35%

likely/very likely to do higher degree			
		men	women
likely/very likely to study at Surrey	no	44%	70%
	yes	56%	30%

Figure 56 Cross tabulation of undergraduates planning higher degrees

We need to initiate conversations with high-performing women from an early point in their studies – through personal tutor meetings, PhD events, targeted face to face meetings between women PhD students and post-docs and identified high performing students, especially women. (**Action point 5.2.5)**

Action point 5.2.5 Encourage our ablest women graduates to do a PhD preferably at Surrey

Identify high performing undergraduate women at an early stage and ensure they are exposed to information about PhD opportunities and career prospects especially from their personal tutors, women post-docs and women PhD students

Increase the number of women studying MMath – both from year 1 recruitment and actively encouraging high performers to switch from BSc

Instigate a regular discussion between the Director of Postgraduate Studies and individual very high performing students from the first year onwards

Run "exit interviews" with students who choose to study further degrees at other institutions

Postgraduates

Support is provided by ECC, where there are specialised postgraduate careers advisors, the Doctoral College and through Mathematics Department initiatives.

The Doctoral College provides continuity of support for researchers, starting from taught students considering doctoral studies, through the transition to researcher student, and throughout the early career researcher stages. This is done through a combination of training (both face-to-face and virtual), mentoring, research culture building events and one-to-one support. A yearly Doctoral College Conference is run, where researchers get an opportunity to present their work to people from across the University.

We carried out a culture survey among PhD students. The results show a friendly, inclusive culture:

- 100% agreed with the statement "I believe that both women and men are actively encouraged and supported by the Department to apply for a PhD".
- 100% agreed that they "consider that both women and men are actively encouraged by the Department to take up opportunities to attend conferences and training" and "The Department supports me to undertake teaching/demonstrating opportunities.
- Some women PhD students felt that they were working in a very male dominated environment (**Action point 5.2.6**).

100% of these who had had the experience agreed that "Both women and men are actively encouraged and supported by the Department to apply for suitable post-doc positions"

PhDs can be undertaken extremely flexibly as the following example shows:

In 2013, aged 34 and three months pregnant with her first child, Mary (not her real name) a Mathematics graduate who had worked in banking for ten years was accepted to study for a PhD at Surrey. After five months she left to have her baby and took a year's maternity leave. For the next year she worked from home, coming into the university once or occasionally twice per week. She then took maternity leave for ten months when her second baby was born. Returning to her studies Mary has worked on a 0.7 FTE basis, from her home, now in Scotland ever since, with occasional visits to Surrey and frequent Skype contact. She expects to submit at the end of 2019. Overall the degree will have taken her seven years – 3 ½ years real time.

- Half of the PhD students we surveyed were aiming for jobs in academia, a rather higher proportion than have achieved academic jobs in the recent past, once competing their PhD. Over the past five years, out of 17 post docs who have been employed in the Department, seven (41%) completed their PhD at Surrey – three women and four men. This suggests a

reasonable rate of flow from PhD to postdoc when compared to the numbers of graduating PhDs – 17 in the same period (seven women and 17 men).

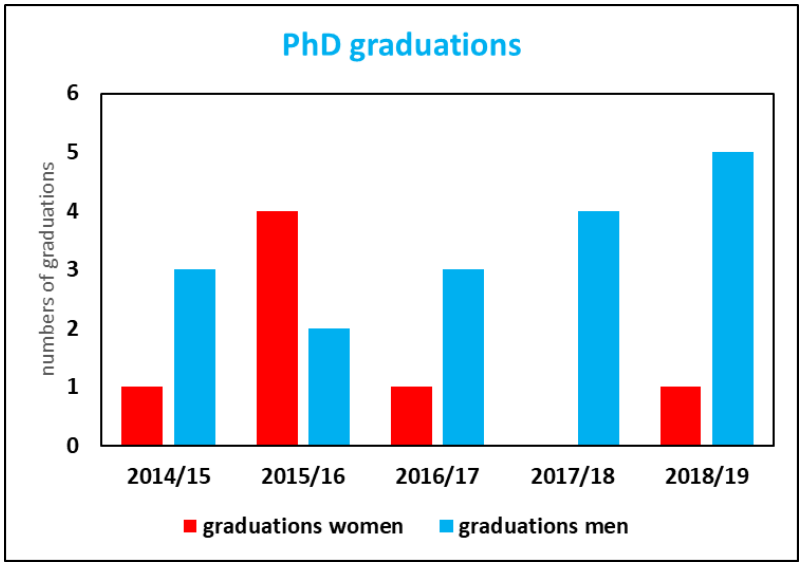


Figure 57 PhD graduations

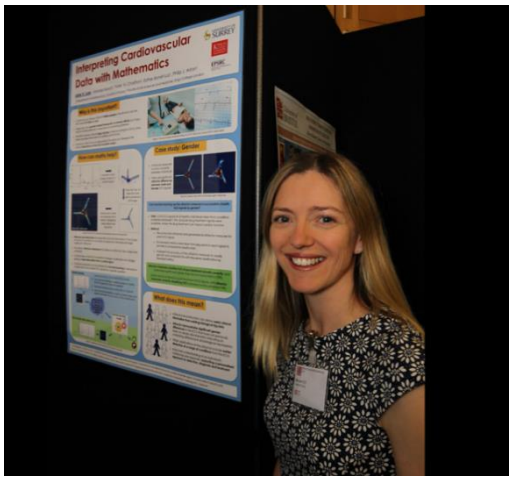
Action point 5.2.6	**Make the PhD environment less male dominated**

vi. Support offered to those applying for research grant applications

- For ECRs and PGR students, the Doctoral College (DC) offers workshops on grant proposals, as part of its Researcher Development Programme. The DC also runs Ideas Generator sessions where participants discuss their initial ideas for a funding bid and receive comments, feedback and ideas from invited RIS (Research and Innovation Support) professionals and other researchers. They also have a booklet aimed at ECRs and run/help with mock interviews for funding applications. They also organise writing retreats which are designed to support researchers with any piece of writing (including funding applications).
- RIS run training sessions and information events, including visits from sponsors (EPSRS, H2020, EU/UKRO etc), and courses such as "Your Toolkit for Research" and "How to Submit RCUK Research Proposals". They have a range of on-line resources, including booklets on "Applying for Research Funding", "Peer Review", and a Research Funding Applicant's Checklist to help guide staff through all the steps. RIS also offers 1-1 support on bid preparation, and participation in Surgeries.
- The Faculty also run a training programme including an "Introduction to Bid Writing" session, which includes representatives from Research Finance and RIS.
- The Department support those applying for grants with a peer review process and, for major grant submissions, a reduction of the administrative workload.

- There was a feeling that it was difficult to find the time to attend courses and one tended to "learn by doing". A commonly held view is that the normal working hours (37½ per week) were taken up with teaching and administration and that research and grant applications were done in "the staff member's time".

A lively postgradute discussion



A poster and the author

5.3 Flexible working and managing career breaks

(I) Cover and support for maternity and adoption leave: before leave

The University has a Maternity Policy and a separate Adoption/Foster to Adopt/Surrogacy Leave Policy, both available on a central University of Surrey web page for Policies.

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
The maternity policies of the University are adequate to support women who have children and who return to work	0	1	1	0	1	3	2	2	6	1	0	1	0%	14%	17%	38%	14%	29%
The paternity policies of the University are adequate to support men who have children and who return to work	0	1	1	0	1	2	2	1	5	1	2	3	0%	14%	13%	38%	21%	33%

Figure 58 Attitudes to university maternity and paternity policies

There is significant dissatisfaction with maternity and paternity policies. A short survey of local universities was undertaken, the results are shown in figure 59, which suggests that our policies are relatively unattractive. [13] We have made representations to the university HR Department to conduct a review of these policies.

Maternity Policy	Surrey	Reading	Bath	Southampton	Sussex	
Number of weeks leave entitled to, regardless of length of service	52	52	52	52	52	
Entitlement to Occupational Maternity Pay; a) Service length prior to QW b) Minimum length of return to work	a) 52 weeks b) 3 months	a) 26 weeks b) 3 months	a) 52 weeks b) 3 months	a) 52 weeks b) 52 weeks	a) 26 weeks b) 3 months	
Amount of Maternity Pay; c) Full pay for d) Half pay plus SMP for e) SMP for	c) 8 weeks d) 16 weeks e) 15 weeks	c) 18 weeks d) n/a e) 21 weeks	c) 8 weeks d) 18 weeks e) 13 weeks	c) 26 weeks d) n/a e) 13 weeks	Option 1: c) 18 weeks d) n/a e) 21 weeks	Option 2: c) 8 weeks d) 16 weeks e) 15 weeks

QW – Qualifying Week (15th week before EWC) **EWC** – Expected Week of Childbirth **SMP** – Statutory Maternity Pay

Figure 59 Maternity policies survey

(ii) Cover and support for maternity and adoption leave: during leave

The University Maternity and Adoption/Surrogacy policies allow for "reasonable contact" between employee and employer, for updates or to discuss return to work. The employee is to be kept informed of any promotion opportunities or vacancies which arise in their Department during the maternity/adoption leave.

[13] Prior to 2014 the policy in Surrey was 13 weeks at full pay plus SMP, 13 weeks half pay pls SMP and 13 weeks SMP

The University policy allows for the employee, by agreement in advance with their Line Manager and in conjunction with their HR representative, to do up to 10 days work, known as Keeping in Touch days (KIT days).
Since 2015 one member of staff (a lecturer) has taken maternity leave. She took 3 KIT days. In future we will encourage staff taking maternity leave to take their full KIT allocation to maintain support by and contact with the Department.

(iii) Cover and support for maternity and adoption leave: returning to work

The University Maternity and Adoption/Surrogacy policies state that, on return from leave, there is an expectation that teaching and/or administration loads will be reduced for a semester to facilitate staff reaching their research targets.

Supporting women academics returning from maternity leave to re-establish their research activities and hence research output is seen as a critical factor in their career progression.

- A potentially attractive approach would be for women going on maternity leave in the future to be assigned a postdoc where this is possible, who would ensure that the research work continued. (**Action point 5.3.1**)
- Staff going on maternity leave retaining their right to sabbaticals under the Departmental policy ensures that this facilitation of research would continue.

Action point 5.3.1	**Wherever possible assign a postdoc to women lecturers going on maternity leave**

(iv) Maternity return rate

- The two members of staff who took maternity leave in the past ten years both returned to work in the Department and both were promoted subsequent to their return. One is still in post, the other left to take up an appointment at the same level in another institution for personal reasons.

Staff taking maternity leave	Staff returning after maternity leave	Staff subsequently promoted
2	2	2

Figure 60 staff returning after maternity leave

(v) Paternity, shared parental, adoption, and parental leave uptake

The University has policies on Paternity Leave, Shared Parental Leave, Adoption/Foster to Adopt/Surrogacy Leave, and Parental Leave. All the details are available from the University "Policies" website and are inclusive of same-sex couples.

In 2018/19 two members of staff took paternity leave

It is generally felt that the paid paternity leave provision (2 weeks) was inadequate, particularly so in the case of premature births.

(vi) Flexible working

The University Flexible Working Policy includes a range of different arrangements, including part-time working, compressed working hours, and remote working. Flexible working requests are made using a "Statutory Flexible Working Request Form".

As part of this Policy, the University has a separate process to request Teaching Constraints. Full time staff are required to be available between 10:00 and 16:00 Monday to Friday. They may request either a late start or an early finish, but otherwise are assumed to be available for timetabling between 09:00 and 18:00. There is a feeling that there is currently much less flexibility in (university) timetabling than in the recent past, to at least some extent due to timetable pressure from an increased number of students in the university and lack of lecture rooms.

Requests for Teaching Constraints are handled by the Faculty Student Services Manager and Head of Department in the first instance, followed by a University HR Review Group for consideration of the consistency of applications.

Over the past three years women in the Department have been four times as likely as men to request constraints and three times as likely to have their requests rejected as shown in figure 62.

Constraints Requests	2015/16		2016/17		2017/18		total	
	women	men	women	men	women	men	women	men
submitted	3	3	3	2	3	1	9	6
supported	3	3	0	1	2	1	5	5
rejected	0	0	3	1	1	0	4	1
submitted as percent of headcount	33%	14%	43%	8%	38%	9%	38%	9%
rejection rate							44%	17%

Figure 62 constraints requests

It is generally considered (by those who have caring responsibilities) that the policies do not cater well for the needs of those with caring responsibilities as shown in figure 63.

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
The flexible working hours policies of the University are not adequate for staff with caring constraints	0	1	2	2	2	4	2	1	3	1	2	3	38%	21%	25%	25%	21%	25%

Figure 63 Attitudes to flxibility policies for carers

The University states that it will seek to provide academic staff with an entitlement to research time one complete day (or pro-rata for part-time staff) for research per week during teaching periods. In the Mathematics Department every effort is made to ensure that two days each week can be allocated to research, on the basis that Mathematics research is fundamentally different from, for example, experimental science.

Staff feel that the Department does try to cater for individuals' particular needs, frequently on an informal basis. 81% agreed that "My line manager is supportive of requests for flexible working". One 0.5 FTE teaching fellow is able, for example, to work almost full time during the semesters and very little during the vacations. This staff member commented:

> *"Taking a view of hours on an annual basis gives real benefits to both me and the Department"*

Working from home is accepted and many staff take advantage of this. This is the experience of a post doc:

> ***A Research Assistant, Claire (not her real name) was engaged on a full-time, fixed-term contract in 2019 for a research project. She is a single mother, aged 40, with an 11-year-old son, who found it expensive to live in Guildford and difficult to find a suitable school. She works from home, in a small town one hour away by car, coming into the University once or twice each week.***

(vii) Transition from part-time back to full-time work after career breaks

No member of staff has made this transition in the past five years. However, the Department would look very sympathetically at the particular case were the situation to arise.

5.4 Organisation and culture

(I) Culture

The Department is small and compact and one to ones and surveys have shown that staff generally feel it to be a friendly and supportive place to work. 67% agreed that the Department was a great place for men to work, 63% that it was a great place for women to work.

The Department is at an early stage in formally embedding Athena SWAN Charter principles into its culture. There is, however, a genuine shared concern across the Department that women are underrepresented at senior levels in academia and that action is needed to deal with this issue. 89% agreed that "I understand the Department's reasons for taking action on gender equality" and none disagreed.

However, the staff survey did highlight some issues.

- It is clear that action is needed to communicate effectively and reinforce the Department's view on unsupportive language and behaviour.
- Staff (particularly women) may find themselves in difficult situations with students in one to one interaction such as supervisions. Where this has been brought to the attention of Department management in recent years, appropriate action has been taken. The University's Dignity at Work and Study Policy provides guidance for these situations. (**Action Point 5.4.1**)

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
Responsibilities in the Department are allocated on a clear and fair basis	0	4	5	0	4	4	2	1	3	1	2	3	0%	57%	38%	38%	21%	25%
The workload allocation by the Department adequately accounts for personal constraints such as caring responsibilities	0	4	4	2	2	4	2	0	0	0	1	1	25%	43%	33%	25%	7%	4%

Figure 63 atttudes to unsupportive behaviour

- Women have been more assiduous than men in completing diversity and unconscious bias training. Follow up action is being taken to ensure this important training is completed by all colleagues. The current proportion of staff who have completed this training is shown in figure 64.

completed the training?	Diversity in the Workplace		Unconscious Bias		Headcount	
	number	% of total headcount	number	% of total headcount		
Readers and Professors	12	92%	10	77%	13	
Lecturers and Senior Lecturers	3	43%	3	43%	7	
Teaching Fellows	6	100%	4	67%	6	
Other Staff	7	64%	3	27%	11	
total	28	76%	20	54%	37	
	women		men		all	
	number	% of total headcount	number	% of total headcount	number	% of total headcount
neither training course done	1	8%	7	28%	8	22%
both training courses done	8	67%	11	44%	19	51%

Figure 64 uptake of diversity and unconscious bias training

Action Point 5.4.1 Ensure that all staff have taken the diversity and unconscious bias training courses, and publish the results of the Department staff survey and make it a discussion item at a staff meeting

(II) HR policies

The University has a set of HR policies related to equality, dignity at work, bullying, harassment, grievance and disciplinary processes. The Department follows those policies but does not currently have a process to monitor the application of these processes for gender equality of application.

Action point 5.4.2 Make gender equality a cornerstone of the way the Mathematics Department operates.

There are a number of areas relating to childcare which are broadly considered by staff in the Department to be unsatisfactory

- Staff with young children feel that the University does not provide sufficient high-quality nursery facilities, nor recognition of childcare responsibilities once children begin school. The nursery was recently expanded from 40 to 100 places as a result of the University's Athena SWAN commitment.
- Nursery facilities are considered to be expensive and difficult to access, comparing unfavourably with other institutions.
- Dropping off and picking up children creates problems with parking in the morning (no places left in the staff car park).

- A telling staff survey quote was

> *"Better and subsidised childcare would help more than anything else"*

reflecting the view that childcare arrangements would have a significant impact on improving the career opportunities and satisfaction for women academics with young children in the university.

When a staff member with caring responsibilities for children is required to attend an academic conference, especially overseas, there may be cases when the only option is either for the children and a carer to accompany the academic or for a full-time carer to be engaged at home for the duration of the conference. This is an expense that many, particularly junior, academics would struggle to meet. Establishing an international profile is of course one of the key attributes the university would look for in promotions to senior positions. There is funding available at faculty level to which academics can apply for conference attendance expenses, and a VC's fund for those with caring responsibilities, created as an Athena SWAN initiative which needs to be better publicised. (**Action Point 5.4.3**)

Action Point 5.4.3 Publicise the VC's fund to which those with caring responsibilities can apply for help in relevant conference expenses

Action Point 5.4.4 Consider giving staff with parking permits and caring responsibilities the right to park every day in the university.

(III) Representation of men and women on committees

There are three principal Departmental committees, the membership of which was as follows in 2018/19

	women	men	total
Management committee	1	4	5
UG/PGT Staff Student Liaison Committee	1	4	5
UG/PGT Teaching and Learning Committee	2	3	5

Figure 65 Committee membership

- One-woman member served on two of the committees.

(IV) Participation on influential external committees

Three members of staff serve on external committees, of whom one, on the Programme Committee of the London Mathematical Society is a women.

(V) Workload model

A workload model, into which the Head of Department has the Departmental input, is maintained by the University but is not shared with departments, nor used in the allocation of responsibilities.

Responsibilities such as teaching and administration are assigned annually by the Director of Teaching and Learning and the Head of Department respectively, who attempt to ensure a fair balance between staff members. The responsibilities taken into consideration when allocating workloads are: teaching

duties, undergraduate tutees, placement student supervisions, PhD students, postdoc supervisions, administrative duties and research grant commitments. These workloads are recorded, and any concerns that staff may have are resolved through discussions.

All staff have the opportunity to raise childcare commitments to the Head of Department in advance of the teaching timetable being compiled, and all reasonable commitments are taken into consideration. Also, as far as possible each member of lecturing staff has two days a week free of teaching to give them research days, although it is recognised that timetabling constraints make this very difficult to maintain.

The views of staff were that by and large the way in which work is allocated was opaque but that there was no gender bias.

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
Responsibilities in the Department are allocated on a clear and fair basis	0	4	5	0	4	4	2	1	3	1	2	3	0%	57%	38%	38%	21%	25%
The workload allocation by the Department adequately accounts for personal constraints such as caring responsibilities	0	4	4	2	2	4	2	0	0	0	1	1	25%	43%	33%	25%	7%	4%

Figure 66 Attitude to allocation of responsibilities

Women were more negative than men about the process and about account being taken of personal constraints.

A typical staff survey comment was

> "The process is opaque, but the result is generally fair"

All staff expressed a sense of having "just too much to do". Given that we are a small Department, that two staff members are on long term sick leave and that recent leavers have not been replaced, this is an unsurprising finding. Our planned recruitment to replace the staff members who left will help relieve the situation.

(VI) Timing of departmental meetings and social gatherings

All Departmental meetings are scheduled to take place between 10:00 and 16:00.

Seminars are also scheduled within this time frame with the exception of those from one research group where all the participants have agreed to a 16:00 start.

There was broad agreement that the position is satisfactory

Staff culture survey November 2019	strongly agree			agree			disagree			strongly disagree			% positive			% negative		
	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all	W	M	all
Meetings and seminars are completed within core hours (10:00 -16:00) to enable those with caring responsibilities and other constraints to attend	1	3	4	4	4	12	1	1	2	1	0	1	63%	50%	67%	**25%**	7%	13%

Figure 67 atitude towards meeting times

The Departmental Christmas Dinner has traditionally been held in the evening – in 2019 it took place at lunchtime on a weekday and the plan is to continue with this timeslot in future years.

vii. Visibility of role models

Women undergraduates are always prominent on open days and applicant days, talking to both parents and potential students. Figure 68 gives a snapshot of the student helpers during 2018/19.

Undergraduate helpers at Open Days 2018/19		
event #	women	men
#1	2	2
#2	4	1
#3	4	1
#4	5	1
#5	5	1

Figure 68 gender of undergraduate helpers

All undergraduates are taught by women lecturers during each year of their course.

Research seminar speakers have tended to be rather more male dominated than the Department staff body. Figure 69 refers to seminars run over the past three years. (In some cases, the historical data have not been recorded).

seminar speakers 2016/7 to 2018/9			
research group	men	women	percent women
Dynamical Systems and PDEs	25	5	17%
Fields, Strings, and Geometry	46	6	12%
Fluids, Meteorology, and Symmetry	4	1	20%
Mathematics of the Life and Social Sciences	24	22	48%
Colloquia	11	0	0%
Total	110	34	24%

Figure 69 seminar speakers

Seminars for undergraduates, where the speakers are from the Department, have featured a larger proportion of women than research seminars.

undergraduate seminar speakers		
men	women	percent women
10	5	33%

Figure 70 undergraduate seminars

- Women are visible and active as members of the MathSoc committee and as student representatives. The response from the undergraduate culture survey is encouraging.

"I see plenty of women role models among Mathematics postgraduate students and lecturers"			
	men	woman	**Total**
strongly agree	11	4	15
agree	29	20	49
positive	*40 (62%)*	*24 (45%)*	*64 (54%)*
disagree	7	13	20
strongly disagree	1	1	2
negative	*8 (12%)*	*14 (26%)*	*22 (19%)*
Total	65	53	118

Figure 71 women role models (UGR survey)

- There is, notwithstanding, amongst undergraduates a strong perception that Mathematics is mile dominated as figure 72 shows

"I think that Mathematics is a male dominated subject."			
	men	woman	**Total**
strongly agree	3	3	6
agree	28	29	57
positive	*31(48%)*	*32 (60%)*	*63 (53%)*
disagree	16	8	24
strongly disagree	4	4	8
negative	*20 (31%)*	*12 (22%)*	*32 (27%)*
Total	65	53	118

Figure 72 male dominance (UGR survey)

(vii) Outreach activities

Outreach and engagement takes place in many forms, some of this is organised by and undertaken on behalf of the University and by FEPS and some is undertaken in a personal capacity by members of the Department. Outreach activities are part of the Collegiality, Administration, Leadership, Management and Engagement (CALME) section of the appraisal documentation.

Each year FEPS organises a Summer School for year 12 students from local comprehensive schools. In 2018, 35% of attendees applied to Surrey. In 2019, 90 students attended the School, 100% of whom met our WP&O criteria (from underrepresented backgrounds in Higher Education). The Mathematics Department participates in the Summer School, giving students who are interested in Mathematics the opportunity to undertake group projects, introduced by an academic, then 8 – 10 hours research and a presentation of the findings to academics.

A Mathematics taster day has 15 – 25 year 12 students spending a day at the University. The students attend a sample undergraduate lecture, before participating in a workshop on the subject. These days are run by PGR students and student ambassadors.

We do not currently systematically capture information on participation in outreach activities at the departmental level, so we are unable to report on involvement by gender and grade here.

Action Point 5.4.5 Increase outreach activities

Develop and implement a process to systematically capture staff and student participation in outreach activities.

Make activity visible within department and make available for workload and appraisals.

Monitor gender ratio to ensure appropriate female representation vs workload.

Agreement with the DfE has been reached for a Mathematics College in Guildford. This is a summary from the project plan of the aims of the outreach programme for the Department in relation to the College.

We aim to build an outreach programme offering that complements local Mathematics outreach
provision and responds to the needs of local schools. Specifically, our pre-opening outreach will target the following three key areas:

1. We will inspire and support primary and secondary students who love Mathematics, Physics and Computing
2. We will improve the diversity of students who go on to study Mathematics at a higher level by
    a. improving the proportion of girls taking part in STEM subjects post-16
    a. further improving social mobility by identifying able mathematicians from disadvantaged backgrounds
3. We will improve the quality of teaching and learning in Mathematics and as a result raise attainment and progress by:

a. working to improve Mathematics outcomes in schools with weak progression and high proportions of disadvantaged students
b. working with schools with low conversion rates from GCSE to A level Mathematics
c. delivering CPD for mathematics teachers who lack further Mathematics knowledge.

7. ADDITIONAL INFORMATION

Covid-19 response **[351 words]**

One week before the start of the Easter break the Department, as the rest of the university, moved to on-line communication, teaching and assessment for all undergraduates and taught postgraduates, who were advised to return home. PhD students are working from home.

All Department staff are working from home, with occasional visits to their offices, if essential for access to equipment or documentation. The Department has ensured that staff have the necessary technology to support their working from home.

Lectures are delivered in a variety of media – such as narrated PowerPoint, Panopto and Zoom video of actual lectures with written notes: all the material for all modules is posted on the university intranet. Examinations have been replaced by open book assessments to be completed in a twenty-four hour period. Undergraduates have been guaranteed an overall mark for the year not lower than they obtained in the first semester.

Staff meetings are held using Zoom and they are supplemented by a twice-weekly virtual coffee morning for general discussion and support. Participation in both events has been very high. Faculty IT support is readily available on a round the clock basis to facilitate remote working and ensure effective access to necessary online material for staff and students.

Working from home creates particular problems for those caring for small children, with a partner also working from home and in an apartment or a small house. The Department's supporting flexibility in the timing of student contact rather than insisting on rigid timetabling and professional interaction helps to alleviate this.

The Centre for Wellbeing has been proactive in its support for staff and students. Mental health, emotional well-being and physical health advice and a wide range of information are available on-line One-to-one drop in sessions are available for staff and students via Zoom.

It has become very clear that in normal times we are not exploiting technology to the full in our teaching and communications. The lessons we are now learning in remote working should allow us to design substantially more flexibility and agility in our working practices once the pandemic has passed.

"Are you sure about that answer?"

studying together

Action Plan

[note that in the reference (p.q.r) p is the section, q is the subsection and r is the sequence number of the action]

Ref.	Planned action/objective	Rationale	Key outputs and milestones	Timeframe	Responsibility	Success criteria/outcome
3.1	Create an Athena SWAN Implementation Team to monitor and coordinate the implementation of the action plan	Needed to implement action plan	ASIT formed and meets quarterly	First meeting in early September 2020	HoD	Creation of a strong, well-balanced, refreshed committee/group Implementation of 2020 action plan Preparation of successful 2024 Silver submission
3.2	Produce and distribute a regular Athena SWAN update newsletter	Keep staff and students informed about ASIT actions	Initially once per semester, review frequency at end 2020/2021	First edition Autumn 2020, second Spring 2021	DL *Involve one undergraduate member (to be selected)*	Clear visibility and awareness of Athena SWAN – driven actions. Measure in staff surveys
4.1.1	Review the effectiveness of our post-application activities, including open days and applicant days, for female applicants	Increase the proportion of women who accept our offers and who actually enrol	Thoroughgoing review of Open Day and Applicant Day processes and implementation of changes	Ready for implementation for academic year 2021/22	CD *Involve UGR admissions tutor and MathSoc [AP]*	Improve the rate of enrolments to offers by women by two percentage points - from an average of 13% to 15% over the period to 2023/24 Achieve positive results for short questionnaires on experience of open days and applicant days to be given to applicants from 2021/22
4.1.2	Redesign our website to include descriptions of our women mathematicians' careers and illustrating what women actually do while studying at Surrey, both in their	Make our image as attractive as possible to women applicants	Describe women mathematicians' careers and academic and non-academic activities at Surrey	Ready for implementation for academic year 2021/22	CD *Working with UGR admissions tutor, MathSoc [AP]and FEPS Marketing*	Positive results for short questionnaire about website for applicants from 2021/22

Ref.	Planned action/objective	Rationale	Key outputs and milestones	Timeframe	Responsibility	Success criteria/outcome
	Mathematics course and more broadly					
4.1.3	Determine the reasons applicants, particularly women, reject our offers, using survey methods	Understand how we are perceived by women applicants	undergraduate survey (2019) analysis Survey of rejectors Survey of all new women starters	Rejectors September 2021 new starters September 2021	CD *Involve UGR admissions tutor and MathSoc [AP]*	Positive results for short questionnaire about website for applicants from 2021/22

Ref	Planned action/objective	Rationale	Key outputs and milestones	Timeframe	Responsibility	Success criteria/outcome
4.1.4	Improve the appeal to women of all our admissions processes and marketing	Understand how women view ○ our admissions process ○ all aspects of our marketing processes Increase exposure to local schools to promote mathematics as a career for women.	Survey of all new women starters Review of all marketing materials Increased engagement with local schools	new starters September 2021 new material ready for 2022/23 recruiting 2021/20 recruiting season	CD *Involve UGR admissions tutor, MathSoc [AP] and FEPS Marketing*	Improve the percentage of applications from women by 4 percentage points – from an average of 35% to 39% over the period from 2020 to 2023/24
4.2.1	Increase the numbers of women PhD students Increase the number of PhD applications from UK women	Understand the reason for the decline in numbers and percentage of women doing PTY Understand why UK women's PhD applications are so low	Review recruiting processes and marketing methods. Focus groups/surveys of UGR and PGR students	From 2021	JG *Work with Director of postgraduate research with FEPS Marketing*	3 new women PhDs average each year over the period from 2020 to 2023/24 up from an average of 1 Increase the number of UK PhD applications each year from women from an average of 3 to 10 from 2020/21
4.2.2	Encourage more Surrey undergraduates to stay on for their PhD	understand our barriers to appealing to women to study for PhDs in Surrey.	Focus groups/surveys of UGR and PGR students effective tracking of our final year students' further degree destination	From 2021	JG *Work with Director of postgraduate research with FEPS Marketing*	recruit at least one Surrey undergraduate woman to study a PhD each year
4.3.1	Understand staff reasons for leaving	Reduce staff turnover	In depth exit interviews with HoD and HR and	From next staff departure	HoD	All leavers have exit interview from 2020

			formal review of outcome by Department management committee		*involve HR*	Reasons for leaving are investigated and reviewed

Ref	Planned action/objective	Rationale	Key outputs and milestones	Timeframe	Responsibility	Success criteria/outcome
5.1.1	Increase the numbers of women applying for academic jobs advertised by the Department	Find out whether academic recruiting material is attractive to women candidates	• Survey women all applicants • Review all marketing material with existing women staff members	Survey from 2020 recruitment activity New material by early 2021	HoD *Involve HR and FEPS Marketing*	Increase the percentage of applications from women for lecturer and for post doc jobs from 18% to 35% over the period from 2020 to 2023/24
5.1.2	Ensure that women applicants have the best prospects of success with their applications	Effective recruitment processes	Recruitment checklist for recruiters, completed and collected	Implement by 2021/22	HoD) FEPS HR	The ratio of appointments to applications for both men and women candidates is the same by 2023/24
5.1.3	New staff settle in quickly and effectively	Effective induction process, all new staff attend induction	Monitor uptake of induction	Apply from 2020 recruitment	HoD	All newly recruited staff follow the induction process Positive impact in culture surveys
5.1.4	Formalise and broaden staff development	Effective staff development processes Well thought through objective setting including focus on communality and collegiality	Written description of all Departmental staff development processes clearly communicated to all staff	Apply from 2020	JFR *Involve FEPS HR*	Every staff member has a written development plan arising out of their appraisal from 2020 Every staff member has at least one Athena Swan related personal objective Every staff member has at least one specific personal development action or course to be attended following their appraisal from 2020 Senior staff have one facilitative, community objective by 2021

Ref	Planned action/objective	Rationale	Key outputs and milestones	Timeframe	Responsibility	Success criteria/outcome
5.1.5	Maximise women's promotion prospects	Formal promotion mentoring and championing process for all staff	The appraiser notifies the HoD that they consider an appraisee to be a candidate for promotion. The HoD nominates a senior member of staff to act as mentor and champion encouraging and advising the individual, helping them to prepare their case and acting as their advocate.	Apply from 2020 promotion round	HoD	Women's success in promotion is at least as high as men from 2020 over the period to 2023/24
5.2.1	Ensure that appraisers focus effectively on and give credit for administrative responsibilities in appraisals Ensure that all appraisers are adequately trained and have a checklist of topics that must be covered during the appraisal meeting, including promotion prospects	Properly recognise all responsibilities in appraisal including administration	All appraisers are trained – departmental session to be organised HoD briefs all appraisers for 2020 appraisal round Prepare checklist of topics that must be covered during the appraisal meeting, including promotion prospects	By 2020 appraisal round	DB *Involve FEPS HR*	Improvement in positivity of attitudes towards appraisal in next department staff survey from 50% to 75%
5.2.2	Appraisals are effective for appraisees	Appraisees are trained and organised Staff know that they are fairly and comprehensively appraised and are empowered to be proactive in appraisals	Appraisees fully document their job roles and fully describe their future plans on the appraisal forms All appraisees are trained Moderators of the appraisals comment fully on the forms	By 2020 appraisal round	HoD with JFR	Improvement in positivity of attitudes towards appraisal in next department staff survey from 50% to 75%
5.2.3	Appraisals of job performance are seen to be fair			By 2020 appraisal round	HoD with JFR	Improvement in positivity of all staff attitudes towards appraisal

						in next department staff survey from 50% to 75%
5.2.4	Make a discussion about career progression a specific item in appraisal meetings	Staff have the opportunity to discuss their future and understand what they need to do to progress – both academically and managerially	Monitoring of appraisals by HoD and Dean (appropriate to level of appraisee) Monitoring of appraisals by faculty HR to ensure quality and follow up Career discussion in all appraisals	By 2020 appraisal round	DB	Improvement in positivity of Women's attitude to career development policies appraisal in next department staff survey from 50% to 75%

5.2.5 Encourage our ablest women graduates to do a PhD, preferably at Surrey	Identify high performing undergraduate women at an early stage and ensure they are exposed to information about PhD opportunities and career prospects especially from their personal tutors, women post-docs and women PhD students Increase the number of women studying MMath – both from year 1 recruitment and actively encouraging high performers to switch from BSc Instigate a regular discussion between the Director of Postgraduate Studies and individual very high performing students from the first year onwards Run "exit interviews" with students who choose to study further degrees at other institutions	Identify and engage potential PhD students early in their university careers Understand Surrey undergraduate women's reasons for not doing a PhD at Surrey Improve the attractiveness of a PhD at Surrey for women	Recruit more women on to the MMath program Top potential women identified in year 1 Direct contact between top women and Director of postgraduate studies and women PhDs Role of personal tutors in identifying talent to be explained and promoted Encourage top women to switch from BSc to MMath Internal communication about the benefits and availability of a PhD Collect statistics on the destination of final year students Focus groups (PhDs and UGRs) "exit interviews" with students going to other institutions to study for PhD	From 2021/22 2021 2021 2020 2020 2020 2021 2021 2021	ASIT (JG) DLT Director of postgraduate studies Personal tutors and Senior Tutor	At least one Surrey graduate woman PhD recruited each year compared to none at present over the period from 2020 to 2023/24

Ref	Planned action/objective	Rationale	Key outputs and milestones	Timeframe	Responsibility	Success criteria/outcome
5.2.6	Make the PhD environment less male dominated	Institute mixing opportunities within university	Proposal made for activity	2021	ASIT (JL)	Proposal and implemented by 2021
5.3.1	Continuity of research during maternity leave	Deal with drop in research output associated with maternity	wherever possible assign a postdoc to women lecturers going on maternity leave	From next opportunity	HoD	Next lecturer to take maternity leave assigned a post doc
5.4.1	Equality and unconscious bias training	Ensure that all staff understand the issues and apply best practice	Discussion item at staff meeting Staff culture survey published and discussed	• October 2020	ASUT (JP)	All staff Participate in the University's face-to-face Unconscious Bias Training' by end 2020
5.4.2	Make gender equality a cornerstone of the way the Mathematics Department operates.	Create a supportive and welcoming working environment for women and men	Work with HR to implement a Departmental process to monitor and ensure gender equality in HR policies related to equality, dignity at work, bullying, harassment, grievance and disciplinary processes.	By 2021/22	ASIT (JFR) FEPS HR	More positive reposes from women staff in next staff survey
5.4.3	Conference fund for those with caring responsibilities	Ensure that staff with caring responsibilities can play as full international role as practically possible	Publicise Vice Chancellor's fund	All staff are aware of the existence of the fund in 2020	ASIT (JL)	All staff with caring responsibilities are reminded of the fund when they apply for conference funding.

						Promulgate knowledge about how staff with caring responsibilities are dealing with this problem
5.4.4	Review parking rules for those with caring responsibilities	Maximise the support that can be given to those with caring responsibilities	Consider giving staff with parking permits and caring responsibilities the right to park every day in the university.	Review in the context of the 2020 parking policy	ASIT (JP)	Representation made to the university parking authorities in 2020 depending on outturn of current review
5.4.5	Increase outreach activities	Maximise the promotion of mathematics to women in particular in local schools and colleges	Develop and implement a process to systematically capture staff and student participation in outreach activities. Make activity visible within department and make available for workload and appraisals. Monitor gender ratio to ensure appropriate female representation vs workload Analyse addresses of undergraduate applicants Active involvement in Mathematics College	Starting in 2020	HoD	Increase in undergraduate applications from qualified women from the local area by 20% from present levels by 2023/23 Increase in applications from less privileged groups by 20% from present levels by 2023/23