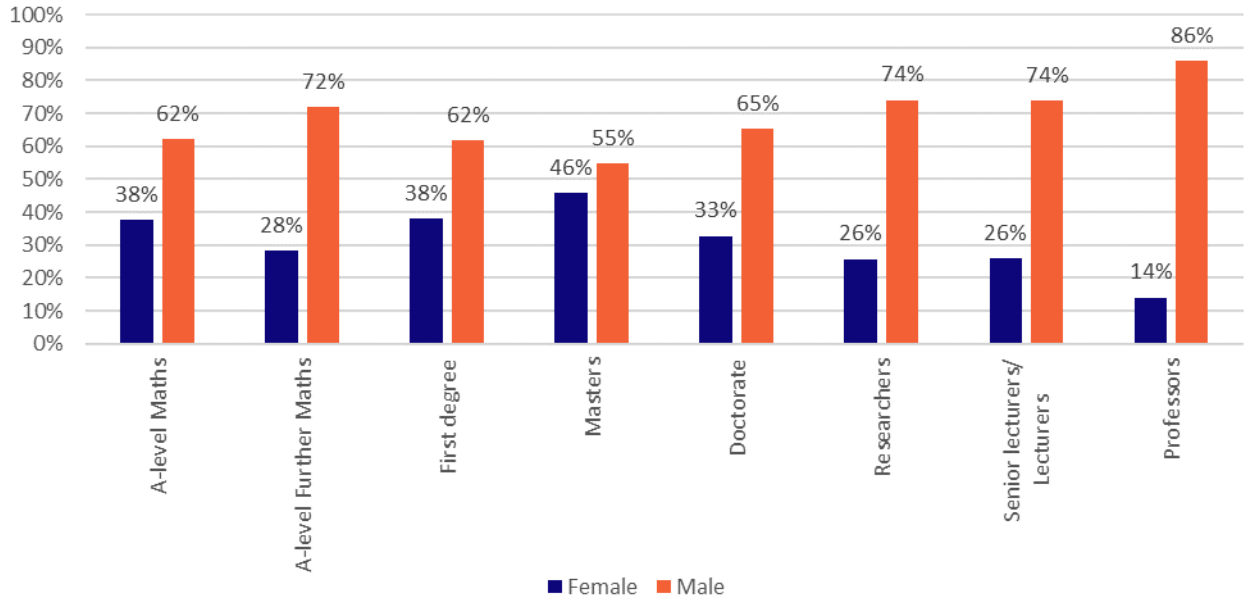
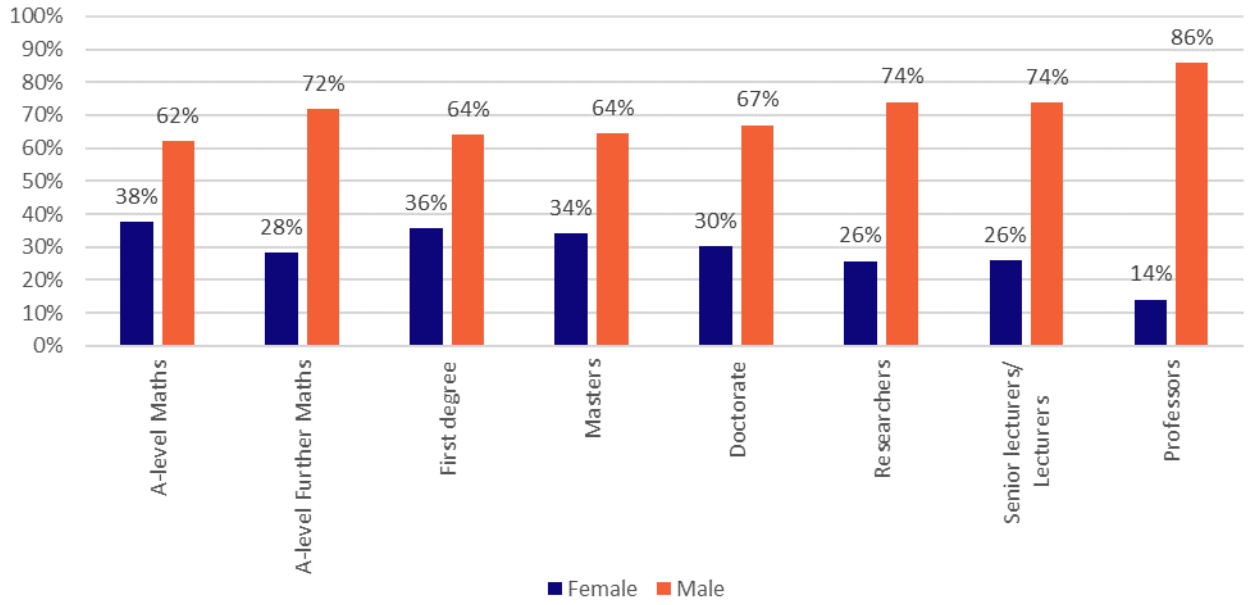
Gender in Mathematics – quantitative analysis

Figure 1: The mathematical sciences pipeline by gender, 2021/22



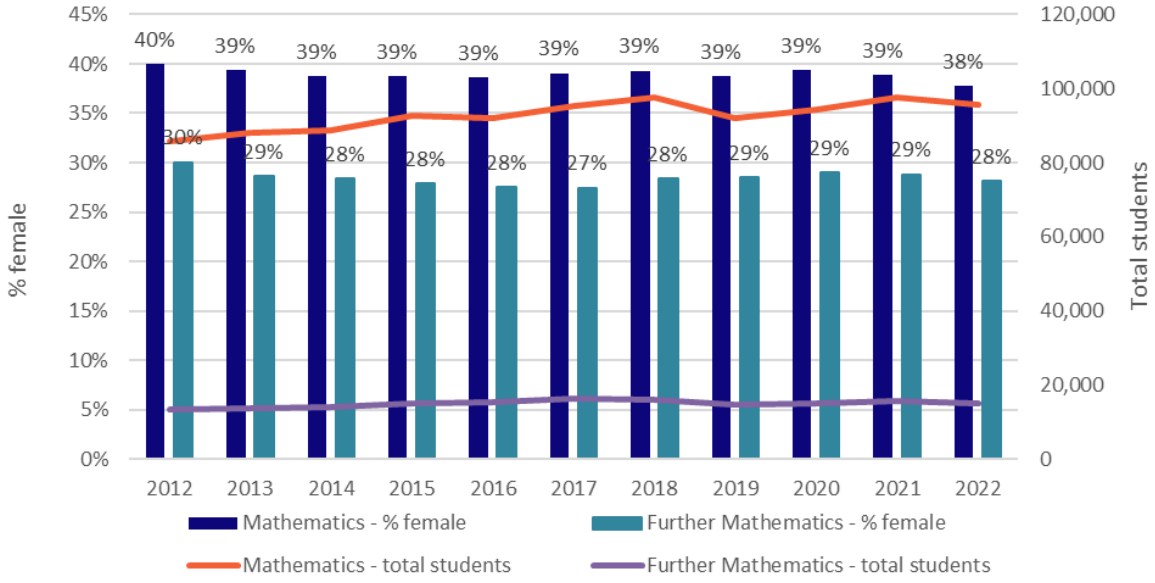
Source: JCQ / HESA Student Record / HESA Staff Record. A-Level data relate to candidates in 2022. First degree, Masters and Doctorate data relate to mathematical sciences graduates in 2021/22. Researchers, senior lecturers/lecturers and Professors data relate to staff in mathematics cost centres in 2021/22.

Figure 2: UK-domiciled mathematical sciences graduates, researchers and academics who are UK nationals, by gender, 2021/22



Source: HESA Student Record / HESA Staff Record. A-Level data relate to candidates in 2022. First degree, Masters and Doctorate data relate to UK-domiciled mathematical sciences graduates in 2021/22. Researchers, senior lecturers/lecturers and Professors data relate to staff who are UK nationals in the mathematics cost centre in 2021/22.

Figure 3: A Level Mathematics and Further Mathematics candidates, 2011/12–2021/22



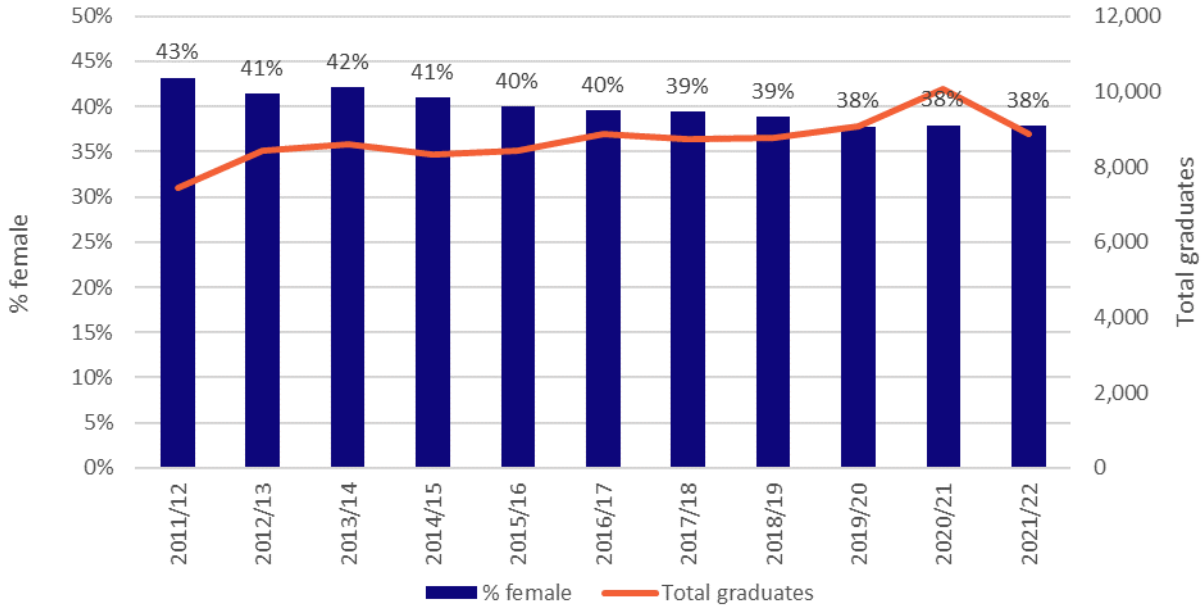
Source: JCQ.

Table 1: A Level Mathematics and Further Mathematics candidates, 2011/12–2021/22

Level	Gender	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Mathematics	Female	34,301	34,625	34,374	35,937	35,628	37,212	38,357	35,605	37,147	38,016	36,083
	Male	51,413	53,435	54,442	56,774	56,535	58,032	59,270	56,290	57,117	59,674	59,552
Further Mathematics	Female	3,972	3,951	3,975	4,177	4,203	4,441	4,580	4,147	4,350	4,538	4,262
	Male	9,251	9,870	10,053	10,816	11,054	11,731	11,577	10,380	10,629	11,210	10,884

Source: JCQ.

Figure 4: First degree mathematical sciences graduates, 2011/12–2021/22



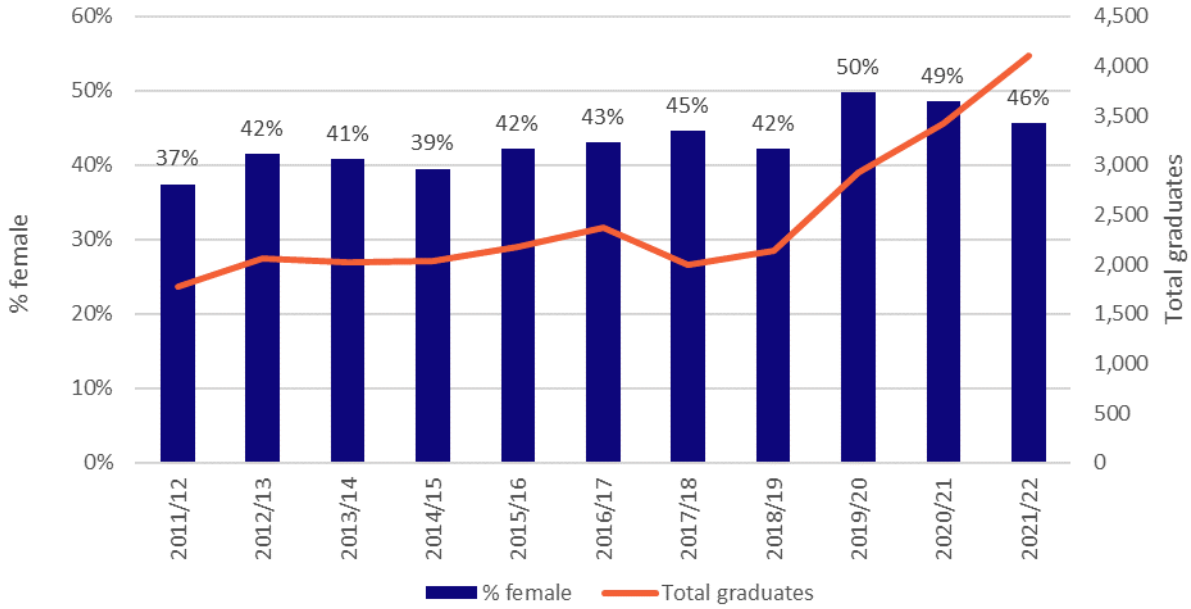
Source: HESA Student Record

Table 2: First degree mathematical sciences graduates, 2011/12–2021/22

Gender	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Female	3,215	3,490	3,630	3,410	3,365	3,510	3,445	3,410	3,435	3,820	3,365
Male	4,230	4,940	4,975	4,900	5,055	5,365	5,295	5,365	5,640	6,225	5,495

Source: HESA Student Record

Figure 5: Master's degree mathematical sciences graduates, 2011/12–2021/22



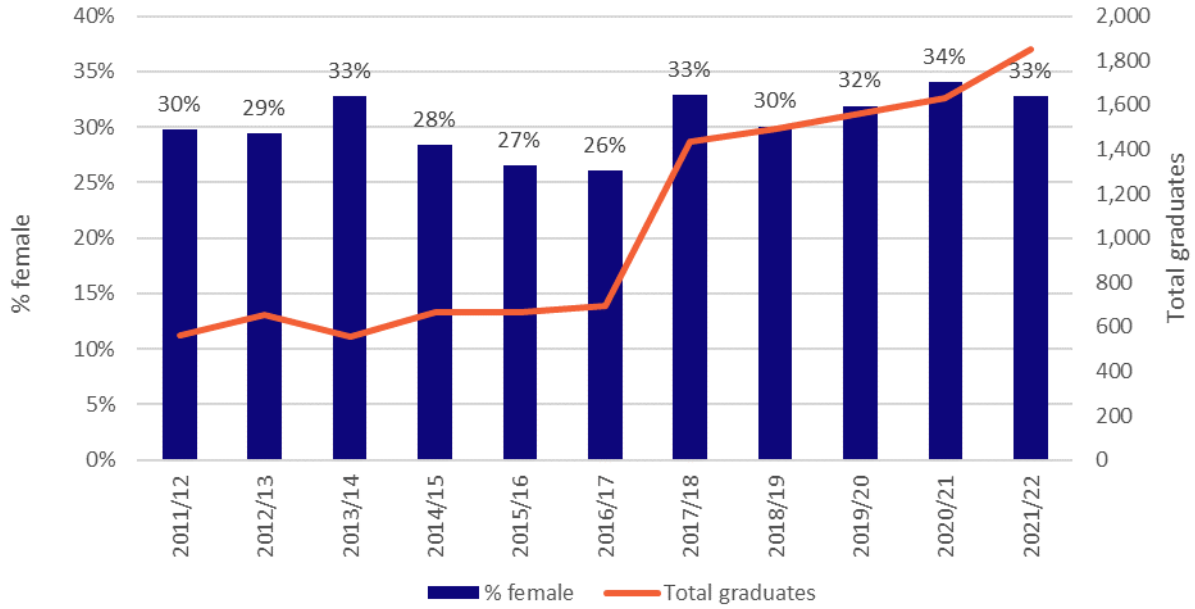
Source: HESA Student Record

Table 3: Master's degree mathematical sciences graduates, 2011/12–2021/22

Gender	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Female	665	855	820	805	920	1,020	895	905	1,455	1,660	1,870
Male	1,115	1,205	1,190	1,230	1,255	1,350	1,125	1,235	1,500	1,790	2,250

Source: HESA Student Record

Figure 6: Doctorate mathematical sciences graduates, 2011/12–2021/22



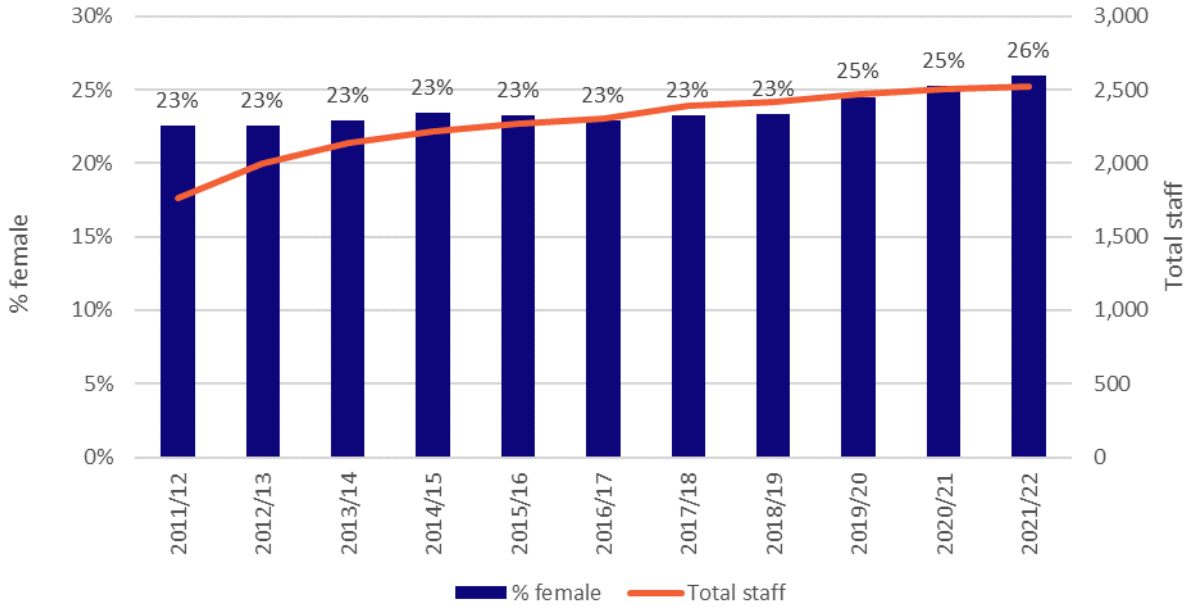
Source: HESA Student Record

Table 4: Doctorate mathematical sciences graduates, 2011/12–2021/22

Gender	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Female	165	195	180	190	175	180	470	450	495	555	605
Male	390	460	375	475	490	515	940	1,030	1,020	1,025	1,205

Source: HESA Student Record

Figure 7: Lecturers and senior lecturers in the Mathematics cost centre, 2011/12–2021/22



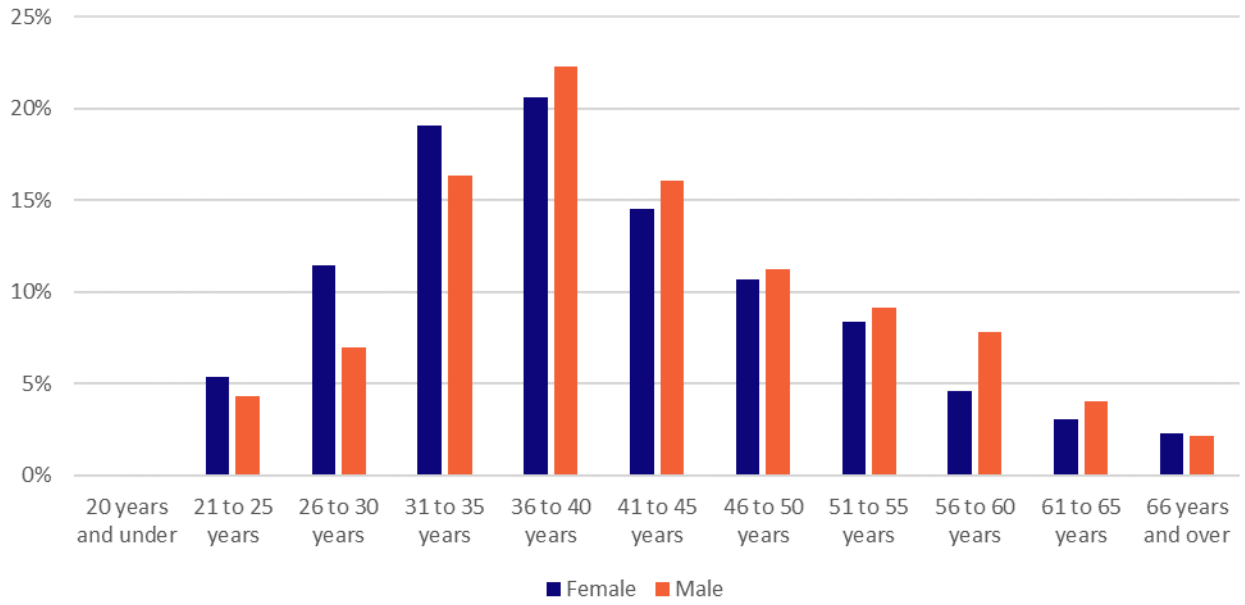
Source: HESA Staff Record

Table 5: Lecturers and senior lecturers in the Mathematics cost centre, 2011/12–2021/22

Gender	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Female	395	450	490	520	525	525	555	560	605	630	655
Male	1,365	1,545	1,645	1,700	1,740	1,770	1,835	1,850	1,865	1,865	1,865

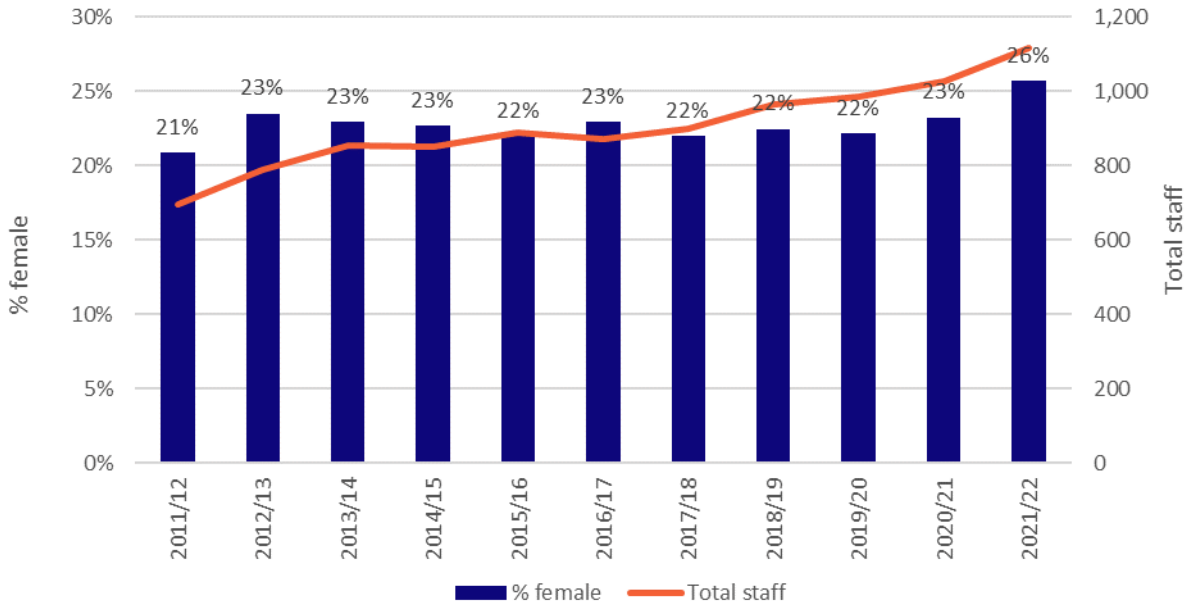
Source: HESA Staff Record

Figure 8: Age profile of lecturers and senior lecturers in the Mathematics cost centre by gender, 2021/22



Source: HESA Staff Record

Figure 9: Researchers in the Mathematics cost centre, 2011/12–2021/22



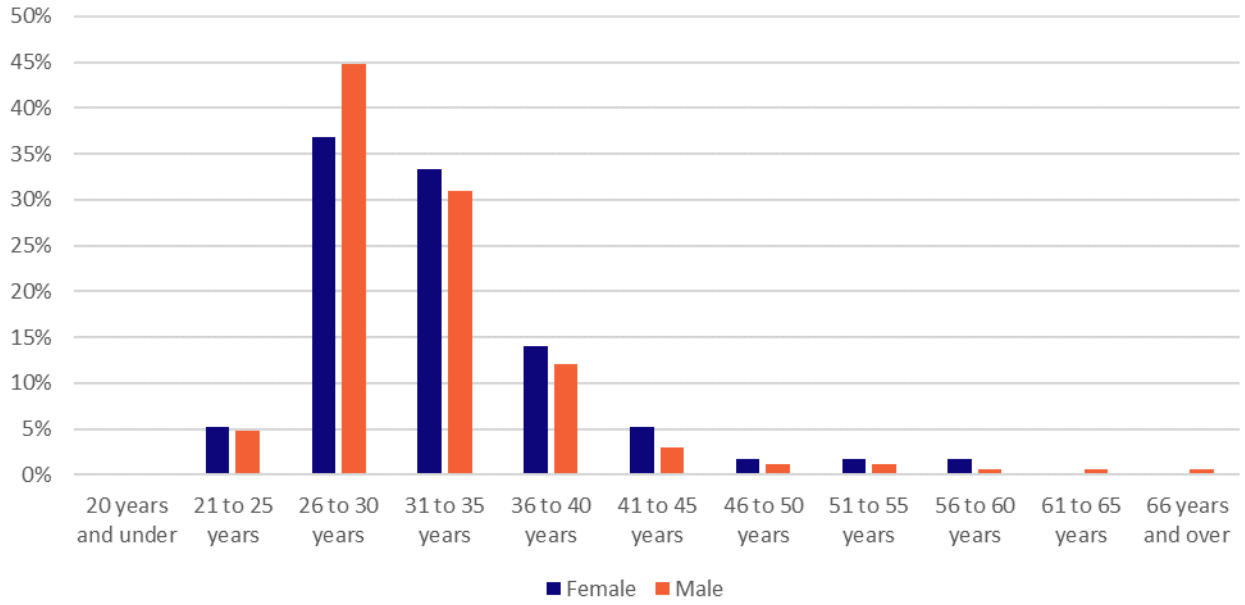
Source: HESA Staff Record

Table 6: Researchers in the Mathematics cost centre, 2011/12–2021/22

Gender	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Female	145	185	195	195	195	200	200	215	220	240	285
Male	550	605	660	660	695	670	705	750	770	785	825

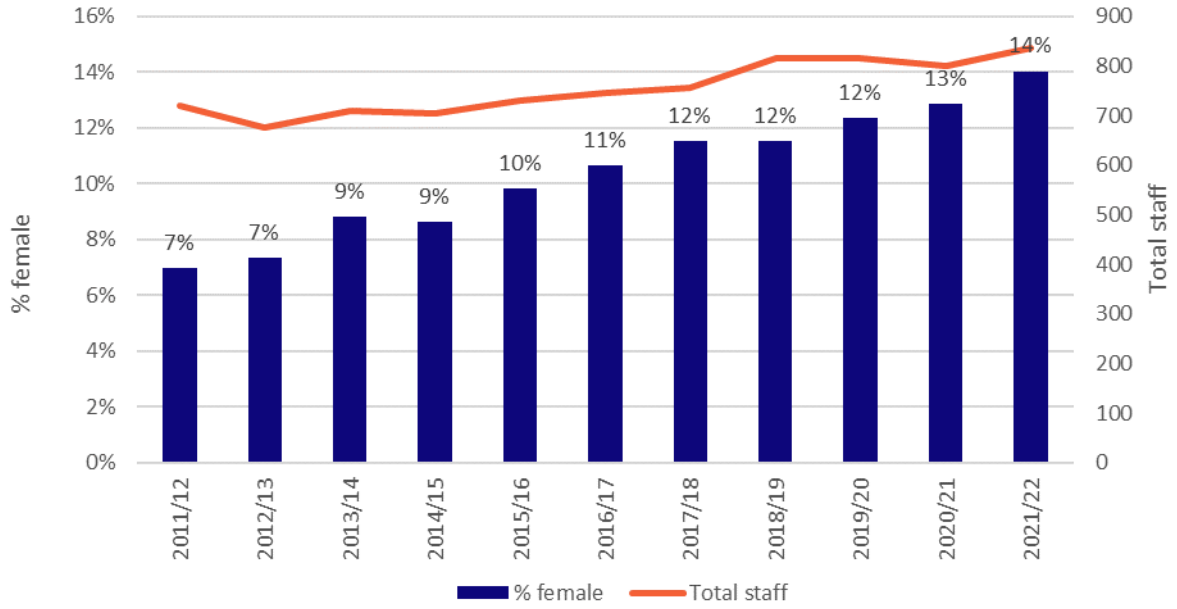
Source: HESA Staff Record

Figure 10: Age profile of researchers in the Mathematics cost centre by gender, 2021/22



Source: HESA Staff Record

Figure 11: Professors in the Mathematics cost centre, 2011/12–2021/22



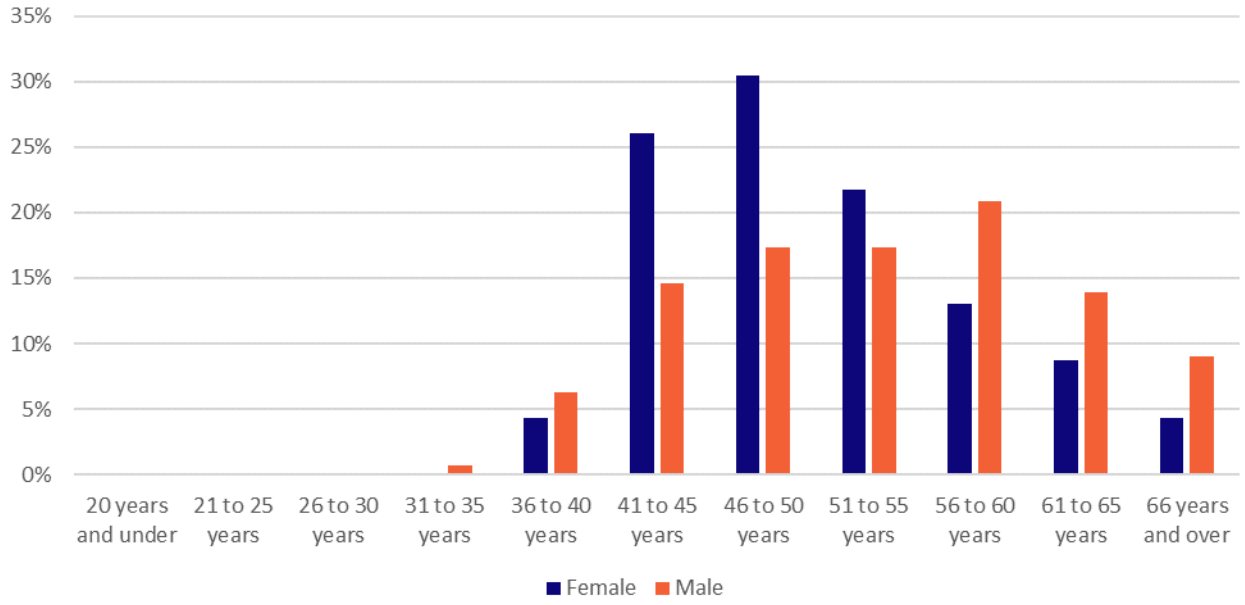
Source: HESA Staff Record

Table 7: Professors in the Mathematics cost centre, 2011/12–2021/22

Gender	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Female	50	50	60	60	70	80	85	90	100	105	115
Male	670	625	645	645	660	665	670	680	710	690	720

Source: HESA Staff Record

Figure 12: Age profile of Professors in the Mathematics cost centre by gender, 2021/22



Source: HESA Staff Record

Benchmarking data – women in mathematics by quartile

The tables below are based on data for individual institutions. Data suppression is applied in line with HESA rules (see the Appendix). This means the quartiles shown do not include the smallest departments with fewer than 23 students or staff. In these departments, the proportion of graduates and/or staff who are female may be as low as 0% or as high as 100%.

Table 8: Proportion of first degree Mathematical Sciences graduates who are female, by quartile

Quartile	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Minimum	20.3%	19.4%	19.5%	18.3%	17.6%	16.7%	14.6%	13.8%	15.0%	15.6%	15.2%	15.5%	17.0%	17.4%
1st quartile	37.9%	38.5%	38.4%	38.6%	37.3%	36.0%	35.7%	34.8%	33.7%	34.3%	33.3%	33.3%	33.3%	31.9%
Median	40.9%	42.6%	42.1%	41.8%	40.9%	40.8%	39.1%	38.3%	39.4%	39.0%	38.3%	37.4%	37.2%	36.7%
3rd quartile	45.7%	46.8%	46.6%	45.0%	44.8%	43.6%	44.6%	42.8%	43.0%	43.8%	43.3%	41.5%	41.3%	41.4%
Maximum	90.6%	90.0%	89.6%	81.7%	83.5%	82.5%	76.4%	76.4%	78.0%	76.0%	76.5%	75.3%	74.7%	73.9%

Source: HESA Student Record

Table 9: Proportion of Masters' degree Mathematical Sciences graduates who are female, by quartile

Quartile	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Minimum	12.9%	18.4%	12.5%	14.7%	17.4%	17.4%	18.9%	13.1%	15.6%	4.2%	21.0%	17.7%	17.4%	8.3%
1st quartile	29.4%	29.7%	30.8%	33.4%	29.1%	29.4%	33.9%	33.0%	37.2%	33.3%	35.6%	32.5%	31.7%	31.9%
Median	36.9%	39.4%	40.7%	38.5%	37.4%	36.3%	44.0%	40.8%	43.3%	40.3%	41.7%	41.4%	38.3%	39.6%
3rd quartile	45.8%	45.0%	45.5%	47.1%	42.8%	41.8%	48.5%	46.8%	47.2%	46.8%	50.1%	51.6%	47.1%	46.4%
Maximum	52.6%	51.5%	71.3%	76.8%	70.8%	62.6%	58.5%	60.0%	59.1%	58.7%	59.3%	65.4%	58.0%	59.2%

Source: HESA Student Record

Table 10: Proportion of Doctorate Mathematical Sciences graduates who are female, by quartile

Quartile	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Minimum	16.2%	16.1%	15.3%	17.4%	13.8%	15.9%	16.7%	11.5%	14.6%	16.0%	15.4%	14.7%	14.8%	17.1%
1st quartile	24.7%	25.8%	26.7%	26.4%	23.0%	22.2%	22.6%	22.9%	21.8%	21.6%	22.2%	23.6%	23.9%	25.7%
Median	31.1%	33.2%	33.3%	29.3%	27.4%	27.8%	26.1%	28.8%	30.7%	28.3%	29.0%	28.2%	30.1%	30.7%
3rd quartile	35.6%	38.0%	38.6%	37.1%	33.1%	34.0%	34.8%	34.8%	34.5%	33.8%	37.0%	36.0%	37.5%	35.1%
Maximum	56.2%	54.7%	46.9%	46.5%	41.4%	46.2%	48.0%	43.9%	47.7%	45.4%	46.6%	45.9%	48.1%	48.6%

Source: HESA Student Record

Due to relatively small student numbers in many institutions, the proportion of females among other postgraduates and other undergraduates is not shown.

Table 11: Proportion of lecturers/senior lecturers in the Mathematics cost centre who are female, by quartile

Quartile	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	20017/8	2018/19	2019/20	2020/21	2021/22
Minimum	5.4%	4.3%	0%	3.6%	2.8%	3.2%	4.7%	4.9%	7.1%	8.1%	8.4%	8.5%	8.4%	10.2%
1st quartile	9.5%	9.9%	9.9%	11.0%	10.2%	11.0%	11.7%	13.7%	14.0%	14.8%	14.5%	16.3%	15.9%	15.7%
Median	14.7%	16.2%	18.4%	16.0%	17.6%	19.4%	17.9%	18.2%	18.8%	19.4%	18.9%	18.9%	20.3%	20.2%
3rd quartile	20.7%	23.5%	24.3%	23.2%	26.0%	24.5%	22.8%	24.0%	24.3%	25.5%	24.6%	23.6%	25.2%	25.7%
Maximum	39.0%	39.0%	39.5%	43.9%	45.6%	43.7%	40.6%	47.5%	48.4%	51.0%	53.6%	52.1%	54.2%	51.7%

Source: HESA Staff Record

Due to relatively small staff numbers in many institutions, the proportion of females among professors and research-only staff is not shown.

Appendix: Quantitative analysis method

Quantitative analysis is based on the following data sources:

- Joint Council for Qualifications A Level Results Tables (https://www.jcq.org.uk/examination-results/)
- Higher Education Statistics Agency Student Record (https://www.hesa.ac.uk/collection/c21051)
- Higher Education Statistics Agency Staff Record (https://www.hesa.ac.uk/collection/c21025)

A Level students

Data count individual candidates sitting A Level examinations in each year.

HE graduates

Data count individual graduates in each year from the mathematical sciences subject area, by level of study.

HE staff

Data count the full time equivalent (FTE) number of academic staff in the mathematics cost centre, by contract level and academic employment function.

HESA requires Higher Education Institutions (HEIs) to map their constituent departments to cost centres as a way of distinguishing between different activities. Departments can be apportioned across a number of cost centres, which can lead to anomalies: in some cases, HEIs report mathematical sciences staff even though there is no recognised mathematical sciences department; in other cases staff numbers may not match those in a specific mathematical sciences department as staff from other departments may be counted as belonging to the mathematics cost centre, and/or staff working in a mathematical sciences department may be assigned to another cost centre.

Staff full-time equivalent numbers are defined by contract(s) of employment and are apportioned to each activity's cost centre. FTE indicates the proportion of a full-time year being undertaken over the course of the reporting period 1 August to 31 July. The FTE is therefore counted using a population of staff who were active during the reporting period, not just on a given snapshot date.

Contract level and academic employment function combine to identify the different types of staff described in this report. From 2012/13, staff with the contract level of 'F1 Professor' constitute the 'Professors' category in the analysis; prior to 2011/12, a separate Professor marker was available. The two are not directly comparable. Other staff (i.e. those not identified as Professors) with an academic employment function of either 'teaching' or 'teaching and research' are counted as 'senior lecturers/lecturers', while those with an academic employment function of 'research only' are counted as 'researchers'.

Mathematical sciences subjects

Mathematical sciences subjects are defined using the Joint Academic Coding System (version 3.0) in the years to 2015/16, and defined using the Common Aggregation Hierarchy (version 1.3.4) in subsequent years.

- Joint Academic Coding System: https://www.hesa.ac.uk/support/documentation/jacs
- Common Aggregation Hierarchy: https://www.hesa.ac.uk/support/documentation/hecos

Data rounding and suppression in HESA data

Counts of student instances (and apportioned subject-level data) and staff are rounded to the nearest multiple of 5. Halves are always rounded upwards. For example 0, 1, 2 are rounded to 0, 3 is represented as 5, 22 is represented as 20, 3286 is represented as 3285 while 0, 20, 55, 3510 remain unchanged. This rounding strategy is also applied to total figures, so the sum of numbers in each row or column may not match the total shown.

Percentages are calculated from un-rounded raw numbers.

Averages based on 22.5 or fewer individuals are suppressed.