

Report on 2015–2016 Academic Recruitment, Hiring, and Attrition

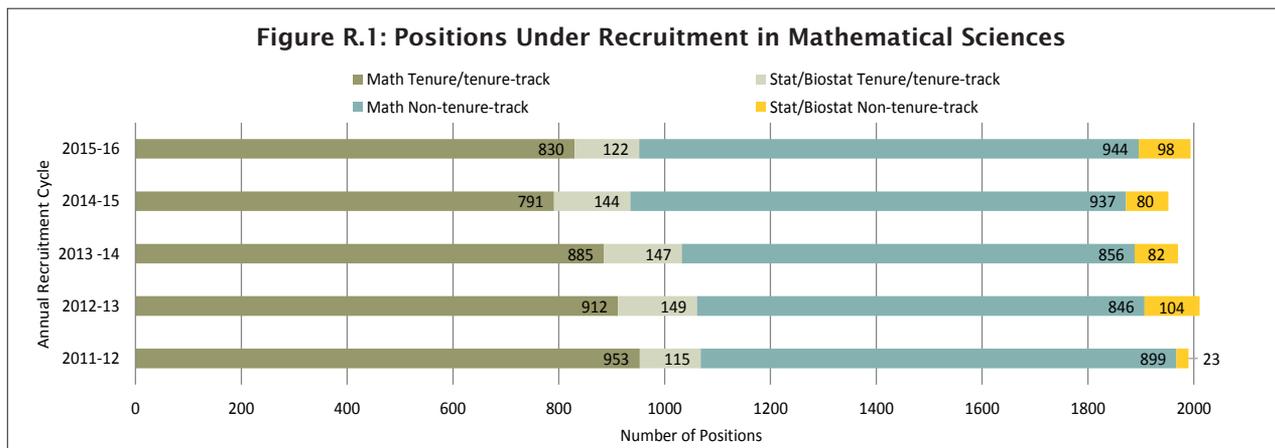
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Each year in academic mathematical sciences departments around the United States, there are searches for new full-time faculty members, and a subset of those positions are filled. The hiring infuses into the profession a new cohort of mathematical scientists actively engaged in research, teaching, and service. At the same time, others retire, take jobs outside of academe, or die, and this process removes a segment of the population of academic mathematical scientists. This report provides a snapshot of that process to aid in understanding the current status of indicators such as: hiring rates; and distributions of gender, position type, and prior experience. Along with current data, the report provides historical context to aid the reader in discerning trends and patterns. For further details, including all tables generated to prepare this report, please see www.ams.org/annual-survey.

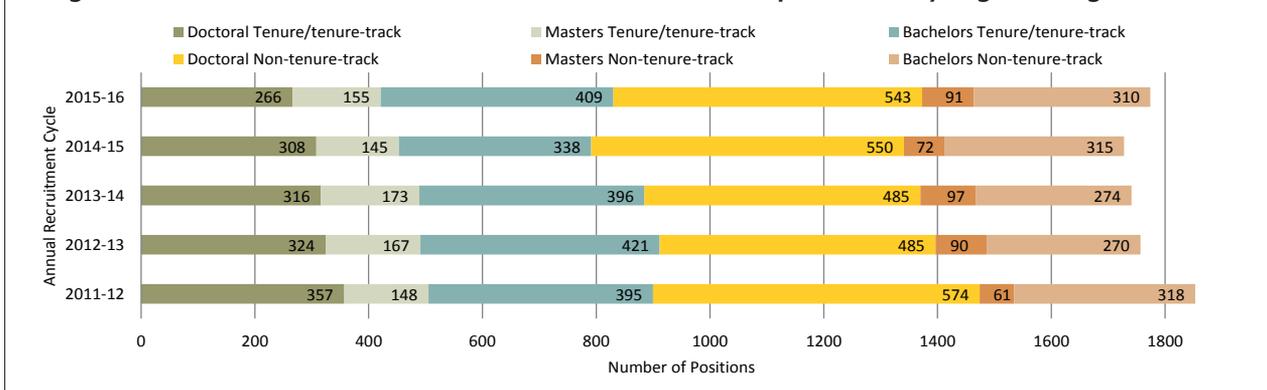
A total of 958 mathematical sciences departments participated in this survey. This report is based on the completed questionnaires received from a subset of these departments, specifically the 574 departments that reported they were recruiting to fill doctoral tenure-track and non-tenure-track positions during the academic year 2015–2016 for employment beginning in the fall of 2016. An additional 50 departments (8 Math Doctoral, 8 Stat/Biostat, 8 Masters, and 26 Bachelors) reported conducting recruitment and hiring during this time but did not return a completed questionnaire and were not included in the analysis.

Overview of Recruitment

This year's data show an overall increase of 2% in the number of positions under recruitment. The Masters and Bachelors Groups were the biggest contributors to the increase, up 11%—offset by the decline reported by the Doctoral Math (6%) and Stat/Biostat (2%) Groups. The Doctoral Math Group reported increases in only the number of open



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Figure R.2: Positions Under Recruitment in Mathematics Departments by Highest Degree Offered

temporary non-tenure-track appointments, while the Stat/Biostat group reported an increase in the overall number of open non-tenure-track positions.

During the 2015–16 academic year, the estimated number of full-time positions under recruitment in mathematical sciences departments was 1,994. This figure breaks down as follows: 830 tenure-track mathematics positions, 944 non-tenure-track mathematics positions, 122 tenure-track statistics or biostatistics positions, and 98 non-tenure-track statistics or biostatistics positions. See Figure R.1 for comparisons. In the period from 2011 to 2016, the overall percentage of positions under recruitment that were tenure-track ranged from 48% to 53%, with the highest percentages in 2011–12 and 2012–13 of this range of time.

- In the 2015–2016 cycle:
 - The estimated number of positions under recruitment was 1,994; this figure represents a slight increase from last year's estimate of 1,952 positions.
 - Females account for 32% of those hired; this is up from 29% for 2014–2015.
 - Since 2011–12 recruitment has decreased 4% in Math and increased 59% in Stat/Biostat.
- Tenure-track positions under recruitment:
 - Open tenure-track positions increased 2% overall from last year.
 - 48% (952) of all positions under recruitment were tenure-track. Of these 952 positions, 88% (833) were open to new PhDs, and 21% (198) were at the rank of associate/full professor.
- Non-tenure-track positions under recruitment:
 - Non-tenure-track positions increased 2% overall, up to 1,042 from 1,017 the previous year.
 - 52% (1,042) of all positions under recruitment were non-tenure-track.

In Math, the number of positions under recruitment (1,774) in 2015–16 is comparable with that for 2014–2015 (1,728) and is up after dropping for three consecutive years. See Figure R.2. Over the period since 2005–06 recruitment in Doctoral departments has increased by 16%, in Masters departments decreased by 30%, and in Bachelors departments increased by 4%. In the same ten-year period, the net number of mathematics positions under recruitment has decreased by 4%.

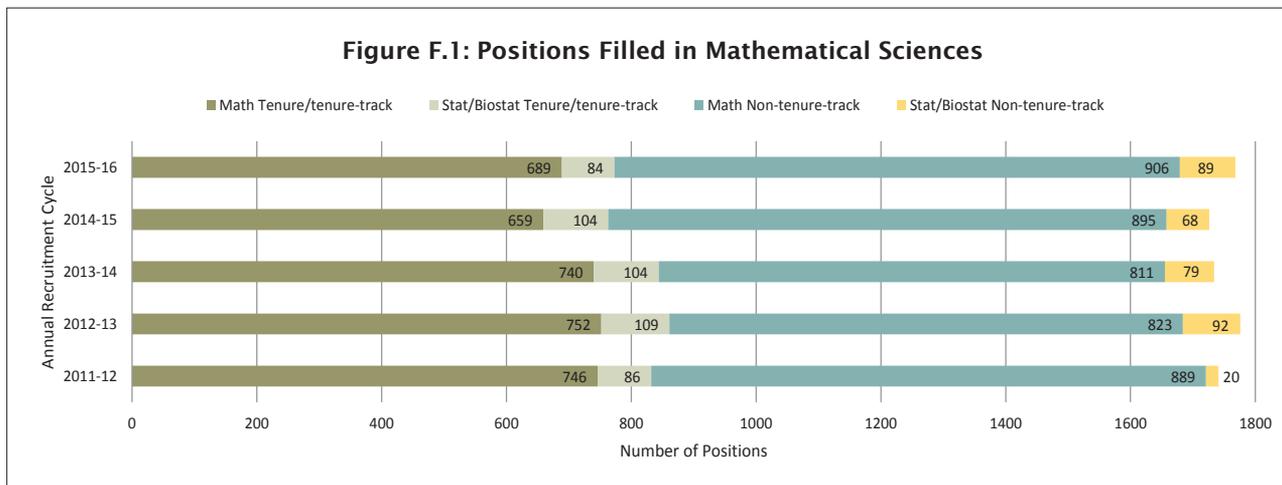
In Stat/Biostat, the number of positions under recruitment was 220, a 2% decrease from 2014–15. The trend over the past few years has been downward, although reviewers should keep in mind that numbers are small.

Positions Filled

A total of 1,768 full-time positions in Mathematical Sciences were filled during the 2015–16 academic cycle, 1,595 from Mathematics Departments and 173 from Statistics or Biostatistics. Figure F.1 gives a breakdown. The total for Math is down 2% from the 2011–12 cycle. For Stat/Biostat, the number of filled positions is up 63% from 2011–12. One interesting feature in these data is that the success rate for filling mathematical sciences tenure-track positions over the period 2009–2016 is about 81%, whereas the success rate for non-tenure-track is about 96%.

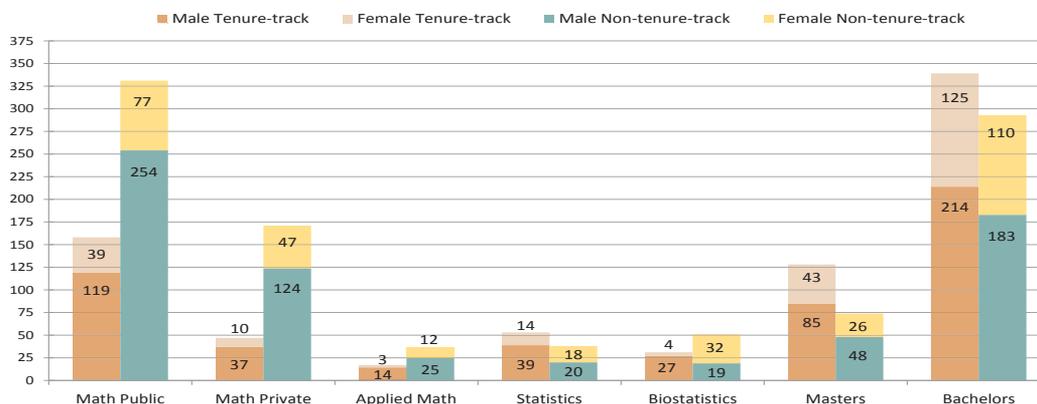
Figure F.2 gives a breakdown on hiring by gender and department grouping. Percentages generally are obtained by comparison with Figure R.1. Here are further highlights and comparisons from the data:

ANNUAL SURVEY



- Overall features of hires in mathematical sciences:
 - Females hold 32% (560) of positions filled.
 - Of all hires, 44% (773) were tenure-track; females constitute 31% (238) of these.
 - Of all hires, 56% (995) were non-tenure track; females constitute 32% (322) of these.
- Math and Stat/Biostat breakdown:
 - In Math overall, 1,595 of 1,774 positions (90%) were filled; 31% of Math positions were filled by females.
 - In Stat/Biostat, 173 of 220 positions (79%) were filled; 39% of Stat/Biostat positions were filled by females.
- Tenure-track hires in mathematical sciences:
 - Of the tenure-track positions under recruitment, 81% (773) were filled.
 - Of tenure-track positions filled, 75% (580) were filled by doctoral faculty (excluding new PhDs). Of these positions filled by doctoral faculty, 28% went to females. In comparison with 2014–2015, all groups except Public Small, Applied, Masters, and Bachelors reported decreases in tenure-track hires of doctoral faculty.
 - Of the 25% of tenure-track hires who were new PhDs, 40% were female.
 - Of tenure-track hires, 32% (244) had a non-tenure-track position in 2014–2015; of these individuals, 20% were female.
 - Of tenure-track hires, 26% (202) held a postdoc last year, and 34% of these postdocs were female.
- Non-tenure-track hires in mathematical sciences:
 - Of the 1,042 non-tenure-track positions under recruitment, 95% were filled. In comparison to 2014–2015, all groups except Math Public Large, Math Public Small, and Statistics reported increased hiring of non-tenure-track faculty.
 - Of non-tenure-track hires, 44% (454) were filled by doctoral faculty (excluding new PhDs); 28% of these doctoral faculty hires were female.

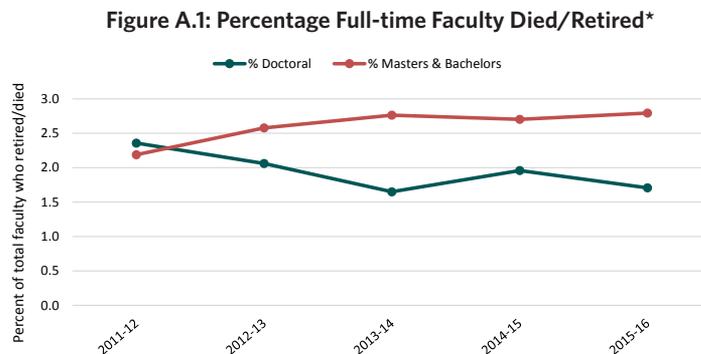
Figure F.2: Gender of Tenure-track and Non-tenure-track Hires by Department Grouping



- Of non-tenure-track hires, 43% (428) were filled by new PhDs; 31% of these new PhD hires were female.
- Of non-tenure-track hires, 11% (113) were filled by non-doctoral faculty; 57% of these non-doctoral hires were female. Over half of these non-doctoral, non-tenure-track hires were in Bachelors departments.
- Of non-tenure-track hires, 25% (253) are temporary (one-year); 28% of these temporary hires are female. About half of all temporary hires were in Bachelors departments.
- Of non-tenure-track hires, 36% (362) were in postdoctoral positions; 23% of these postdocs were female.
- Female hires (see Figure F.2):
 - Of all hires, 32% (560) were female; of these women, Bachelors departments hired 42%, and Doctoral Math departments hired 34%.
 - In the Doctoral Math Group, female hires increased 6% over the past year to 188.
 - All groups except Math Public Large, Math Public Small, and Biostatistics reported increases in the number of female hires over 2014–2015.
 - Over the past year, the number of females hired into tenure-track positions remained essentially unchanged at 238; the number hired into non-tenure-track positions decreased by 3% to 259.
 - Females accounted for 31% of all tenure-track and 32% of all non-tenure track hires; 2014–2015 these percentages were, respectively, 31% and 27%.

Faculty Attrition

Figure A.1 shows rates of attrition from deaths and retirements among full-time faculty numbers for the academic years 2011–12 through 2015–16. On average over the period shown, the percentage of faculty in doctoral departments retiring or dying each year is about 1.9%, and in Masters and Bachelors departments that percentage is about 2.6%.



* The percentage of full-time faculty who died or retired is the number of faculty who died or retired at some point during the academic year (September 1 through August 31) divided by the number of full-time faculty at the start of the academic year.

During the same period, in the respective groups, the percentages of tenured faculty who retired averaged 3.5% for Doctoral Math departments, 3.9% for Bachelors and Masters, and 2.9% for Stat/Biostat. The majority of individuals who are reported by their department as retiring are, in fact, members of the tenured faculty. For instance, data collected for 2011–15 indicate that approximately 86% of those retiring were tenured.

Here are a few other highlights for the attrition data from the 2015–16 cycle in comparison with the previous year:

- Overall retirements by tenured faculty decreased by 5% to 430
- Deaths and retirements decreased by 4% to 565
- Overall retirements (515) break down by departmental grouping as follows:
 - 48% (247) were from Bachelor
 - 30% (154) were from Doctoral Math
 - 18% (93) were from Masters
 - 4% (21) were from Stat/Biostat

Department Grouping Response Rates

In this report, *Mathematical Sciences* departments are those in four-year institutions in the US that refer to themselves with a name that incorporates (with a few exceptions) “Mathematics” or “Statistics” in some form. For instance, the term includes, but is not limited to, departments of “Mathematics,” “Mathematical Sciences,” “Mathematics and Statistics,” “Mathematics and Computer Science,” “Applied Mathematics,” “Statistics,” and “Biostatistics.” Also, *Mathematics (Math)* refers to departments that (with exceptions) have “mathematics” in the name; *Stat/Biostat* refers to departments that incorporate (again, with exceptions) “statistics” or “biostatistics” in the name but do not use “mathematics.” The streamlining of language here militates against the possible objection to foreshortening the full subject names.

Starting with reports on the 2012 AMS-ASA-IMS-MAA-SIAM Annual Survey of the Mathematical Sciences, the Joint Data Committee implemented a new method for grouping doctorate-granting Mathematics departments. These departments are first grouped into those at public institutions and those at private institutions. These groups are further subdivided based on the size of their doctoral program as reflected in the average annual number of PhDs awarded between 2000 and 2010, based on their reports to the Annual Survey during that period.

For further details on the change in the doctoral department groupings, see the article in the October 2012 issue of *Notices of the AMS* at www.ams.org/journals/notices/201209/rtx120901262p.pdf.

Math Public Large consists of departments with the highest annual rate of production of PhDs, ranging between 7.0 and 24.2 per year.

Math Public Medium consists of departments with an annual rate of production of PhDs, ranging between 3.9 and 6.9 per year.

Math Public Small consists of departments with an annual rate of production of PhDs of 3.8 or less per year.

Math Private Large consists of departments with an annual rate of production of PhDs, ranging between 3.9 and 19.8 per year.

Math Private Small consists of departments with an annual rate of production of PhDs of 3.8 or less per year.

Applied Mathematics consists of doctoral-degree-granting applied mathematics departments.

Statistics consists of doctoral-degree-granting statistics departments.

Biostatistics consists of doctoral-degree-granting biostatistics departments.

Masters contains US departments granting a master’s degree as the highest graduate degree.

Bachelors contains US departments granting a baccalaureate degree only.

Doctoral Math contains all US math public, math private, and applied math mathematics departments granting a PhD as the highest graduate degree.

Mathematics (Math) contains all US Math Public, Math Private, and Applied Math, Masters, and Bachelors Groups above.

Stat/Biostat contains all doctoral-degree-granting statistics and biostatistics departments.

Listings of the actual departments that compose these groups are available on the AMS website at www.ams.org/annual-survey/groups.

Response Rates by Survey Groups

Faculty Recruitment & Hiring Response Rates*

Group	Received (%)
Math Public Large	20 of 26 with 20 recruiting (77%)
Math Public Medium	36 of 40 with 29 recruiting (90%)
Math Public Small	58 of 64 with 41 recruiting (91%)
Math Private Large	20 of 24 with 17 recruiting (83%)
Math Private Small	21 of 29 with 16 recruiting (72%)
Applied Math	20 of 23 with 16 recruiting (87%)
Statistics	43 of 59 with 28 recruiting (73%)
Biostatistics	33 of 46 with 24 recruiting (72%)
Masters	113 of 176 with 67 recruiting (64%)
Bachelors	519 of 1021 with 220 recruiting (51%)
Total	908 of 1512 with 574 recruiting (60%)

* Doctoral programs that do not formally “house” faculty and their salaries are excluded from this survey.

Other Information

The interested reader may view additional details on the results of this survey and prior year trends by visiting the AMS website at www.ams.org/annual-survey.

Acknowledgements

The Annual Survey attempts to provide an accurate appraisal and analysis of various aspects of the academic mathematical sciences scene for the use and benefit of the community and for filling the information needs of the professional organizations. Every year, college and university departments in the United States are invited to respond. The Annual Survey relies heavily on the conscientious efforts of the dedicated staff members of these departments for the quality of its information. On behalf of the Data Committee and the Annual Survey Staff, we thank the many secretarial and administrative staff members in the mathematical sciences departments for their cooperation and assistance in responding to the survey questionnaires. Comments or suggestions regarding this Survey Report may be e-mailed to the committee at ams-survey@ams.org.