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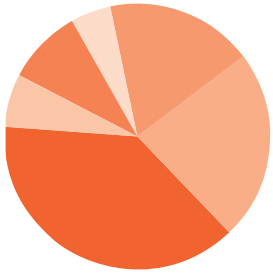


Report on 2015–2016 Academic Recruitment, Hiring, and Attrition

Amanda L. Golbeck, Thomas H. Barr, and Colleen A. Rose

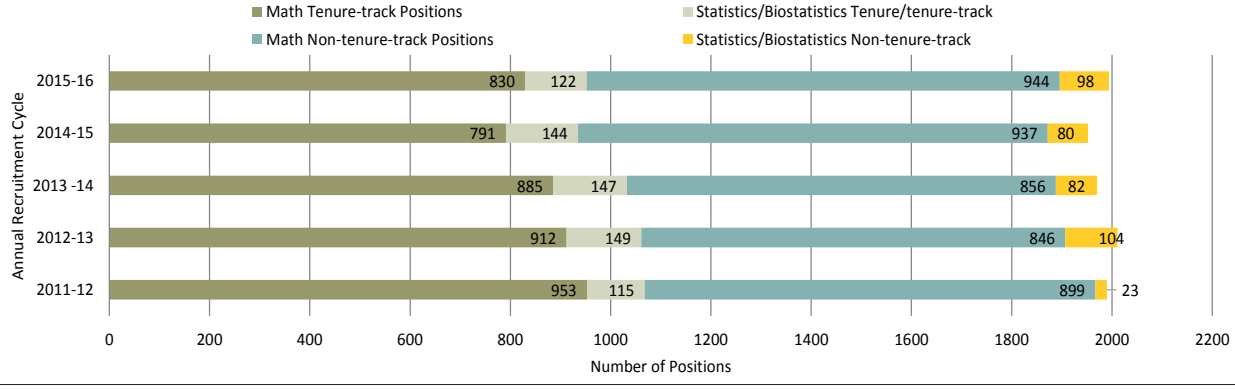
Each year in academic mathematical sciences departments around the United States, new full-time faculty are recruited, and a subset of those positions are filled. The hiring infuses a new cohort of mathematical scientists actively engaged in research and teaching. At the same time, others retire, take jobs elsewhere, or die, and this process removes a segment of the poulation of mathematical scientists. This report provides a snapshot of that process to aid in understanding the current status of such variables as: hiring rates, gender distribution, 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 the 574 departments that reported 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 (3 Math Doctoral, 8 Stats, 8 Masters, and 26 Bachelors) reported conducting recruitment and hiring during this time but did not return a completed questionnaire and therefore not included in the analysis.

Overview of Recruitment

This year's data shows 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 Stats (2%) Groups. The Doctoral Math Group reported increases in only the number of open

Figure R.1: Positions Under Recruitment in Mathematical Sciences



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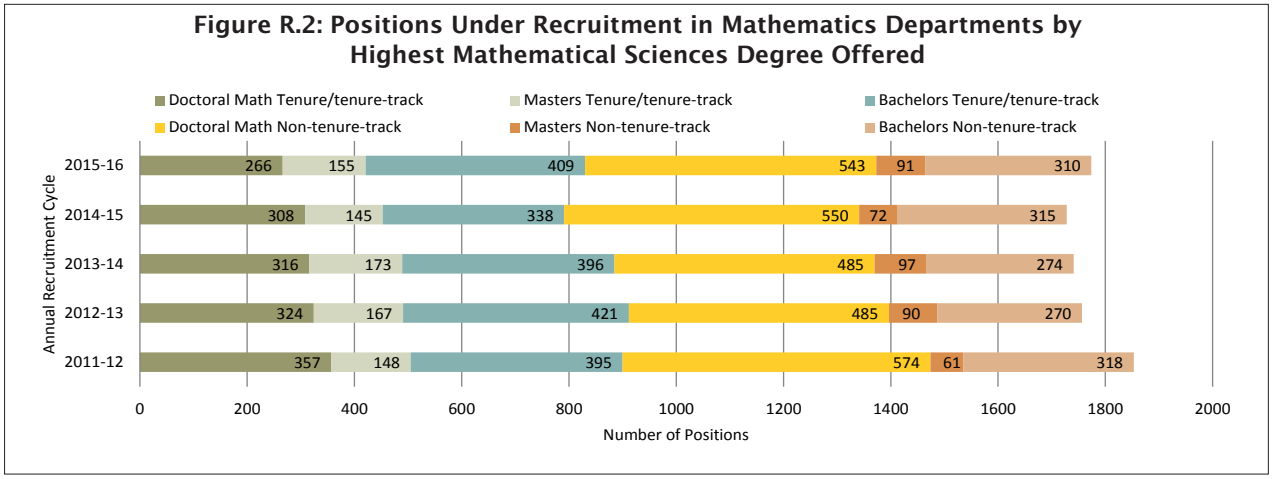


non-tenure-track temporary appointments and Statistics and biostatistics reported an increase in the number of open non-tenure-track positions.

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: 689 tenure-track mathematics positions, 906 non-tenure-track mathematics positions, 84 tenure-track statistics or biostatistics positions, and 89 non-tenure-track statistics or biostatistics positions. See Figure R.1 for comparisons. In the period from 2009 to 2016, the overall percentage of positions under recruitment that were tenure-track ranged from 48% to 57%, with the highest percentages in 2009–10 and 2011–12 of this range of time.

- Overall features 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% the previous year.
  - Since 2008 recruitment has decreased 2% in all Mathematical Sciences, decreased 6% in Math, and increased 57% in Stats.
- 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.

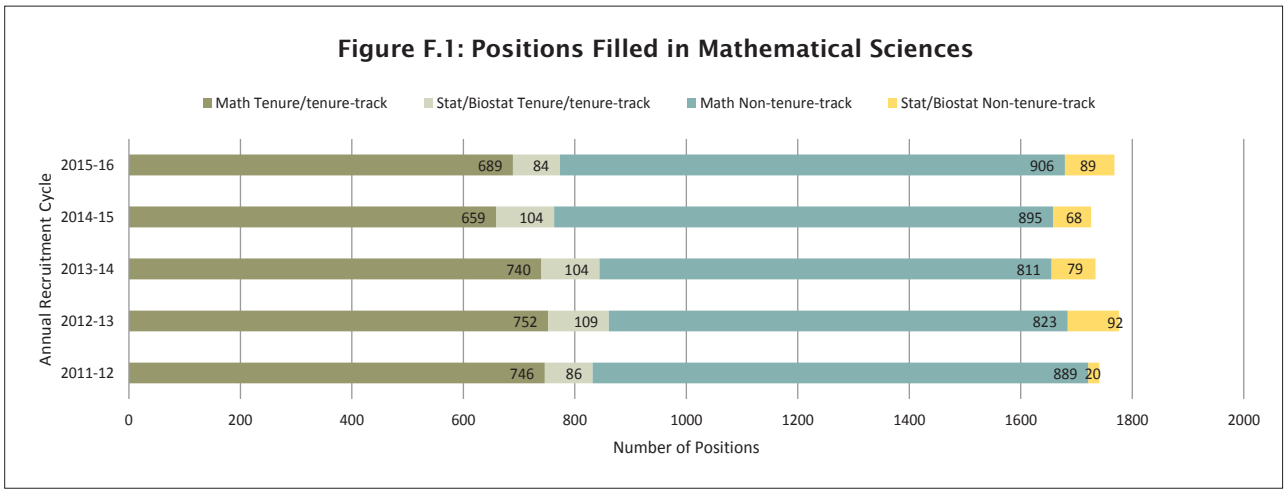
In Math the number of positions under recruitment (1,774) in 2015–16 is comparable with the previous year (1,728) and is up after dropping for three consecutive years. See Figure R.2. Over the period since 2005–06 recruitment in Doctoral departments has increased by 17%, in Masters departments decreased by 30%, and in Bachelors departments increased by 74%. In the same ten-year period, the net number of mathematics positions under recruitment has decreased by 4%.

In Stats, the number of positions under recruitment was 220 a 2% decrease over 2014–15. The trend over the past few years has been downward.

Positions Filled

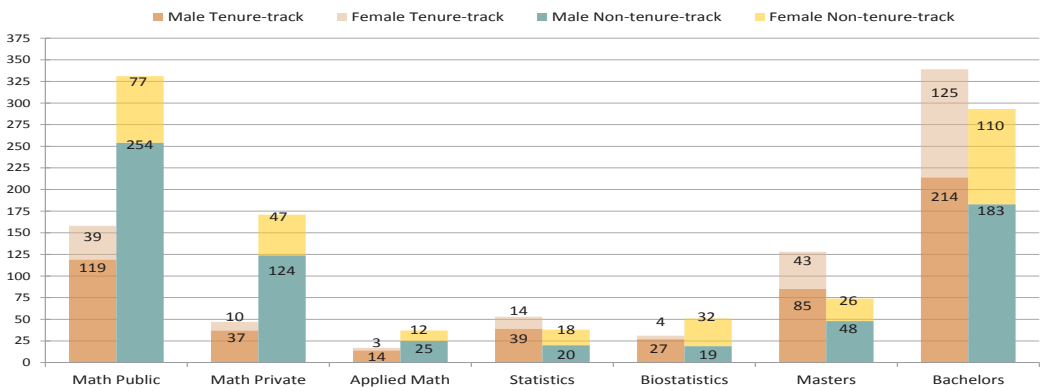
A total of 1,768 full-time positions in Mathematical Sciences were filled during the 2015–16 academic cycle, 1,595 from Mathematics Departments and 173 from Statistics or Biostatistics. Figure F.1 gives a breakdown. The total for Math is up 66% from the 2009–10 cycle. For Stats, the number of filled positions is up 31% from 2009–10. One interesting feature implicit in this 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 R1. Here are further highlights and comparisons from the data:



- 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 Stats breakdown:
  - In Math overall, 1,595 of 1,774 positions (90%) were filled; 31% of Math positions were filled by females.
  - In Stats, 173 of 220 positions (79%) were filled; 39% of Stats 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 (i.e., not new PhDs). Of these positions filled by doctoral faculty, 31% went to females. In comparison with last year, 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 last year; 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
  - Of the 1,042 non-tenure-track positions under recruitment, 95% were filled. In comparison to last year, all groups except Math Public Large, Math Public Small, and Statistics reported increased hiring of non-tenure-track faculty.
  - Of non-tenure-track hires, 32% (382) were filled by doctoral faculty (excluding new PhDs); 21% of these doctoral faculty hires were female.
  - Of non-tenure-track hires, 43% (428) were filled by new PhDs; 31% of these new PhD hires were female.

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



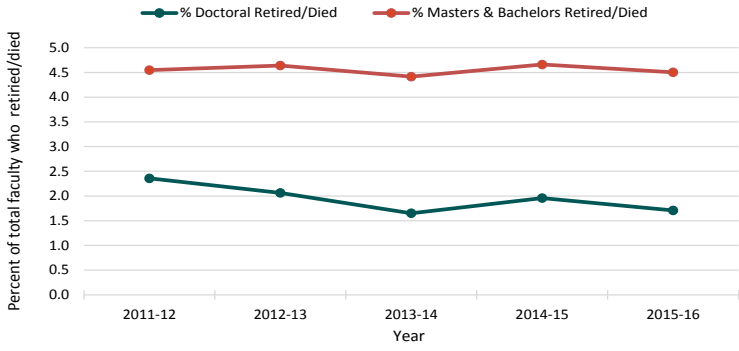
- Of non-tenure-track hires, 11% (113) were filled by non-doctoral faculty; 57% of these non-doctoral hires were female. Over half of these non-doctoral, non-tenure-track hires were in Bachelors departments.
- Of non-tenure-track hires, 25% (253) are temporary (one-year); 28% of these temporary hires are female. About half of all temporary hires were in Bachelors departments.
- Of non-tenure-track hires, 36% (362) were in postdoctoral positions; 21% 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 by 6% to 188.
  - All groups except Math Public Large, Math Public Small, and Biostatistics reported increases in the number of female hires over last year.
  - The number of females hired into tenure-track positions dropped slightly to 238 from 240; the number hired into non-tenure-track positions decreased by 3% to 259.
  - Females accounted for 31% of all tenure-track and 26% of all non-tenure track hires; last year these percentages were, respectively, 31% and 27%.

Faculty Attrition

Figure A.1 shows the variation in attrition from deaths and retirements among full-time faculty for the academic years 2006–07 through 2015–16. Attrition rates reached a minimum in 2009–10, a phenomenon likely linked to economic conditions at the time. On average over the period shown, the percentage of faculty in doctoral departments retiring

Figure A.1: Percentage Full-time Faculty Died/Retired*



* 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.

or dying each year is about 1.9%, and in Masters and Bachelors departments that percentage is about 2.4%.

During the same period, in the respective groups, the percentages of tenured faculty who retired averaged 3.3% for Doctoral Math departments, 4% for Bachelors and Masters, and 2.7% for Statistics. 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 2013–15 indicate that approximately 84% of those retiring were tenured. Figure A.2 provides a five-year summary.

Here are a few other highlights from the attrition data from the 2015–16 cycle:

- Overall retirements by tenured faculty decreased by 5% to 430
- Deaths and retirements decreased by 4% to 565
- Overall retirements 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

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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; *Stats* 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.
Stats 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 (85%)
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 (59%)
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 emailed to the committee at ams-survey@ams.org.