

Report on the 2016–2017 New Doctorate Recipients

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

This report presents a statistical profile of recipients of doctoral degrees awarded by departments in the mathematical sciences at universities in the United States during the period July 1, 2016 through June 30, 2017. Information in this report was provided by 299 of the 321 doctoral-granting departments surveyed, with additional information provided by the individual new doctoral recipients.

The Report on the 2016–2017 Employment Experiences of New Doctorate Recipients immediately following this report provides an analysis of the fall 2017 employment plans of the 635 PhD recipients who responded to this survey, as well as a summary of their demographic characteristics.

Detailed information, including tables not appearing in this report, is available on the AMS website at www.ams.org/annual-survey.

Doctorates Awarded

In mathematical sciences 1,957 PhDs were awarded by 299 doctorate-granting departments. Of these, 16 departments awarded no doctorate.

The highest percentage, 31% (615), of the new PhDs had a dissertation in statistics/biostatistics, followed by algebra/number theory with 14% (280) and applied mathematics with 14% (271).

Comparing PhDs awarded in 2016–17 to 2015–16 the number of PhDs awarded:

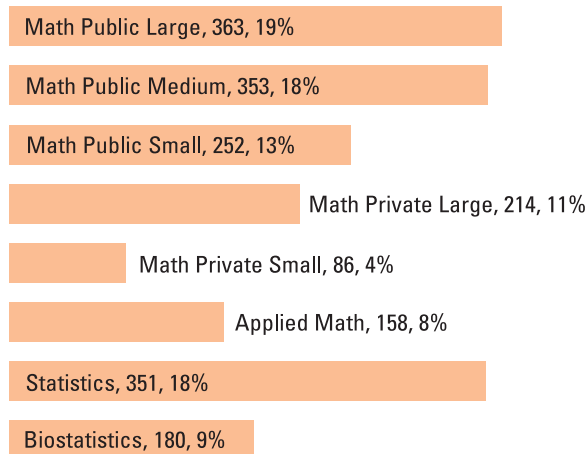
- Increased about 2% from 1,921 to 1,957. In the 280 departments that responded both this year and last year the number of PhDs awarded decreased from 1,921 to 1,826.
- Increased in all groups except Math Public Large, Math Private Large, and Math Private Small.

- Increased 21% in Statistics, 14% in both Math Public Medium and Applied Math, 4% in Math Public Small, and 2% in Biostatistics.
- Decreased 15% in Math Public Large, and 11% in both Math Private Large and Math Private Small.

Comparing PhDs awarded in 2016–17 with those awarded in 2006–07:

- PhDs awarded increased by 47%.
- Degrees awarded by Doctoral Math and by Statistics/Biostatistics combined increased by 46% and 49%, respectively.

Figure A.1: Number and Percentage of Degrees Awarded by Department Grouping*
Total Degrees Awarded: 1,957

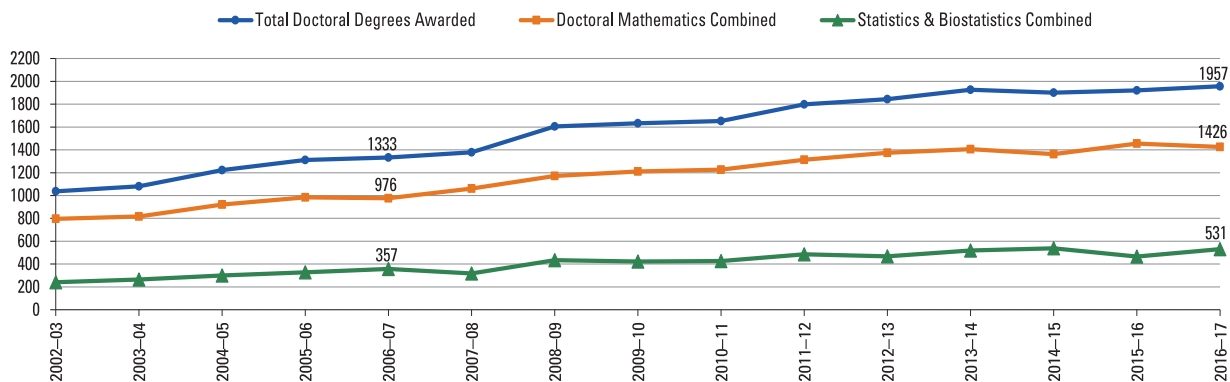


*See page 1157 for a description of the department groupings.

Amanda L. Golbeck is associate dean for academic affairs and professor of biostatistics in the Fay W. Boozman College of Public Health at University of Arkansas for Medical Sciences. Thomas H. Barr is AMS special projects officer. Colleen A. Rose is AMS survey analyst.

ANNUAL SURVEY

Figure A.2: New PhDs Awarded by Group



Employment

The employment status as of late 2017 was known for 1,671 of the 1,957 doctoral recipients. Figure E.1 gives a percentage breakdown by employment locale and seeking status. Figure E.2 shows the overall percentages of these PhDs reporting employment in various job sectors, and Figure E.3 provides a breakdown of the same information by citizenship.

Most of these distributions are close to the ones for 2015–16.

Of the US Citizens whose employment status is known, 89% (762) are employed in the US, and of these:

- 29% are employed in PhD-granting departments.
- 39% are employed in all other academic categories.
- 32% are employed in government, business and industry.

About 33% of the 2016–17 PhDs were in postdoc positions, which marks a decrease of about 8 percentage points from 2015–16. Most were in doctorate-granting departments, and their distribution is shown in Figure E.4. The counts of postdocs in various job sectors are shown in Figure E.5, broken down by citizenship. Of the PhDs in US academic jobs, 47% are postdocs.

Figure E.6 tracks the overall and women’s unemployment of new PhDs over a ten-year period. These rates have tended to parallel each other, though in all but two of these years, the unemployment rate has been slightly lower for women. The highest unemployment rate in 2016–17 was approximately 8% in the Math Public Medium group, and the lowest was about 1% in the Biostatistics group.

Figure E.1: Employment Status (n=1,957)

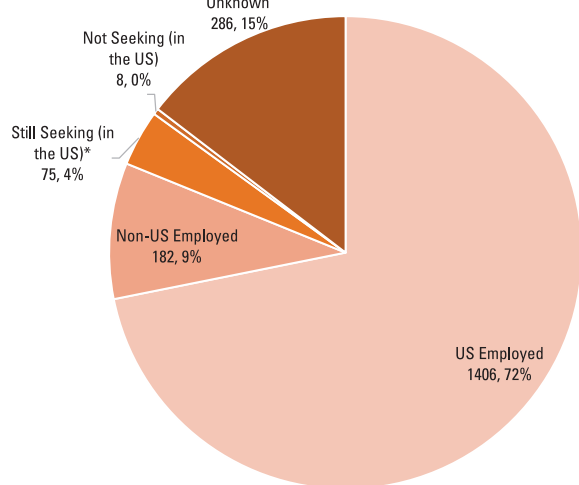
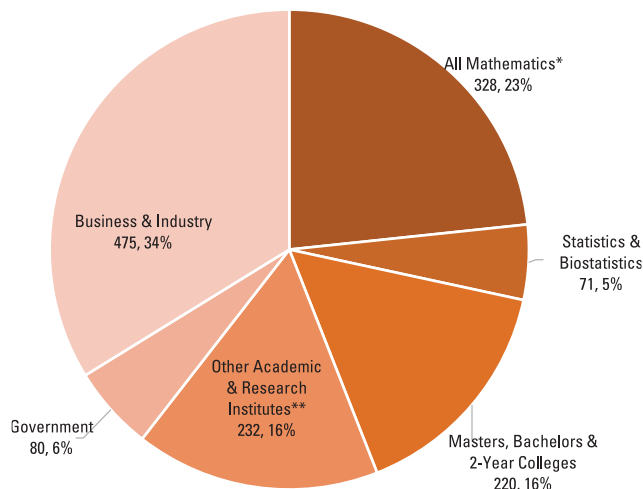


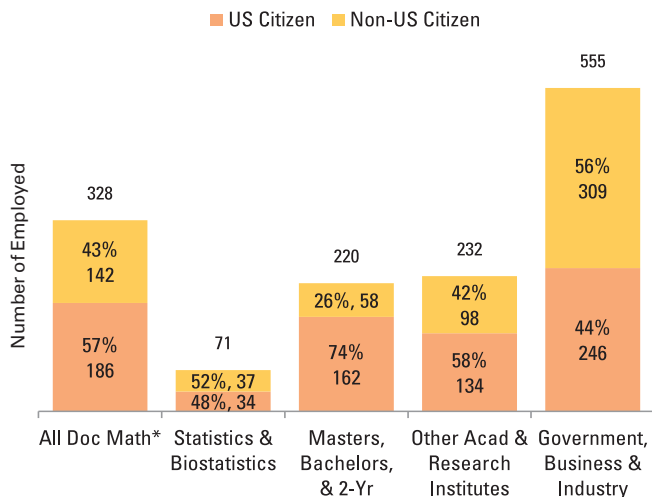
Figure E.2: US Employed by Type of Employer (n=1,406)



* If the unemployment percentage is adjusted by computing with a denominator that excludes those employed outside the US, then the value rounds to the same whole number percentage, 4%. Even if, in addition, those whose employment status is unknown are also removed from the denominator, the unemployment rate would be slightly more than 5%.

* Includes all Math Public, Math Private, and Applied Math departments.
 ** Other Academic consists of departments outside the mathematical sciences including numerous medical-related units.

Figure E.3: Employment in the US by Type of Employer and Citizenship (n=1,406)



*Includes all Math Public, Math Private, and Applied Math departments.

Figure E.4: PhDs Employed in Postdocs by Degree-Granting Department Group (n=1,957)

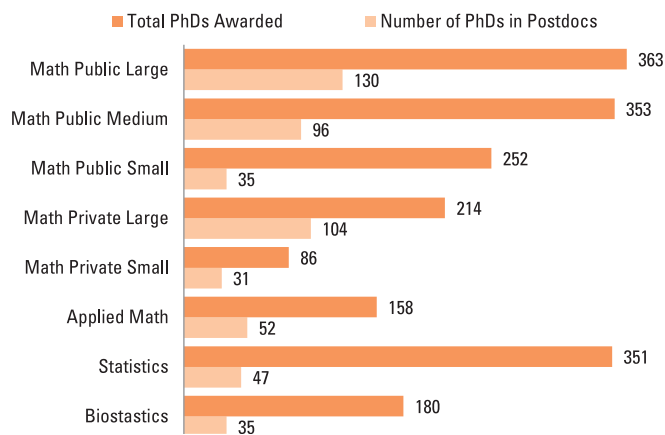
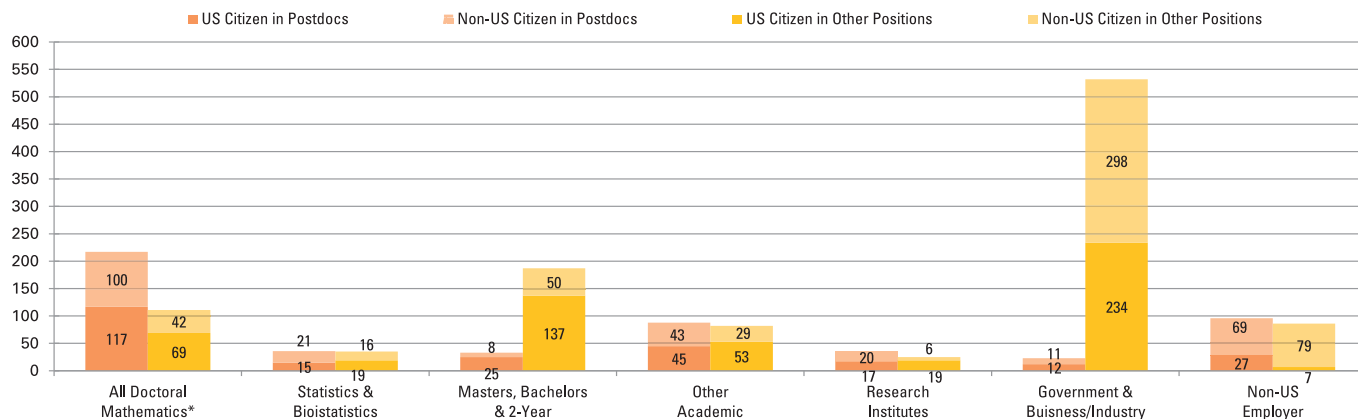
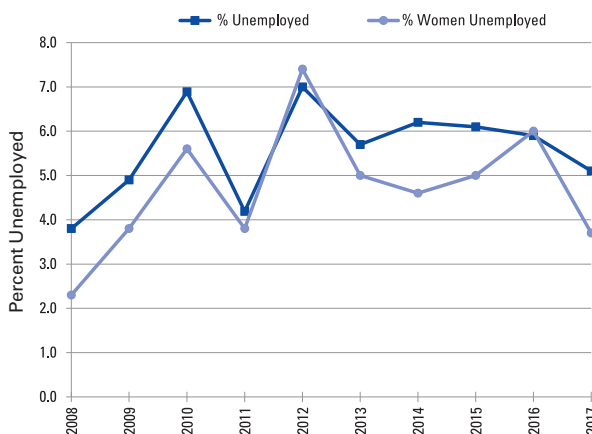


Figure E.5: New PhDs Employment by Citizenship, Type of Position, and Type of Employer (n=1,588)



* Includes all Math Public, Math Private, and Applied Math departments.

Figure E.6: Percentage of New Doctoral Recipients Unemployed 2008–17*



Demographics

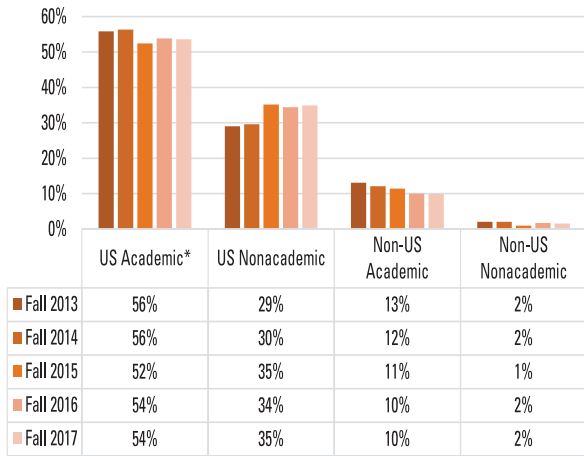
Gender and citizenship were known for all 1,957 new PhDs reported for 2016–17. Figure D.1 gives a breakdown by departmental grouping of the recipients' gender, and Figure D.2 provides the same categorical breakdown by citizenship. Overall, 49% (957) of recipients were US citizens, 29% (577) were women, and 8% (81) were members of underrepresented minority groups. Figure D.3 shows the gender breakdown of the US citizens, and Figure D.4 shows the overall size of the PhD cohort and citizenship breakdown for 2016–17 and the preceding five years.

Here are a few other features of the 2016–17 data:

- 54% of the PhDs awarded by Math Public Large and Medium groups were to US citizens; 34% of the PhDs awarded by the Statistics group were to US citizens.

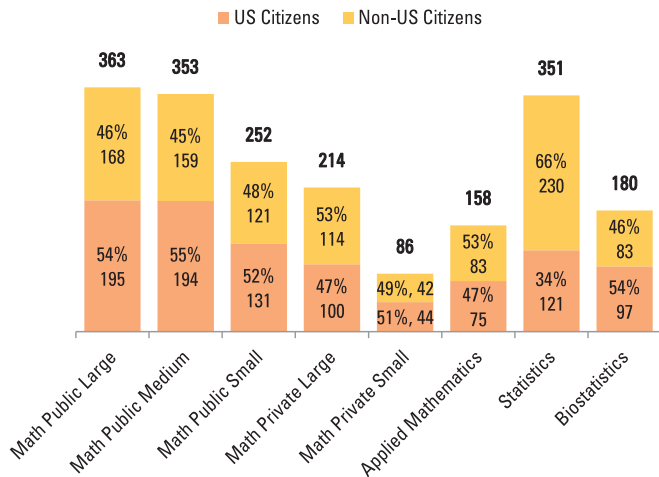
ANNUAL SURVEY

Figure E.7: Percentage of Employed New PhDs by Type of Employer



* Includes other academic departments and research institutes/other non-profits.

Figure D.2: Citizenship of Doctoral Recipients by Degree-Granting Grouping (n=1,957)



- Except for departments in Math Private Large, Applied Math, and Statistics, more PhDs were awarded to US citizens.
- 50% of those identifying as men, 46% of those identifying as women, and 100% of those identifying as of neither of these genders were US citizens.
- Among the US citizens earning PhDs, 4 were American Indian or Alaska Native, 113 were Asian, 30 were Black or African American, 33 were Hispanic or Latino, 4 were Native Hawaiian or Other Pacific Islander, 720 were White, and 53 were of unknown race/ethnicity.
- Math Public Large departments awarded 15 PhDs to US citizen minorities, and the Large Private group awarded 2; these are, respectively, the largest and smallest production rates. Departments in the other groups account for the remaining minority PhDs.

Figure D.1: Gender of Doctoral Recipients by Degree-Granting Grouping (n=1,957)

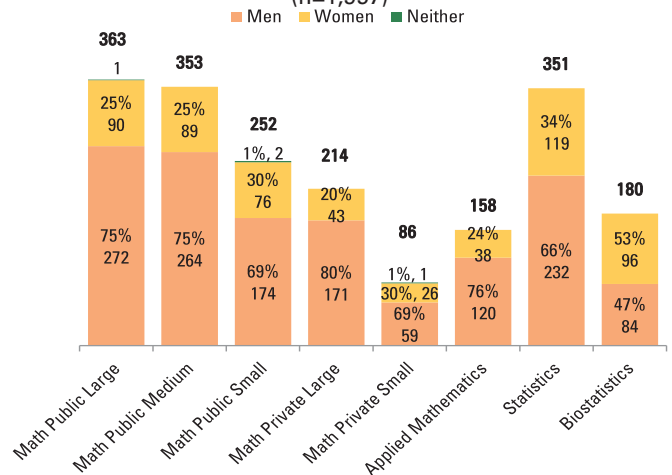


Figure D.3: Gender of US Citizen Doctoral Recipients by Degree-Granting Grouping (n=957)

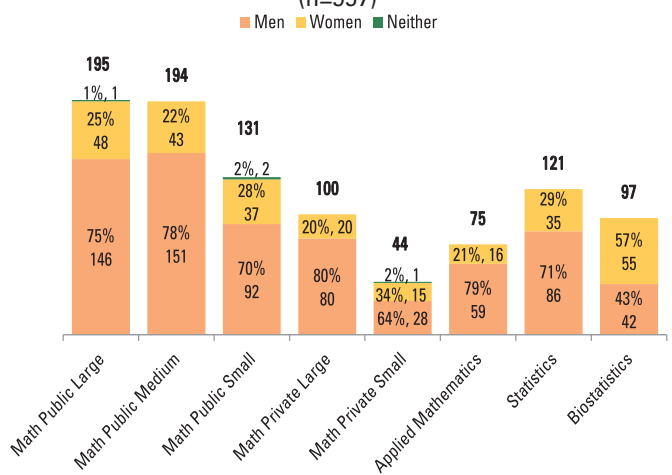


Figure D.4: Citizenship of New PhD Recipients, 2011–17

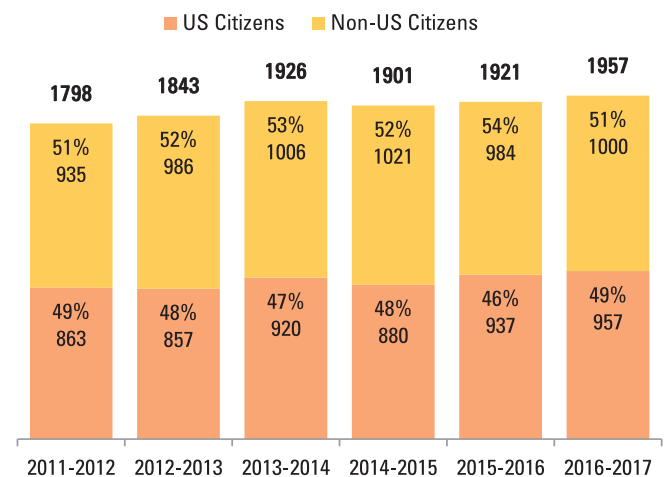


Figure F.1: Women as a Percentage of Doctoral Recipients Produced by and Hired by Department Grouping

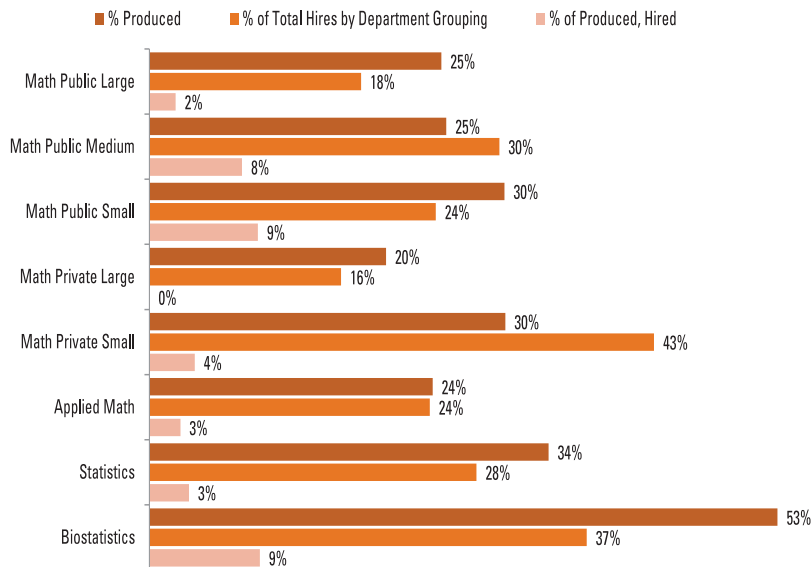
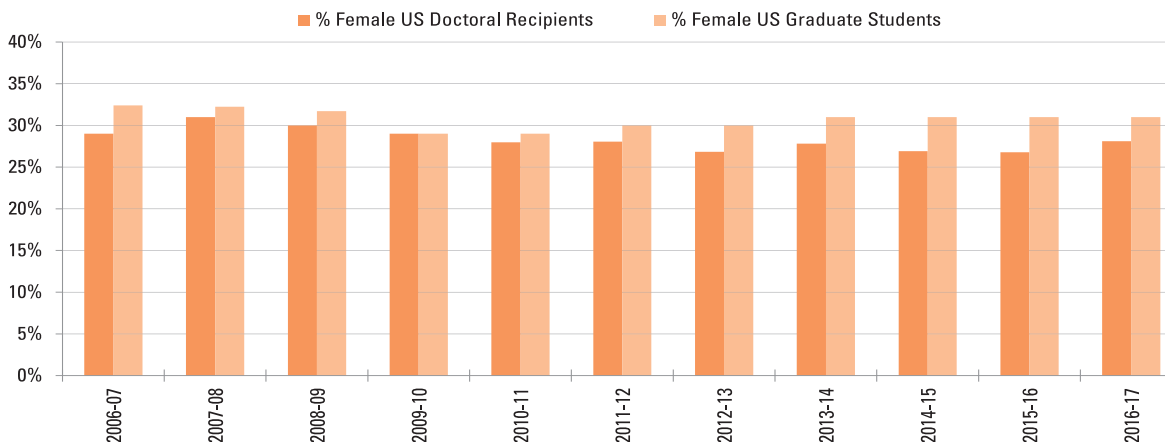


Table F.1: Number of Women Doctorates Produced by and Hired by Department Groupings

Department Grouping	Women		
	Produced	Total Hired	# Hired among women produced
Math Public Large	90	16	2
Math Public Medium	89	22	7
Math Public Small	76	9	7
Math Private Large	43	14	0
Math Private Small	26	9	1
Applied Math	38	5	1
Statistics	19	10	4
Biostatistics	96	13	9
Total	77	98	31

Figure F.2: Women as a Percentage of US Citizen Doctoral Recipients and Graduate Students



Women Doctoral Recipients

Overall, 29% of doctorate recipients were women, a fraction that has fallen by roughly a percentage point a year for the third year in a row. Of the 1,009 PhDs taking academic jobs, 28% (286) were women, and this continues a parallel decline in that percentage. Figure F.2 focuses on the percentage, over time, of US-citizen PhDs and graduate students who are women. Among US-citizen PhDs, the fraction in 2016–17 who are women ticked up by a percentage point or two from 26% in 2014–15 and 2015–16.

Figure F.1 gives some insight to which groups tend to hire their own women graduates. For example the graph shows that in Math Public Small departments, women constituted 30% of PhDs produced, 24% of faculty hired

in this group were women from this group, and overall 9% of women produced by this group were hired in this group.

The section on Demographics contains some discussion of the status of women earning PhDs in mathematical sciences.

ANNUAL SURVEY

Figure S.1: PhDs Awarded by Statistics/Biostatistics Departments (n=531)

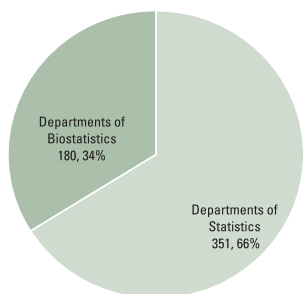


Figure S.2: Gender of PhD Recipients from Statistics/Biostatistics Departments (n=531)

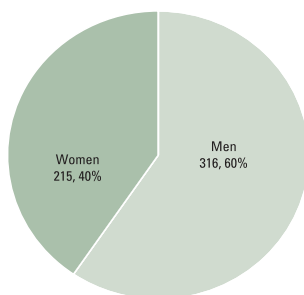
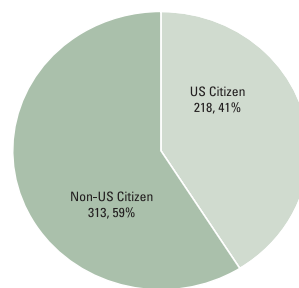


Figure S.3: Citizenship of PhD Recipients from Statistics/Biostatistics Departments (n=531)



PhDs Awarded by Statistics and Biostatistics (Stat/Biostat) Departments

One hundred one Stat/Biostat departments (58 of 59 statistics and 43 of 46 biostatistics) responded to this survey. They produced 531 doctorates, all of whom had dissertations in statistics/biostatistics, 14% more than in 2015–16. Figures S.1 through S.5 give breakdowns of these numbers by gender, citizenship, and employment status.

In addition, departments in the Mathematics groups had 123 PhD recipients with dissertations in statistics, so the overall number of PhDs specializing in statistical sciences for 2016–17 was 615, or 31% of the total. For the remainder of this section, the counts and percentages stated refer to doctorates awarded by departments in the Statistics groups.

Here are some attributes of the 2016–17 Stat/Biostat PhDs:

- 27% of all those in mathematical sciences were in the Stat/Biostat group.
- Women accounted for 34% of Statistics and 53% of Biostatistics.
- 41% of the US citizens were women.
- The unemployment rate of 2% is less than half of the corresponding percentage among Math PhDs.
- 32% of 2016–17 mathematical and statistical sciences PhDs hired by Stat/Biostat departments were women.

Figure S.4: Employment Status of PhD Recipients from Statistics/Biostatistics Departments (n=531)

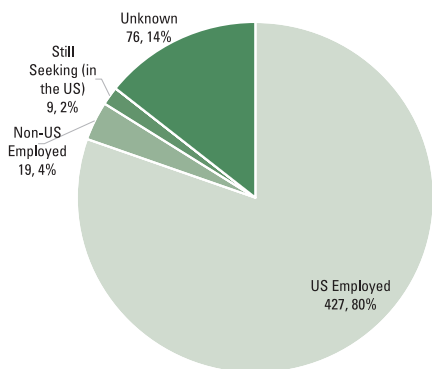
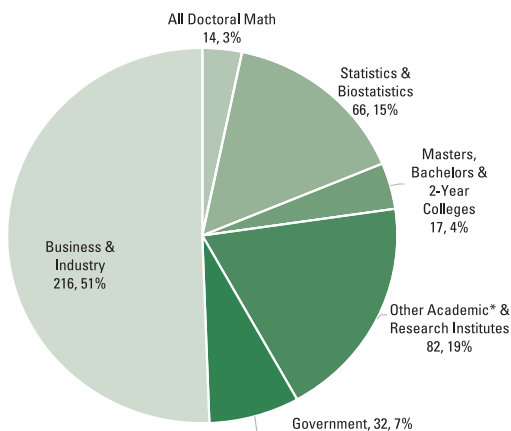


Figure S.5: US-Employed PhD Recipients from Statistics/Biostatistics Departments by Type of Employer (n=427)



* Other Academic consists of departments outside the mathematical sciences including numerous medical-related units.

Departmental Groupings

In this report, *Mathematical and Statistical 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.”

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

A department is in Group...	...when its subject area, highest degree offered, and PhD production rate p
Math Public Large	Math PhD, $7.0 \leq p$
Math Public Medium	Math PhD, $3.9 \leq p < 7.0$
Math Public Small	Math PhD, $p < 3.9$
Math Private Large	Math PhD, $3.9 \leq p$
Math Private Small	Math PhD, $p < 3.9$
Applied Math	Applied mathematics, PhD
Statistics	Statistics, PhD
Biostatistics	Biostatistics, PhD
Masters	Math, masters
Bachelors	Math, bachelors
Doctoral Math	Math Public, Math Private, & Applied Math
Stat/Biostat or Stats	Statistics & Biostatistics
Math	All groups except Statistics & Biostatistics

Department Response Rates by Grouping

Group	Received
Math Public Large:	26 of 26 including 0 with no degrees
Math Public Medium:	40 of 40 including 0 with no degrees
Math Public Small:	67 of 68 including 8 with no degrees
Math Private Large:	23 of 24 including 0 with no degrees
Math Private Small:	28 of 28 including 1 with no degrees
Applied Math:	30 of 30 including 2 with no degrees
Statistics:	58 of 59 including 4 with no degrees
Biostatistics:	33 of 46 including 4 with no degrees
Total:	315 of 321 including 4 with no degrees

As of press time for this issue of *Notices*, the following departments had not responded to the survey. Therefore, any PhDs which may have been awarded by these departments are not included in this report.

Mathematics Departments

California Institute of Technology
University of Puerto Rico, Rio Piedras

Statistics Departments

University of Pennsylvania

Biostatistics Departments

Saint Louis University College for Public Health & Social Justice
University of Illinois at Chicago
University of Texas–School of Public Health

Doctoral Degrees Conferred 2016–2017

Supplementary List

The following list supplements the list of thesis titles published in the September 2018 *Notices*, pages 969–999.

CALIFORNIA

Stanford University (26)

Statistics

Choi, Yunjin, Selecting the dimension of a subspace in principal component analysis and canonical correlation analysis.

Dobriban, Edgar, Topics in high-dimensional asymptotics.

Erdogdu, Murat Anil, Stein's Lemma and subsampling in large-scale optimization.

Fukuyama, Julia, Multivariate methods for the analysis of structured data.

Gorham, Jackson, Measuring sample quality with Stein's method.

He, Hera, Efficient permutation P-value estimates for gene set tests.

Huang, Ruojun, Monotone interactions of random walks and graphs.

Janson, Lucas, A model-free approach to high-dimensional inference.

Jiang, Bai, Two parameter inference methods in likelihood-free models: approximate Bayesian computation and contrastive divergence.

Kou, Jiyao, Large-scale inference with block structure.

Kuang, Yuming, Adaptive particle filters in hidden Markov models: A new approach and its application.

Lee, Minyong, Prediction and dimension reduction methods in computer experiments.

Liu, Linxi, Convergence rates of a class of multivariate density estimators based on adaptive partitioning.

Loftus, Joshua, Post-selection inference for models characterized by quadratic constraints.

Michael, Haben, Evaluating diagnostics under dependency.

Pekelis, Leonid, False discoveries with dependence, towards an objective inference.

Powers, Scott, Leveraging similarity in statistical learning.

Sen, Subhabrata, Optimization, random graphs, and spin glasses.

Sepehri, Amir, Non-parametric goodness-of-fit testing and applications.

Tian, Xiaoying, Topics in selective inference.

Wager, Stefan, Causal inference with random fields.

Wang, Chaojun, Financial markets and trading networks.

Wang, Jingshu, Factor analysis for high dimensional inference.

Xiang Gao, Katelyn, Scalable estimation and inference for massive linear mixed models with crossed random effects.

Zhao, Qingyuan, Topics in causal and high dimensional inference.

Zheng, Charles Yang, Supervised evaluation of representations.

University of California, Los Angeles (10)

Statistics

Gordon, Joshua Seth, Nonparametric estimation forecasts, and model evaluation of spatial temporal point process models for California seismicity.

Ho, Hao, Integrative analysis of genomic and transcription data in Taiwanese lung and adenocarcinomas.

Lu, Yang, Coupling and learning hierarchical generative and descriptive models for image systems and analysis.

Mao, Junhua, Multimodal learning for vision and language.

Razaee, Zahra, Community detection in networks with node covariates.

ANNUAL SURVEY

Rosario, Ryan Robert, A data augmentation approach to short text classification.

Wang, Jianyu, Modeling objects and parts by compositional relations.

Wang, Peng (Jerry), Joint multiple visual task understanding from a single image via deep learning and conditional random field.

Xia, Fangting, Pose-guided human semantic part segmentation.

Yu, Chengcheng (Joey), Single view 3D reconstruction and parsing using geometric commonsense for scene understanding.

University of California, Merced (5)

School of Natural Sciences

Adhikari, Lasith, Nonconvex sparse recovery methods.

Dark, Julie, A theoretical understanding of circular polarization memory.

Davis, Jason Karl, Mathematical models of prions in *S.cerevisiae*.

Madushani, R.W.M.A., Parameter inference for stochastic differential equations.

Sandoval, Christopher, Generalized Kubelka-Munk theory—A derivation and extension from radiative transfer.

University of California, Santa Barbara (3)

Statistics & Applied Probability

He, Jingyi, Fixed mixed effects models with big data.

Shi, Jian, Some contributions to smoothing spline density estimation and inference.

Zhu, Ling, Regularization and look-ahead procedures for selection of basic functions from multiple libraries.

COLORADO

Colorado State University (3)

Statistics

Liao, Xiyue, Change-point estimation using shape-restricted regression splines.

Wang, Lulu, Some topics on model-based clustering.

Weller, Zachary, Nonparametric tests of spatial isotropy and calibration-capture-recapture.

CONNECTICUT

Yale University (1)

Statistics and Data Science

Shaham, Uri, Algorithms, applications and theoretical properties of deep neural networks.

DISTRICT OF COLUMBIA

George Washington University (8)

Statistics

Chen, Chen, Advances in urn models and applications to self-similar bipolar networks.

Cheung, Li, Mixture models for left- and interval-censored data and concordance indices for composite survival outcomes.

Feng, Yarong, On fast growth models for random structures.

Huang, Hailin, Semi-parametric and structured nonparametric modeling.

Wang, Cong, Analysis for familial aggregation using recurrence risk for complex survey data.

Yang, Aotian, Constrained maximum entropy models for selecting genotype interactions associated with interval-censored failure times and methods for power calculation in a three-arm four-step clinical bioequivalence study.

Yang, Biao, Particle and ensemble methods for state space models.

Zhao, Wanying, Adaptive designs utilizing covariates for precision medicine and their statistical inference.

Howard University(1)

Mathematics

Pleasant, Kendra, When Ramsey meets Stone-Cech: Some new results in Ramsey theory.

FLORIDA

University of South Florida (2)

Epidemiology & Biostatistics

Nash, Michelle, Deployment, post-traumatic stress disorder and hypertensive disorders of pregnancy among US active-duty military women.

Sebastião, Yuri Combo Vanda, Racial and ethnic differences in low-risk cesarean deliveries in Florida.

ILLINOIS

Northwestern University (4)

Statistics

Gao, Yi, On a generalization of the Gini correlation for statistical data mining.

Hu, Xiaofei, Volatility estimation for integer-valued financial time series.

Mei, Xuan, Small dispersion asymptotics in stratified models.

Seeskin, Zachary, Topics on official statistics and statistical policy.

KENTUCKY

University of Louisville (2)

Bioinformatics & Biostatistics

Dutta, Sandipan, Some contributions to nonparametric inference for clustered and multistate data.

Shah, Jasmit, Novel statistical approaches for missing values in truncated high-dimensional metabolomics data with a detection threshold.

MISSOURI

University of Missouri–Columbia (3)

Statistics

Cheng, Yuan, Bayesian analysis of fMRI data and RNA-Seq time course experiment data.

Wang, Henan, Bayesian partition models for DNA methylation analysis.

Yu, Guanglei, Regression analysis of panel count data with informative observations and drop-outs.

NEW YORK

Clarkson University (1)

Mathematics & Computer Science

Al Basheer, Aladeen, A mathematical investigation of the effects of cannibalism in two and three species predator-prey systems.

Columbia University (4)

Applied Physics & Applied Mathematics

Dandapani, Aditi, Enlargement of filtration and the strict local Martingale property in stochastic differential equations.

Shaevitz, Daniel, Extreme weather: Subtropical floods and tropical cyclones.

Tian, Xiaochuan, Nonlocal models with a finite range of nonlocal interactions.

Biostatistics

Chen, Yakuan, Methods for functional regression and nonlinear mixed-effects models with applications to PET data.

Cornell University (7)

Biological Statistics & Computational Biology

Dias, Jishnu, Using protein interactome networks to understand human disease and evolution.

Gao, Feng, Utilizing rare and X-linked variants for inference of population size history and association studies of complex diseases.

Huang, Lei, Information topology of kinetic models of metabolism.

Meyer, Michael J., Methods for functional inference in the proteome and interactome.

Ramstetter, Monica, High resolution relative detection via inference of identical by descent sharing of sample ancestors.

Sinclair, David Giles, Model selection results for latent high-dimensional graphical models on binary and count data with applications of fMRI and genomics.

Zawack, Kelson, A comprehensive analysis of the United States' National Resistance Monitoring System.

Rensselaer Polytechnic Institute (3)

Mathematical Sciences

Heath, Emily, Optimization approaches to problems in network mitigation and restoration.

Pickering, William, Solution of urn models by generating functions with applications to social, physical, biological, and network sciences.

Shen, Xin, Complimentary formulations for problems with sparsity objective.

NORTH CAROLINA

North Carolina State University (12)

Statistics

Alfaro Cordoba, Marcela, Variable selection methods with applications to atmospheric sciences.

Choi, Bong Seog, Testing and estimation under hidden activity.

Das, Priyam, Bayesian quantile regression.

Hager, Sarah Rebecca, Optimal dynamic treatment regimes from a classification perspective for two stage studies with survival data.

Kang, Suhyun, Flexible estimation and testing methods for survival data with application in epidemiology and precision medicine.

Li, Yuan, GPU computing in statistics and R solution.

Morris, Samuel Alan, Spatial methods for modeling extreme and rare events.

Park, So Young, Longitudinal functional data analysis with biomedical applications.

Peng, Huimin, Selection and inference for high-dimensional regression with applications in biomedical research.

Peterson, Geoffrey Cohn Lee, Mean-dependent spatial prediction methods with applications to materials sciences.

Wang, Chong, A study of sufficient dimension reduction methods.

Xu, Yingzi, Binormal precision-recall and ROC classification and variable selection.

NORTH DAKOTA

North Dakota State University, Fargo (1)

Statistics

Sattler, Elizabeth, Subfractals induced by subshifts.

PENNSYLVANIA

Carnegie Mellon University (2)

Statistics

Asher, Jana, Methodological innovations in the collection and analysis of human rights violation data.

Chen, Yen-Chi, Statistical inference using geometric features.

Pennsylvania State University (6)

Statistics

Berstein, Jason, Inference of biophysical diffusion with transient binding using particle filters and stochastic EM.

Chu, Wanghuan, Feature screening for ultra-high dimensional longitudinal data.

Hao, Han, Modeling the genetic architecture of complex traits.

Russell, James, Stochastic models for individual and collective animal movement.

Taoufik, Bahaeddine, Functional data based inference for high frequency financial data.

Xu, Zhanxiang, Efficient parameter estimation methods using quantile regression in heteroscedastic methods.

University of Pittsburgh (2)

Statistics

Lee, Sung Won, Analysis of variation structure of high-dimensional multi-block data.

Zhang, Yun, Cluster analysis and network community detection with application to neuroscience.

SOUTH CAROLINA

University of South Carolina (1)

Epidemiology & Biostatistics

Xu, Xinling, Statistical methods for multivariate and correlated data.

VERMONT

University of Vermont (4)

Mathematics & Statistics

Cody, Emily, Mathematical modeling of public opinion using traditional and social media.

McAndrew, Thomas, Weighted networks: Applications from power grid construction to crowd control.

Regan, Andrew, Towards a science of human stories: Using sentiment analysis and emotional arcs to understand the building blocks of complex social systems.

Stephens, Thomas, Topological methods for evolution equations.

VIRGINIA

Virginia Commonwealth University, Medical Center (4)

Biostatistics

Czarnota, Jenna, Modeling spatially varying effects of chemical mixtures.

Evani, Bhanu, Weighted quantile sum regression for analyzing correlated predictors acting through a mediation pathway on a biological outcome.

Ferber, Kyle, Methods for predicting an ordinal response with high-throughput genomic data.

Joshi, Kabita, Finding the cutpoint of a continuous covariate in a parametric survival analysis model.

ANNUAL SURVEY


Acknowledgments

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 supporting organizations. Every year, college and university departments in the United States are invited to respond, and the Annual Survey relies heavily on the conscientious efforts of the dedicated staff members of these departments. On behalf of the Joint Data Committee and the Annual Survey Staff, we thank the many secretarial and administrative staff in the departments for their cooperation and assistance in responding to the survey questionnaires.

The Annual Survey is co-sponsored by the American Mathematical Society (AMS), American Statistical Association (ASA), Institute for Mathematical Statistics (IMS), Mathematical Association of America (MAA), and Society for Industrial and Applied Mathematics (SIAM).

Mathematical and
Statistical Sciences
Annual Survey

DATA ON THE COMMUNITY



DOCTORAL RECIPIENTS
New PhD graduates, their employment plans, demographics,
and starting salaries

DOCTORAL DEGREES & THESIS TITLES
PhD graduates, their thesis titles, and where they earned their degrees

FACULTY SALARIES
By rank and employment status

RECRUITMENT & HIRING
The academic job market

DEPARTMENTAL PROFILE
The number of—faculty, their employment statuses and demographics;
course enrollments; graduate students; masters and bachelors degrees awarded

www.ams.org/annual-survey

Sponsored by:
AMS | ASA | IMS | MAA | SIAM

Report on the 2016–2017 Employment Experiences of the New Doctoral Recipients

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

This report focuses on information that comes from the Employment Experiences of New Doctorate Recipients (EENDR) survey of individual PhD recipients regarding their experiences in finding and beginning new jobs. The survey was sent to the 1,419 new PhDs for whom departments provided contact information, and responses were collected during the period July 2017 to October 2018. Six hundred thirty-five (45%) responded. Some of the gross features of the respondents to the EENDR are similar to those of the overall group on which the New Doctorates report is based. For instance, of the 635, 33% were women (29% overall), 60% were US citizens (49% overall), 11% were employed outside the US (9% overall), and 4% were members of underrepresented minority groups (8% overall).

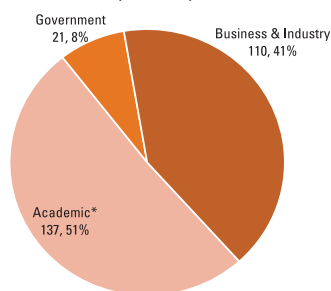
Figure EE.1 shows a breakdown by sector of EENDR respondents working in permanent jobs in the US in the broad sectors academia, business and industry, and government; Figure EE.2 gives the same breakdown for

those in temporary jobs. All but 2% of these jobs are full-time. When combined, the information in these two figures can be compared with that in Figure E.2 in the New Doctorates report:

Employment Sector	EENDR Overall % US Employed (n=544)	DR Overall % US Employed (n=1,406)
Academia	72%	61%
Government	7%	6%
Business & Industry	21%	34%

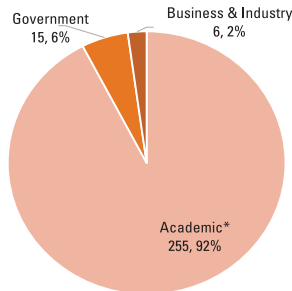
This comparison suggests that 2016–2017 EENDR responses are somewhat biased toward those employed in academia, and thus any conclusions about the entire group of new PhDs based on EENDR responses alone should be made with this qualification. Such bias is not unexpected, since the EENDR responses are not the product of a random sample. The similarities here suggest that estimates based on the EENDR data (e.g., median starting salaries) may not

Figure EE.1: EENDR Respondents Reporting Permanent US Employment by Sector (n=268)



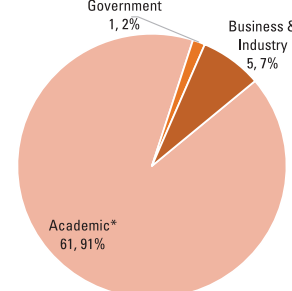
* Includes research institutes and other non-profits.

Figure EE.2: EENDR Respondents Reporting Temporary US Employment by Sector (n=276)



* Includes research institutes and other non-profits.

Figure EE.3: EENDR Respondents Employed Outside the US by Sector (n=67)



* Includes research institutes and other non-profits.

ANNUAL SURVEY

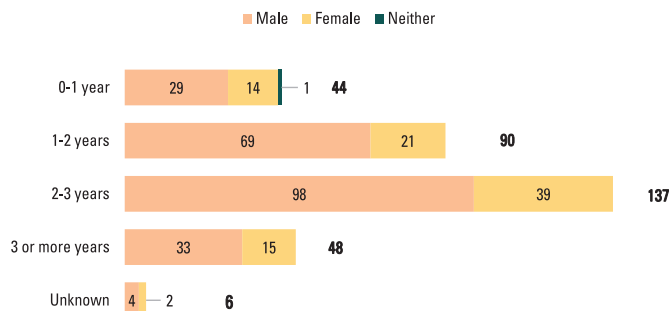
Table EE.1: Number and Percentage of EENDR Respondents Employed in the US by Job Status

Year	Permanent		Temporary		Temporary		Temporary Postdocs			#(%) Unknown	
	Total	%	Total	%	Perm Not Avail	% of Temp Total	Total	% of Temp Total	Perm Not Avail		% of Temp Postdocs
Fall 2013	374	53%	335	47%	173	52%	247	74%	106	43%	0
Fall 2014	363	51%	343	49%	148	43%	260	76%	88	34%	0
Fall 2015	357	51%	341	49%	160	47%	258	76%	102	40%	0
Fall 2016	323	52%	298	48%	136	46%	214	72%	82	38%	2 (<1%)
Fall 2017	268	49%	276	51%	134	49%	209	76%	147	70%	5 (1%)

Table EE.2: Percentage of EENDR Respondents Employed in the US by Employment Sector within Job Status

Year	Permanent			Temporary		
	Acad	Gov'n	B/I	Acad	Gov'n	B/I
Fall 2013	53%	7%	40%	92%	4%	4%
Fall 2014	54%	6%	40%	92%	5%	3%
Fall 2015	44%	8%	48%	93%	3%	4%
Fall 2016	47%	7%	46%	93%	5%	3%
Fall 2017	51%	8%	41%	92%	5%	2%

Figure EE.4: Temporary Positions by Duration, Gender, and Count (n=325)



be wildly different from the actual values for all of the new PhDs, but the reader should keep these differences in mind.

Table EE.1 gives a longitudinal comparison of responses to the EENDR questionnaire from 2013 through 2017. Here are a few features to note:

- 49% of those employed for fall 2017 were in permanent positions.
- The percentage of those in temporary jobs because a permanent one was not available has ranged between 43% and 52% in the years 2013 to 2017, and the 2017 value of 49% is in line with these percentages.
- The percentage of those in temporary jobs who are postdocs has remained consistent over this five-year period, and the 2017 percentage of 76% is the modal value. Also in 2017, of those in postdocs, 70% hold that position because a permanent job was not available.

Table EE.2 compares percentages of PhDs taking employment in various sectors, by job durability. Over the five years shown, the percentages in all of these categories have remained remarkably stable.

Figures EE.5, EE.6, and EE.7 show breakdowns of employment in the broad sectors of education, government, and business and industry. The following table provides

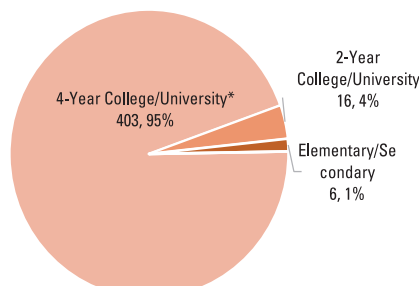
Sector	Number of Responses	% US Citizens	% Women	% Temporary	% Looking
Education	425	59%	32%	67%	35%
Government	38	73%	37%	42%	10%
Business and Industry	121	58%	26%	5%	12%

further insight to these figures by sector, demographics, and job status.

Five hundred eighty-three doctorates provided age information, and Figure EE.8 provides the distribution. The median age was 30, the youngest PhD was 23, and the oldest 55. Almost 60% of these respondents were between the ages of 26 and 30.

Figure EE.9 gives percentages by employment sector of EENDR respondents who identify themselves as Hispanic. The designation “unknown” indicates the respondent did not provide ethnicity data.

Figure EE.5: Employment by Type of Educational Institution (Educ) (n=425)



* Includes research institutes and other non-profits.

Figure EE.6: Employment by Type of Government (Gov) (n=38)

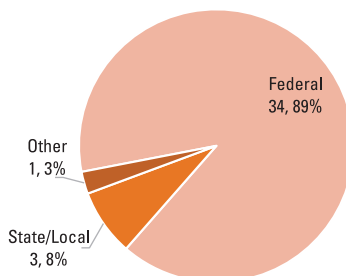
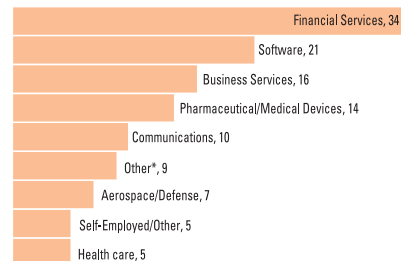


Figure EE.7: Employment by Type of Business/Industry (BI) (n=121)



* Includes Biotechnology (2), Consumer Merchandising (3), Energy (3), and Survey/Market Research (1).

Figure EE.8. Age Distribution of New PhD Respondents (n=583)

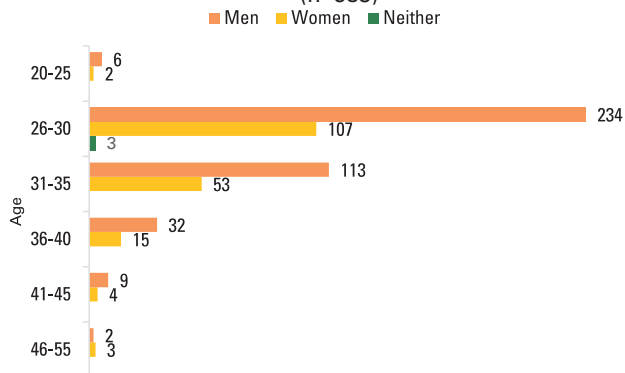
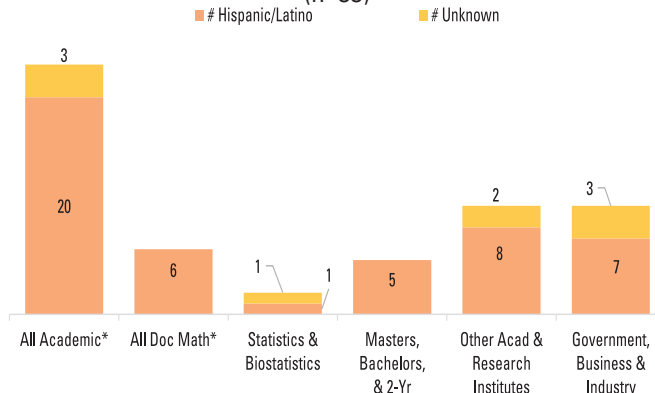


Figure EE.9. Ethnicity of New PhD Respondents by Type of US Employer (n=33)



Nineteen respondents to the EENDR survey were Black or African American, 4 were American Indian or Alaska Native, 3 were Native Hawaiian or Other Pacific Islander, 198 were Asian, 394 were White, and 17 were unknown.

Starting Salaries of the 2016–2017 Doctorate Recipients

The starting salary figures were compiled from information gathered on the EENDR questionnaires sent to 1,419 individuals using addresses provided by the departments granting the degrees; 635 individuals responded between late October 2017 and June 2018. Responses with insufficient data or from individuals who indicated they had part-time or non-US employment were excluded. Numbers of usable responses for each salary category are reported in the tables on page 1164.

Readers are warned that the data in this report are obtained from a self-selected sample, and inferences from them may not be representative of the full population. Detailed information, including boxplots which traditionally appeared in this report, is available on the AMS website at www.ams.org/annual-survey/survey-reports.

Remarks on Starting Salaries

Key to Tables and Graphs. Salaries are those reported for the fall immediately following the survey cycle. Years listed denote the survey cycle in which the doctorate was received—for example, survey cycle July 1, 2016–June 30, 2017 is designated as 2017. Salaries reported as 9–10 months exclude stipends from summer grants teaching, or the equivalent. M and W are men and women, respectively. Separate figures are not provided when the number of salaries available for analysis in a particular category was five or fewer. All categories of “Teaching/Teaching and Research” and “Research Only” contain those recipients employed at academic institutions only.

Graphs. The graphs show standard boxplots summarizing salary distribution information for the years 2010 through 2017. Values plotted for 2010 through 2016 are converted to 2017 dollars using the implicit price deflator prepared annually by the Bureau of Economic Analysis, US Department of Commerce [<https://www.bea.gov>]. The category for each graph is based on a work activity reported in the EENDR. Salaries of postdoctorates are shown separately. They are also included in other academic categories with matching work activities.

For each boxplot the box shows the first quartile (Q1), the median (M), and the third quartile (Q3). Upper whiskers extend from Q3 to the largest data value below Q3+1.5IQR, and lower whiskers from Q1 down to the smallest data value above Q1–1.5IQR. Data points falling between Q3+1.5IQR and Q3+3IQR or Q1–1.5IQR and Q1–3IQR are designated as outliers and plotted as circles (°). Data outside the range Q1–3IQR to Q3+3IQR are designated as extreme outliers and plotted as stars (*).

Response Rates

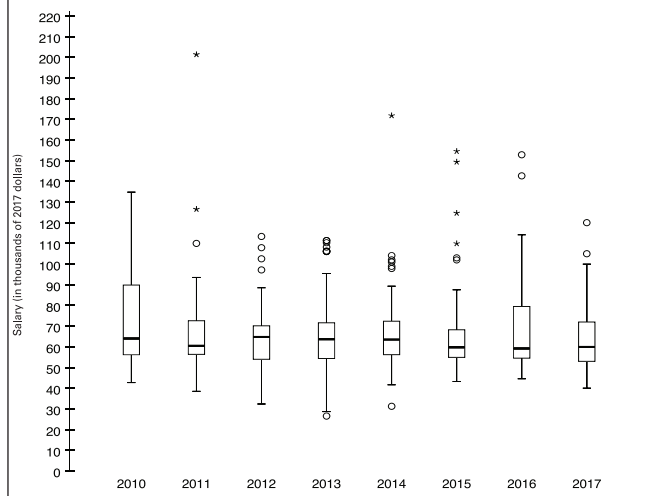
New PhD Recipient Response Rates by Granting Department Grouping

Granting Department Group	Received	Percent
Math Public Large:	139 of 288	48%
Math Public Medium:	122 of 259	47%
Math Public Small:	67 of 180	37%
Math Private Large:	87 of 176	49%
Math Private Small:	34 of 61	56%
Applied Math:	50 of 133	38%
Statistics:	82 of 195	42%
Biostatistics:	54 of 127	43%
Total:	635 of 1,419	45%

ANNUAL SURVEY

Academic Teaching/Teaching and Research
9–10-Month Starting Salaries*
(in thousands of dollars)

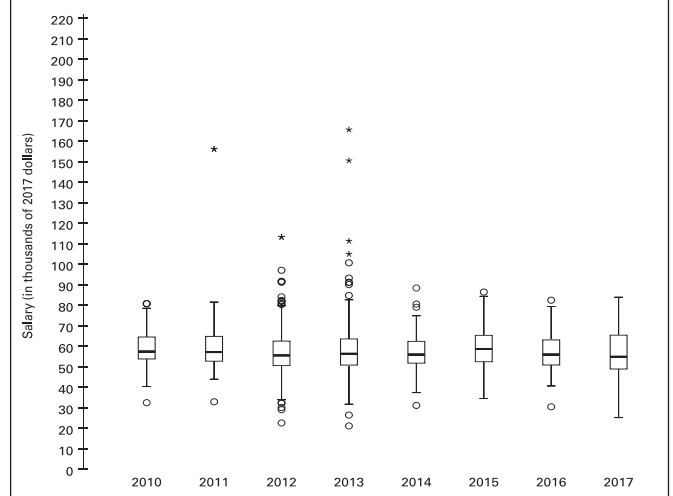
PhD Year	Min	Q ₁	Median	Q ₃	Max
Total (19 men/4 women/2 neither)					
2017 M	25.3	50.0	56.6	65.0	110.0
2017 W	40.0	55.4	60.3	70.5	110.0
2017 N	too few to report				
One year or less experience (130 men/58 women/2 neither)					
2017 M	25.3	50.0	56.5	65.0	110.0
2017 W	40.0	55.1	60.8	69.9	110.0
2017 N	too few to report				



* Includes postdoctoral salaries.

Academic Postdoctorates Only*
9–10-Month Starting Salaries
(in thousands of dollars)

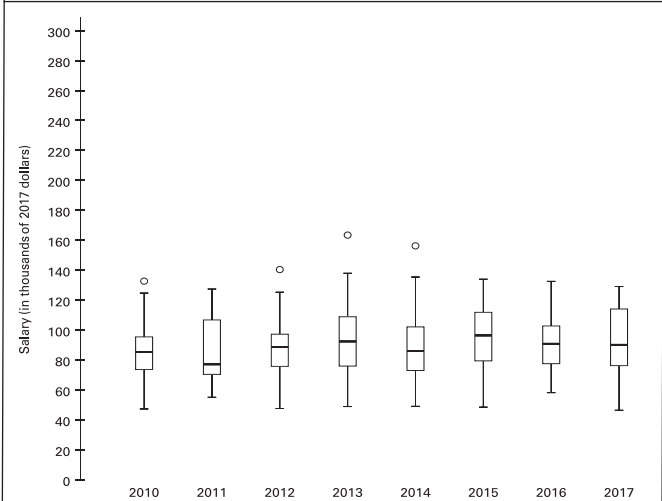
PhD Year	Min	Q ₁	Median	Q ₃	Max
Total (43 men/11 women/1 neither)					
2017 M	25.3	47.3	53.0	61.5	84.0
2017 W	55.0	60.8	66.0	71.0	82.0
2017 N	none to report				
One year or less experience (43 men/10 women/1 neither)					
2017 M	25.3	47.3	53.0	61.5	84.0
2017 W	55.0	62.8	67.8	71.5	82.0
2017 N	none to report				



* A postdoctoral appointment is a temporary position primarily intended to provide an opportunity to extend graduate training or to further research experience.

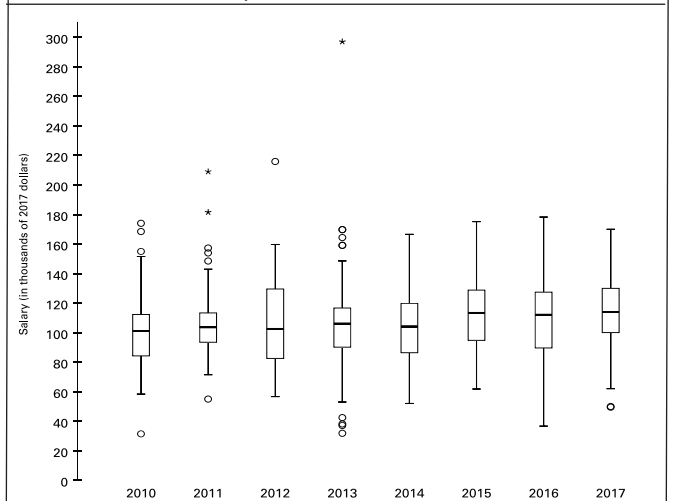
Government
11–12-Month Starting Salaries
(in thousands of dollars)

PhD Year	Min	Q ₁	Median	Q ₃	Max
Total (22 men/14 women/0 neither)					
2017 M	46.3	74.1	94.5	107.0	129.0
2017 W	66.9	80.5	94.3	115.0	125.0
2017 N	none to report				
One year or less experience (18 men/10 women/0 neither)					
2017 M	46.3	60.3	82.4	103.0	129.0
2017 W	66.9	80.5	91.3	115.0	125.0
2017 N	none to report				



Business and Industry
11–12-Month Starting Salaries
(in thousands of dollars)

PhD Year	Min	Q ₁	Median	Q ₃	Max
Total (80 men/29 women/0 neither)					
2017 M	50.0	104.8	118.5	135.0	400.0
2017 W	49.5	87.5	108.5	120.0	160.0
2017 N	none to report				
One year or less experience (67 men/21 women/0 neither)					
2017 M	50.0	100.0	114.0	130.0	400.0
2017 W	70.0	85.0	110.0	120.0	160.0
2017 N	none to report				



Acknowledgments

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. For this EENDR report, we thank the PhD recipients who responded to the survey. Their participation is vital to our providing accurate and timely information.

The Annual Survey is co-sponsored by the American Mathematical Society (AMS), American Statistical Association (ASA), Institute for Mathematical Statistics (IMS), Mathematical Association of America (MAA), and Society for Industrial and Applied Mathematics (SIAM).

Distribution of New PhD Recipient Responses by EmployerType

Employer Type	Received	Percent
Math Public Large:	40	6%
Math Public Medium:	32	5%
Math Public Small:	13	2%
Math Private Large:	47	7%
Math Private Small:	9	1%
Applied Math:	10	2%
Statistics:	10	2%
Biostatistics:	11	2%
Masters:	19	3%
Bachelors:	92	14%
Two-Year Institutions:	15	2%
Other Academic:	70	11%
Research Institute/Other Non-profit:	24	4%
Government:	36	6%
Business/Industry:	116	18%
Non-US Academic:	61	10%
Non-US Nonacademic:	6	1%
Not Seeking (US):	3	<1%
Still Seeking (US):	17	3%
Unknown (US):	0	0%
Non-US: Not Seeking, Still Seeking, Unknown:	4	1%
Total:	635	100%

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table A.1: Field of Thesis of 2016-2017 Doctoral Recipients by Degree-Granting Department

Granting	Algebra/ Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/ Topology	Discr. Math./ Combin./ Logic/ Comp. Sci.	Probability	Statistics	Biostatistics	Applied Math	Numerical Analysis/ Approxi- mations	Linear Nonlinear Optim./ Control	Differential, Integral, & Difference Equations	Math Educ	Other/ Unknown	Total
Math Public Large	81	21	54	43	18	10	0	48	28	8	32	2	18	363
Math Public Medium	71	30	31	25	16	38	0	66	27	8	31	7	3	353
Math Public Small	45	16	13	18	6	43	0	37	27	4	18	19	6	252
Math Private Large	64	9	39	24	15	8	0	23	2	5	22	2	1	214
Math Private Small	17	6	12	16	5	4	0	10	5	0	11	0	0	86
Applied Mathematics	2	2	0	5	11	20	0	73	26	1	14	0	4	158
Statistics	0	0	0	0	7	326	0	4	0	0	1	0	13	351
Biostatistics	0	0	0	0	0	4	162	10	0	0	0	0	4	180
Total	280	84	149	131	78	453	162	271	115	26	129	30	49	1957
Men	218	69	126	99	62	286	75	190	87	18	88	17	41	1376
Women	61	15	23	31	16	167	87	80	28	8	40	13	8	577
Neither	1	0	0	1	0	0	0	1	0	0	1	0	0	4

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table D.1: Gender and Citizenship of 2016-2017 New Doctoral Recipients
by Degree-Granting Department

	Gender	Citizenship Status		Total
		U.S.	Non-U.S.	
Math Public Large	Men	146	126	272
	Women	48	42	90
	Neither	1	0	1
Math Public Medium	Men	151	113	264
	Women	43	46	89
	Neither	0	0	0
Math Public Small	Men	92	82	174
	Women	37	39	76
	Neither	2	0	2
Math Private Large	Men	80	91	171
	Women	20	23	43
	Neither	0	0	0
Math Private Small	Men	28	31	59
	Women	15	11	26
	Neither	1	0	1
Applied Math	Men	59	61	120
	Women	16	22	38
	Neither	0	0	0
Statistics	Men	86	146	232
	Women	35	84	119
	Neither	0	0	0
Biostatistics	Men	42	42	84
	Women	55	41	96
	Neither	0	0	0
Total by Gender	Men	684	692	1376
	Women	269	308	577
	Neither	4	0	4
Total		957	1000	1957

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table D.2: US Citizen Doctoral Recipients,
Fall 2006 to Fall 2017

Year	Total Doctorates Granted by US Institutions	Total US Citizen Doctoral Total	%
2006-07	1333	576	43%
2007-08	1378	622	45%
2008-09	1605	742	46%
2009-10	1632	789	48%
2010-11	1653	802	49%
2011-12	1798	863	48%
2012-13	1843	857	47%
2013-14	1926	920	48%
2014-15	1901	880	46%
2015-16	1921	937	49%
2016-17	1957	957	49%

Table D.3: Gender of US Citizen Doctoral Recipients,
Fall 2006 to Fall 2017

Year	Total U.S. Citizen Doctoral Recipients	Male	Female	Neither	% Female
2006-07	576	396	180		31%
2007-08	622	431	191		31%
2008-09	742	515	227		31%
2009-10	789	564	225		29%
2010-11	802	574	228		28%
2011-12	863	621	242		28%
2012-13	857	627	230		27%
2013-14	920	664	256		28%
2014-15	880	636	244		28%
2015-16*	937	684	251	2	27%
2016-17*	957	684	269	4	28%

* Total US Citizen Doctoral Recipient counts includes two individual whose gender was reported as neither female or male.

Table D.4: Gender, Race/Ethnicity & Citizenship of
2016-2017 New Doctoral Recipients, July 1, 2016- June 30, 2017

All Groups Combined

315 of 321 departments responding (16 with no degrees)

	MEN					WOMEN					Neither					TOTAL			
	Citizenship					Citizenship					Citizenship								
	US	Non-US				Total	US	Non-US				Total	US	Non-US				Total	
		Perm	Temp	Unk	Temp			Unk	Temp	Unk	Temp			Unk					
Am Ind/Alas	3	0	5	0	8	1	0	0	0	1	0	0	0	0	0	9			
Asian	68	23	410	42	543	45	16	205	22	288	0	0	0	0	0	831			
Bl/Afr Am	19	5	15	1	40	11	1	2	0	14	0	0	0	0	0	54			
Hisp/Lat	27	4	28	1	60	6	0	7	0	13	0	0	0	0	0	73			
Haw/Pac Is	3	0	0	0	3	1	0	0	0	1	0	0	0	0	0	4			
White	527	13	127	4	671	189	8	39	3	239	4	0	0	0	4	914			
Unknown	39	0	3	9	51	14	2	3	2	21	0	0	0	0	0	72			
TOTAL	686	45	588	57	1376	267	27	256	27	577	4	0	0	0	4	1957			

All Math Public Groups Combined

Doctorate Granting Departments of Mathematics

133 of 134 departments responding (4 with no degrees)

	MEN					WOMEN					Neither					TOTAL			
	Citizenship					Citizenship					Citizenship								
	US	Non-US				Total	US	Non-US				Total	US	Non-US				Total	
		Perm	Temp	Unk	Temp			Unk	Temp	Unk	Temp			Unk					
Am Ind/Alas	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	3			
Asian	25	5	198	3	231	15	6	82	1	104	0	0	0	0	0	335			
Bl/Afr Am	8	3	12	1	24	2	1	1	0	4	0	0	0	0	0	28			
Hisp/Lat	11	3	17	0	31	4	0	5	0	9	0	0	0	0	0	40			
Haw/Pac Is	2	0	0	0	2	1	0	0	0	1	0	0	0	0	0	3			
White	325	6	67	0	398	102	2	24	0	128	3	0	0	0	3	529			
Unknown	16	0	2	3	21	4	2	3	0	9	0	0	0	0	0	30			
TOTAL	389	17	297	7	710	128	11	115	1	255	3	0	0	0	3	968			

All Math Private Groups Combined

Doctorate Granting Departments of Mathematics

51 of 52 departments responding (1 with no degrees)

	MEN					WOMEN					Neither					TOTAL			
	Citizenship					Citizenship					Citizenship								
	US	Non-US				Total	US	Non-US				Total	US	Non-US				Total	
		Perm	Temp	Unk	Temp			Unk	Temp	Unk	Temp			Unk					
Am Ind/Alas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Asian	17	2	59	6	84	6	1	18	3	28	0	0	0	0	0	112			
Bl/Afr Am	3	0	1	0	4	1	0	0	0	1	0	0	0	0	0	5			
Hisp/Lat	4	0	3	1	8	0	0	1	0	1	0	0	0	0	0	9			
Haw/Pac Is	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
White	72	4	39	3	118	27	4	8	0	39	1	0	0	0	1	158			
Unknown	13	0	1	2	16	0	0	0	0	0	0	0	0	0	0	16			
TOTAL	109	6	103	12	230	34	5	27	3	69	1	0	0	0	1	300			

Math Public Large Group

Doctorate Granting Departments of Mathematics

26 of 26 departments responding (0 with no degrees)

	MEN					WOMEN					Neither					TOTAL			
	Citizenship					Citizenship					Citizenship								
	US	Non-US				Total	US	Non-US				Total	US	Non-US				Total	
		Perm	Temp	Unk				Perm	Temp	Unk				Perm	Temp		Unk		
Am Ind/Alas	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1		
Asian	13	2	79	0	94	4	1	26	0	31	0	0	0	0	0	0	125		
Bl/Afr Am	2	0	0	0	2	1	0	0	0	1	0	0	0	0	0	0	3		
Hisp/Lat	5	1	7	0	13	3	0	3	0	6	0	0	0	0	0	0	19		
Haw/Pac Is	2	0	0	0	2	1	0	0	0	1	0	0	0	0	0	0	3		
White	116	4	29	0	149	37	1	10	0	48	1	0	0	0	0	1	198		
Unknown	7	0	1	3	11	2	0	1	0	3	0	0	0	0	0	0	14		
TOTAL	146	7	116	3	272	48	2	40	0	90	1	0	0	0	0	1	363		

Math Public Medium Group

Doctorate Granting Departments of Mathematics

40 of 40 departments responding (0 with no degrees)

	MEN					WOMEN					Neither					TOTAL			
	Citizenship					Citizenship					Citizenship								
	US	Non-US				Total	US	Non-US				Total	US	Non-US				Total	
		Perm	Temp	Unk				Perm	Temp	Unk				Perm	Temp		Unk		
Am Ind/Alas	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1		
Asian	3	2	70	2	77	4	2	32	0	38	0	0	0	0	0	0	115		
Bl/Afr Am	4	2	8	0	14	0	0	1	0	1	0	0	0	0	0	0	15		
Hisp/Lat	2	1	8	0	11	1	0	2	0	3	0	0	0	0	0	0	14		
Haw/Pac Is	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
White	135	0	19	0	154	38	0	9	0	47	0	0	0	0	0	0	201		
Unknown	6	0	1	0	7	0	0	0	0	0	0	0	0	0	0	0	7		
TOTAL	151	5	106	2	264	43	2	44	0	89	0	0	0	0	0	0	353		

Math Public Small Group

Doctorate Granting Departments of Mathematics

67 of 68 departments responding (4 with no degrees)

	MEN					WOMEN					Neither					TOTAL			
	Citizenship					Citizenship					Citizenship								
	US	Non-US				Total	US	Non-US				Total	US	Non-US				Total	
		Perm	Temp	Unk				Perm	Temp	Unk				Perm	Temp		Unk		
Am Ind/Alas	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1		
Asian	9	1	49	1	60	7	3	24	1	35	0	0	0	0	0	0	95		
Bl/Afr Am	2	1	4	1	8	1	1	0	0	2	0	0	0	0	0	0	10		
Hisp/Lat	4	1	2	0	7	0	0	0	0	0	0	0	0	0	0	0	7		
Haw/Pac Is	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
White	74	2	19	0	95	27	1	5	0	33	2	0	0	0	0	2	130		
Unknown	3	0	0	0	3	2	2	2	0	6	0	0	0	0	0	0	9		
TOTAL	92	5	75	2	174	37	7	31	1	76	2	0	0	0	0	2	252		

Annual Survey of the Mathematical Sciences

www.ams.org/annual-survey

Table D.5: Profile of PhDs Awarded to Underrepresented Minorities (URMs)*
by Degree Granting Group and Citizenship, July 1, 2016 - June 30, 2017

	Number of PhDs Awarded to US Citizens & Permanent Residents	Underrepresented Minorities		Number of PhDs awarded to URMs	As % of Total URMs	As % of PhDs awarded to US Citizens & Permanent Residents within Group
		US Citizens	Permanent Resident			
Math Public Large	204	15	1	16	20%	7.8%
Math Public Medium	201	8	3	11	14%	5.5%
Math Public Small	143	7	3	10	12%	7.0%
Math Private Large	108	2	0	2	2%	1.9%
Math Private Small	47	6	0	6	7%	12.8%
Applied Math	84	8	1	9	11%	10.7%
Statistics	132	11	1	12	15%	9.1%
Biostatistics	110	14	1	15	19%	13.6%
Total	1029	71	10	81	100%	

* Underrepresented minorities include any person, who is a U.S. Citizen or Permanent Resident, who is Black or African American, Hispanic or Latino, American Indian, Alaska Native, Native Hawaiian or Other Pacific Islander.

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table E.1: Employment Status of 2016-2017 Doctoral Recipients in the Mathematical Sciences by Type of Degree-Granting Department

Type of Employer	Math Public Large	Math Public Medium	Math Public Small	Math Private Large	Math Private Small	Applied Math	Statistics	Biostatistics	Total	Female	Male	Neither
Math Public Large	48	12	2	18	3	2	4	0	89	16	73	0
Math Public Medium	20	28	7	7	4	7	1	0	74	22	52	0
Math Public Small	5	4	26	0	0	0	2	0	37	9	28	0
Math Private Large	25	6	0	45	4	2	3	1	86	14	72	0
Math Private Small	6	8	3	0	3	1	0	0	21	9	12	0
Applied Mathematics	3	3	0	2	1	9	3	0	21	5	16	0
Statistics	0	2	0	1	0	0	29	4	36	10	26	0
Biostatistics	0	0	1	0	0	1	7	26	35	13	22	0
Master's	8	17	11	0	4	0	3	2	45	15	29	1
Bachelor's	25	51	31	9	12	8	11	1	148	50	98	0
Two-Year Colleges	4	7	12	2	1	1	0	0	27	9	18	0
Other Academic Dept	15	34	19	16	9	16	34	27	170	53	116	1
Research Institute/ Other Nonprofit	11	8	3	8	2	9	8	13	62	19	43	0
Government	13	12	10	3	0	10	17	15	80	29	51	0
Business and Industry	64	56	38	35	14	52	148	68	475	148	326	1
Non-US Academic	40	34	13	37	9	9	14	2	158	42	116	0
Non-US Nonacademic	8	3	1	4	1	4	3	0	24	5	19	0
Not Seeking Employment	2	1	2	2	0	1	0	0	8	4	4	0
Still Seeking Employment	11	22	14	9	4	6	7	2	75	16	58	1
Unknown (US)	25	23	31	7	3	13	20	3	125	37	88	0
Unknown (non-US)*	30	22	28	9	12	7	37	16	161	52	109	0
Total	363	353	252	214	86	158	351	180	1957	577	1376	4
Female	90	89	76	43	26	38	119	96	577			
Male	272	264	174	171	59	120	232	84	1376			
Neither	1	0	2	0	1	0	0	0	4			

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table E.2: Employment Status of 2016-2017 Doctoral Recipients in the Mathematical Sciences
by Type of Degree-Granting Department with Citizenship

Type of Employer	Math Public Large	Math Public Medium	Math Public Small	Math Private Large	Math Private Small	Applied Math	Statistics	Biostatistics	Total	US Citizen	Non-US Citizen
Math Public Large	48	12	2	18	3	2	4	0	89	48	41
Math Public Medium	20	28	7	7	4	7	1	0	74	38	36
Math Public Small	5	4	26	0	0	0	2	0	37	30	7
Math Private Large	25	6	0	45	4	2	3	1	86	45	41
Math Private Small	6	8	3	0	3	1	0	0	21	13	8
Applied Mathematics	3	3	0	2	1	9	3	0	21	12	9
Statistics	0	2	0	1	0	0	29	4	36	14	22
Biostatistics	0	0	1	0	0	1	7	26	35	20	15
Master's	8	17	11	0	4	0	3	2	45	25	20
Bachelor's	25	51	31	9	12	8	11	1	148	119	29
Two-Year Colleges	4	7	12	2	1	1	0	0	27	18	9
Other Academic Dept.	15	34	19	16	9	16	34	27	170	98	72
Research Institute/Other Nonprofit	11	8	3	8	2	9	8	13	62	36	26
Government	13	12	10	3	0	10	17	15	80	65	15
Business and Industry	64	56	38	35	14	52	148	68	475	181	294
Non-US Academic	40	34	13	37	9	9	14	2	158	32	126
Non-US Nonacademic	8	3	1	4	1	4	3	0	24	2	22
Not Seeking Employment	2	1	2	2	0	1	0	0	8	6	2
Still Seeking Employment	11	22	14	9	4	6	7	2	75	51	24
Unknown (US)	25	23	31	7	3	13	20	3	125	102	23
Unknown (non-US)*	30	22	28	9	12	7	37	16	161	2	159
Total	363	353	252	214	86	158	351	180	1957	957	1000
US Citizen	195	194	131	100	44	75	121	97	957		
Non-US Citizen	168	159	121	114	42	83	230	83	1000		

Mathematical and Statistical Sciences Annual Survey
www.ams.org/annual-survey

Table E.3: Employment Status of 2016-2017 New Doctoral Recipients by Citizenship Status

Type of Employer	US Citizen	Non-US Citizens			TOTAL
		Permenant Visa	Temporary Visa	Unknown Visa	
US Employer	762	55	535	54	1406
US Academic	516	25	296	14	851
Math Public	116	5	74	5	200
Math Private	58	2	46	1	107
Applied Mathematics	12	1	8	0	21
Statistics	14	1	20	1	36
Biostatistics	20	3	12	0	35
NonPhD	260	11	113	6	390
RI/NP	36	2	23	1	62
US Nonacademic	246	30	239	40	555
NonUS Employer	34	3	142	3	182
NonUS Academic	32	2	121	3	158
NonUS Nonacademic	2	1	21	0	24
Not Seeking	6	1	1	0	8
Seeking	51	3	20	1	75
Subtotal	853	62	698	58	1671
Unknown US	102	1	22	0	125
Unknown NonUS	2	11	125	23	161
Total	957	74	845	81	1957

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table E.4: Employment Status of 2016-2017 Doctoral Recipients by Field of Thesis

Type of Employer	Algebra/ Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/ Topology	Discr. Math./ Combin. /Logic/ Comp. Sci.	Probability	Statistics	Biostatistics	Applied Math.	Numerical Analysis/ Approxi- mations	Linear Nonlinear Optim./ Control	Differential, Integral, & Difference Equations	Math. Educ.	Other/ Unknown	Total
Math Public Large	18	8	15	8	3	4	0	15	6	0	12	0	0	89
Math Public Medium	20	1	15	2	4	4	0	12	3	2	8	2	1	74
Math Public Small	5	5	3	3	1	3	0	7	3	0	1	6	0	37
Math Private Large	22	4	19	8	8	3	1	3	2	2	13	1	0	86
Math Private Small	9	1	1	2	1	0	0	4	1	1	1	0	0	21
Applied Mathematics	1	0	0	2	1	2	0	9	1	0	3	1	1	21
Statistics	1	0	0	0	2	28	4	0	0	0	0	0	1	36
Biostatistics	0	0	0	0	1	7	25	2	0	0	0	0	0	35
Master's	6	4	4	7	3	8	2	3	3	1	3	1	0	45
Bachelor's	39	11	12	16	1	20	1	12	15	2	13	6	0	148
Two-Year Colleges	10	1	2	1	2	1	0	3	3	0	2	1	1	27
Other Academic Dept. Research Institute/ Other Nonprofit	13	4	7	11	4	41	24	40	6	1	10	7	2	170
Government	7	2	2	4	1	20	13	19	8	0	1	1	2	80
Business and Industry	25	13	15	18	24	190	58	66	30	7	25	0	4	475
Non-US Academic	40	10	25	13	6	17	2	16	11	4	12	1	1	158
Non-US Nonacademic	3	0	2	1	0	7	0	2	7	0	1	0	1	24
Not Seeking Employment	1	0	2	0	0	0	0	1	2	0	1	1	0	8
Still Seeking Employment	18	5	2	13	5	11	2	8	1	1	9	0	0	75
Unknown (US)	23	7	6	9	3	28	3	17	4	2	5	2	16	125
Unknown (non-US)*	14	6	11	9	8	45	15	18	7	3	6	0	19	161
Total	280	84	149	131	78	453	162	271	115	26	129	30	49	1957
Female	61	15	23	31	16	167	87	80	28	8	40	13	8	577
Male	218	69	126	99	62	286	75	190	87	18	88	17	41	1376
Neither	1	0	0	1	0	0	0	1	0	0	1	0	0	4

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table E.5: 2016–2017 New PhDs Employed in the US by Type of Degree-Granting Department

Type of Employer	Math Public Large	Math Public Medium	Math Public Small	Math Private Large	Math Private Small	Applied Math	Statistics	Biostatistics	Total
All Doctoral Mathematics*	107	61	38	72	15	21	13	1	328
Statistics & Biostatistics	0	2	1	1	0	1	36	30	71
Master's, Bachelor's, and 2-Year Colleges	37	75	54	11	17	9	14	3	220
Other Academic and Research Institutes	26	42	22	24	11	25	42	40	232
Government	13	12	10	3	0	10	17	15	80
Business and Industry	64	56	38	35	14	52	148	68	475
Total	247	248	163	146	57	118	270	157	1406

* Includes Doctoral Mathematics: Public Large, Public Medium, Public Small, Private Large, Private Small, and Applied Math.

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table E.6: Summary of 2016-2017 New PhDs Employed in the US
by Type of Employer and Citizenship

US Employer	Citizenship		Total
	US	Non-US	
Academic	516	335	851
All Doctoral Mathematics*	186	142	328
Statistics & Biostatistics	34	37	71
Masters, Bachelors, & 2-Year	162	58	220
Other Academic & Research Institutes	134	98	232
Government, Business & Industry	246	309	555
Total	762	644	1406

* Includes Doctoral Mathematics: Public Large, Public Medium, Public Small, Private Large, Private Small, and Applied Math.

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table E.7: Percentage of Employed New PhD's by Type of Employer

	Employed in US		Employed Outside the US		Total
	US Academic*	US Nonacademic	Non-US Academic	Non-US Nonacademic	
Fall 2012	59%	27%	12%	2%	1511
Fall 2013	56%	29%	13%	2%	1572
Fall 2014	56%	30%	12%	2%	1643
Fall 2015	52%	35%	11%	1%	1649
Fall 2016	54%	34%	10%	2%	1642
Fall 2017	54%	35%	10%	2%	1588
	851	555	158	24	

* Includes other academic departments and research institutes/other nonprofits.

Mathematical and Statistical Sciences Annual Survey
www.ams.org/annual-survey

Figure E.8 : New PhDs Employed in US Academic and US Business/Industry & Government by Degree-Granting Department Group, 2012-2017

Year	Math Public Large		Math Public Medium		Math Public Small		Math Private Large		Math Private Small		Applied Math		Statistics		Biostatistics		TOTAL	
	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government	Academic	Business/ Industry & Government
Fall 2012	201	67	153	57	107	29	103	34	42	5	66	27	132	116	90	52	894	387
Fall 2013	206	78	165	56	126	37	107	39	37	12	55	27	113	141	69	47	878	437
Fall 2014	198	70	187	60	108	39	120	40	58	14	69	27	122	158	64	45	926	453
Fall 2015	209	105	167	70	101	31	111	51	38	15	53	56	117	168	68	84	864	580
Fall 2016	205	106	164	69	140	45	113	58	44	19	53	67	95	143	70	58	884	565
Fall 2017	170	77	180	68	115	48	108	38	43	14	56	62	105	165	74	83	851	555

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table E.9: Academic Positions in the US Filled by New PhDs
by Type of Hiring Department, Fall 2012 to Fall 2017

Year	Math Public	Math Private	Applied Math	Statistics	Biostatistics	Master's and Bachelor's	Other	Total
Fall 2012	208	110	20	51	39	218	248	894
Fall 2013	247	97	16	45	35	208	230	878
Fall 2014	237	108	17	48	24	227	265	926
Fall 2015	233	88	28	47	36	210	222	864
Fall 2016	252	111	22	36	32	217	214	884
Fall 2017	200	107	21	36	35	193	259	851

Table E.10: Number of New PhDs Taking Positions US Academic Positions
by Type of Degree-Granting Department, Fall 2012 to Fall 2017

Year	Math Public Large	Math Public Medium	Math Public Small	Math Private Large	Math Private Small	Applied Math	Statistics	Biostatistics	Total
Fall 2012	201	153	107	103	42	66	132	90	894
Fall 2013	206	165	126	107	37	55	113	69	878
Fall 2014	198	187	108	120	58	69	122	64	926
Fall 2015	209	167	101	111	38	53	117	68	864
Fall 2016	205	164	140	113	44	53	95	70	884
Fall 2017	170	180	115	108	43	56	105	74	851

Table E.11: Number of New PhDs Taking Positions in Business and Industry
in the US by Type of Degree-Granting Department, Fall 2012 to Fall 2017

Year	Math Public Large	Math Public Medium	Math Public Small	Math Private Large	Math Private Small	Applied Math	Statistics	Biostatistics	Total
Fall 2012	57	46	23	30	4	34	105	41	340
Fall 2013	57	47	29	31	10	37	128	42	381
Fall 2014	54	48	33	37	12	44	145	36	409
Fall 2015	90	57	21	50	12	47	150	65	492
Fall 2016	96	56	38	54	14	56	133	48	495
Fall 2017	64	56	38	35	14	52	148	68	475

Mathematical Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table EE.9: Ethnicity Summary of 2016-2017 EENDR Respondents Employed in the US
by Type of Employer and Citizenship

US Employer	Ethnicity			Total
	Hispanic/Latino	Not Hispanic/Latino	Unknown	
Academic	20	369	3	392
Doctoral Math*	6	145	0	151
Statistics & Biostatistics	1	19	1	21
Masters, Bachelors, & 2-Year	5	121	0	126
Other Academic & Research Institutes	8	84	2	94
Government, Business & Industry	7	142	3	152
Total	27	511	6	544

* Includes Doctoral Mathematics: Public Large, Public Medium, Public Small, Private Large, Private Small, and Applied Math.

Mathematical Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table EE.6: Race Summary of 2016-2017 EENDR Respondents
by Type of Employment

Employer	Race																		Total
	American Indian/Alaska Native			Asian			Black/African American			Native Hawaiian/Other Pacific Islander			White			Unknown			
	US	Non-US	Total	US	Non-US	Total	US	Non-US	Total	US	Non-US	Total	US	Non-US	Total	US	Non-US	Total	
Academic	2	0	2	26	86	112	4	6	10	0	0	0	219	41	260	3	5	8	392
Doctoral Math*	1	0	1	7	43	50	2	2	4	0	0	0	71	23	94	0	2	2	151
Statistics & Biostatistics	1	0	1	1	11	12	1	0	1	0	0	0	6	0	6	1	0	1	21
Masters, Bachelors, & 2-Year	0	0	0	9	12	21	1	2	3	0	0	0	94	8	102	0	0	0	126
Other Academic & Research Institutes	0	0	0	9	20	29	0	2	2	0	0	0	48	10	58	2	3	5	94
Government, Business & Industry	1	1	2	18	38	56	5	1	6	1	0	1	70	11	81	3	3	6	152
Non-US Academic	0	0	0	3	22	25	1	2	3	0	1	1	11	19	30	0	2	2	61
Non-US Nonacademic	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	1	1	6
Not Seeking	0	0	0	1	1	2	0	0	0	0	0	0	1	0	1	0	0	0	3
Still Seeking	0	0	0	1	0	1	0	0	0	0	0	0	13	3	16	0	0	0	17
Unknown (NonUS)	0	0	0	0	2	2	0	0	0	1	0	1	0	1	1	0	0	0	4
Total	3	1	4	49	149	198	10	9	19	2	1	3	314	80	394	6	11	17	635

* Includes Doctoral Mathematics: Public Large, Public Medium, Public Small, Private Large, Private Small, and Applied Math.

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table F.1: Number and Percentage of 2016–17 New Female PhDs Produced by and Hired by
Doctoral-Granting Department Grouping

	Math Public Large	Math Public Medium	Math Public Small	Math Private Large	Math Private Small	Applied Math	Statistics	Biostatistics	Total
Females Produced	90	89	76	43	26	38	119	96	577
<i>Percentage¹</i>	25%	25%	30%	20%	30%	24%	34%	53%	29%
Female Hired	16	22	9	14	9	5	10	13	98
<i>Percentage²</i>	16%	22%	9%	14%	9%	5%	10%	13%	17%
<i>Percentage of Produced Hired³</i>	18%	25%	12%	33%	35%	13%	8%	14%	17%

¹ Females as a percentage of total produce.

² Females as a percentage of total female hires.

³ Females hired as a percentage of females produce by department grouping.

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table F.2: Employment Status of 2016-17 Female New Doctoral Recipients
by Citizenship Status

Type of Employer	US Citizen	Non-US Citizens			TOTAL
		Permenant Visa	Temporary Visa	Unknown Visa	
US Employer	228	20	154	19	421
US Academic	158	9	73	4	244
Math Public	39	3	31	1	74
Math Private	35	3	31	0	69
Applied Math	62	4	20	1	87
Statistics	27	4	16	0	47
Biostatistics	4	1	5	0	10
NonPhD	95	4	26	2	127
RI/NP	13	0	5	1	19
US Nonacad	70	11	81	15	177
NonUS Employer	6	3	38	0	47
NonUS Acad	6	2	34	0	42
NonUS Nonacad	0	1	4	0	5
Not Seeking	2	1	1	0	4
Seeking	5	1	10	0	16
Subtotal	241	25	203	19	488
Unk US	27	0	10	0	37
Unk NonUS	1	2	42	7	52
Total	269	27	255	26	577

Mathematical and Statistical Sciences Annual Survey

www.ams.org/annual-survey

Table F.3: Employment Status of 2016-2017 Female New Doctoral Recipients
by Type of Degree-Granting Department

Type of Employer	Math Public Large	Math Public Medium	Math Public Small	Math Private Large	Math Private Small	Applied Math	Statistics	Biostatistics	Total
Math Public Large	11	2	0	2	0	1	0	0	16
Math Public Medium	7	6	2	3	0	3	1	0	22
Math Public Small	1	0	7	0	0	0	1	0	9
Math Private Large	3	1	0	7	3	0	0	0	14
Math Private Small	4	2	2	0	1	0	0	0	9
Applied Mathematics	1	0	0	0	0	3	1	0	5
Statistics	0	1	0	0	0	0	8	1	10
Biostatistics	0	0	0	0	0	0	1	12	13
Master's	2	7	1	0	2	0	1	2	15
Bachelor's	10	13	10	2	5	5	4	1	50
Two-Year Colleges	1	1	4	2	0	1	0	0	9
Other Academic Dept. Research Institute/Other Notprofit	6	8	7	2	4	2	10	14	53
Government	2	0	1	2	1	3	4	6	19
Business and Industry	5	5	1	1	0	1	5	11	29
Non-US Academic	11	12	14	6	6	10	52	37	148
Non-US Nonacademic	10	13	4	5	1	2	7	0	42
Not Seeking Employment	1	0	1	0	0	1	2	0	5
Still Seeking Employment	1	0	2	1	0	0	0	0	4
Unknown (US)	2	3	5	2	1	1	2	0	16
Unknown (non-US)*	3	9	9	4	0	4	6	2	37
Total	9	6	6	4	2	1	14	10	52
	90	89	76	43	26	38	119	96	577