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Evaluating the Postdoctoral Fellowship Program at MSRI (SLMath)

2016-2023

Grantibly

Report prepared by
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Notice of Institute Name Change

Beginning in 2022-2023, the Mathematical Sciences Research Institute (MSRI) has become the Simons Laufer Mathematical Sciences Institute (SLMath). As this evaluation covers the period 2016-2023, the Institute is referred to as MSRI within this report.

Funder Statement

The Mathematical Sciences Research Institute (MSRI), now the Simons Laufer Mathematical Sciences Institute (SLMath), has been supported from its origins by the National Science Foundation, joined by the National Security Agency, over 100 Academic Sponsor departments, private foundations, and generous and farsighted individuals.

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Executive Summary

The in-depth analysis of the Mathematical Sciences Research Institute's (MSRI) Postdoctoral Fellowship Program, spanning from 2016 to 2023, offers a critical look at the program's achievements, demographic inclusivity, and areas necessitating further enhancement. This period has seen MSRI make strides in fostering diversity and equity within the mathematical sciences, a commitment that is mirrored in the demographics of its fellowship recipients compared to national figures.

Nationally, the landscape of postdoctoral fellowships in mathematics presents a skewed demographic, with an underrepresentation of women and minorities. According to data from the National Center for Science and Engineering Statistics Integrated Postsecondary Education Data System (IPEDS) Completion Survey, women and individuals from underrepresented minority groups have historically been less likely to earn degrees in mathematics at the doctoral level (24% and 12%, respectively) than men, Asians and Whites. In contrast, the MSRI program has demonstrated a concerted effort to bridge this gap. With 31.8% of its fellows being women, the program surpasses the national average for female representation in mathematical sciences postdoctoral roles. Furthermore, the inclusion of 14% fellows from underrepresented minority groups among U.S. citizens or permanent residents is commendable, showcasing MSRI's dedication to enhancing diversity within the field.

A survey of 220 former postdoctoral fellows from 2016-2023 was conducted by Dr. Lauren McClain of Grantibly on MSRI's behalf. The survey yielded a 70% response rate (n=154). The survey measured overall satisfaction with the program as well as satisfaction with specific areas, the impact on fellows' career trajectories, their number of coauthors, professional contacts, presentations, publications, and other measure of research success, their relationship with their mentors, and the impact of the COVID-19 pandemic (for those who were enrolled during that time). Fellows had the opportunity to provide feedback.

The survey data highlights the successes of the program, underscored by the high satisfaction rates among participants. An impressive 81% of fellows rated their experience within the program as either excellent or very good, a testament to the program's quality and its effectiveness in meeting the needs of its fellows. This high level of satisfaction is attributed to several key factors, including the quality of mentorship provided, the opportunities for professional development, and the collaborative environment that fosters innovative research and academic growth. Moreover, the program significantly contributes to career advancement, with a noteworthy 87% of respondents reporting that their fellowship experience had been crucial in securing new or improved professional positions.

Despite these strengths, the report identifies areas for improvement to further enhance the program's impact and effectiveness. Recommendations include expanding professional development opportunities, specifically enhancing training related to the academic job market, such as interview skills, transitioning to tenure-track positions, grant proposal writing, and navigating the peer review process. Additionally, the report suggests refining the mentorship component by ensuring more aligned pairings between fellows and mentors based on research interests, which could enrich the mentoring experience and further support fellows' career trajectories.

Another area highlighted for improvement involves providing more comprehensive support services for fellows, addressing mental health, well-being, and accommodations for invisible disabilities. This holistic approach to fellow support underscores the importance of addressing the full spectrum of needs that fellows may have, ensuring they have access to the resources necessary to thrive both professionally

and personally.

In sum, the MSRI Postdoctoral Fellowship Program stands as a beacon of excellence and diversity in the mathematical sciences. Its dedication to fostering an inclusive and supportive environment has not only contributed to the advancement of its fellows but also set a benchmark for diversity and inclusion within the academic community. While the program boasts numerous strengths, particularly in terms of career development, mentorship, and research opportunities, the outlined suggestions for improvement present a pathway for MSRI to further solidify its role as a leader in postdoctoral education. By addressing these areas, MSRI can continue to evolve, offering an even more enriching and supportive experience for future generations of mathematicians.

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Evaluating MSRI's Postdoctoral Fellowship Program

A Survey of 2016-2023 Postdoctoral Fellows
including some comparison to 2009-2016 and 2004-2009 Fellows and national IPEDS data

Introduction

Background

The Mathematical Sciences Research Institute (MSRI)'s Postdoctoral Fellows are associated with MSRI's scientific programs, which last for one or two semesters. These fellowships are intended for recent recipients of a Ph.D. in mathematics (typically within five years of the program) and are carefully structured to incorporate supervision by and collaboration with a research mentor. In addition to their assigned research mentor, at MSRI the fellows have the opportunity to interact with a broad swath of the mathematics community, from other postdocs to some of the foremost researchers in their field, allowing them to grow their professional network and fostering collaborations that could continue throughout their careers. Fellows are expected to be in residence at MSRI for the duration of the program and spend their time on research activities including writing papers, preparing grant proposals, and giving presentations at MSRI and other U.S. universities, as well as at national conferences. For the most recent funding period, the COVID-19 pandemic caused adjustments to the logistics of the program for some postdoctoral fellows. During the Spring 2020 semester, all activities were moved online after the onset of the pandemic. During the 2020-2021 academic year, there was a mix of virtual and in-person postdoctoral fellows. By the 2021-2022 academic year, all activities were in person again.

Since Fall 2004, MSRI has granted 569 postdoctoral fellowship awards associated with its scientific programs.

The MSRI directorate is dedicated to evaluating the impact of its postdoctoral fellowship programs and to improving these programs where possible. To this end, MSRI conducted a survey of fellows during the five program years from Fall 2004 to Spring 2009 and then again during the seven program years from Fall 2009 to Spring 2016. Those reports included related demographic data available from program records and were presented to the NSF.

MSRI recently contracted with Grantibly LLC, an evaluation research company, to conduct a similar survey of fellows who received their awards from Fall 2016 to Spring 2023. The findings are summarized in the present report, which is written in two parts. The first part is an analysis of the recent survey results and related demographic data in a format very similar to the previous reports. The second part is a comparative analysis of the three survey cohorts with some additional comparison to data available from the Integrated Postsecondary Education Data System (IPEDS) Completions Survey from the Department of Education published by the NSF National Center for Science and Engineering Statistics.

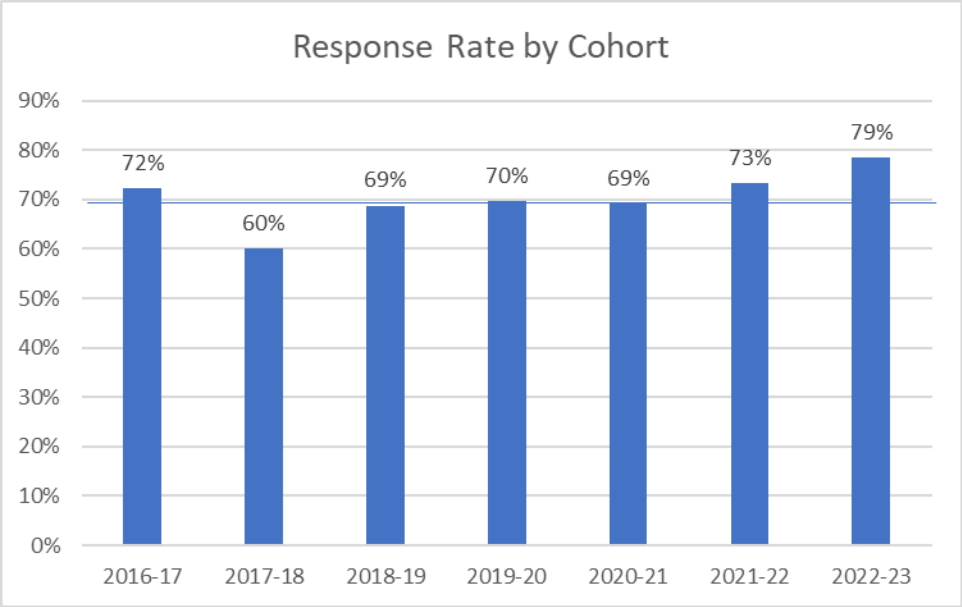
Methods

MSRI's Deputy Director Hélène Barcelo designed a survey in collaboration with independent consultant Amelia Taylor and MSRI staff member Alaina Drake-Moore. For the most recent iteration, Dr. Lauren McClain, Co-Owner, CEO, and Principal Evaluator of Grantibly LLC, was also consulted to add a few questions that supplement the overall evaluation. This survey asked about the current occupation of the fellows, the impact of the fellowship on fellows' careers, mentoring success, and research outcomes based on the work fellows conducted at MSRI. Additionally, a few more questions were added about the ongoing nature of the mentoring relationship established during the fellowship and the impact of the COVID-19 pandemic for those in the program during Spring 2020 to Spring 2021. These questions were formulated for multiple choice or numeric responses with two open-ended questions. The full survey can be found in Appendix A to this report.

We implemented this survey as an online survey through Survey Monkey. All 220 postdoctoral fellows from academic years 2016-2017 through 2022-2023 were contacted by email and asked to complete the survey. Demographic data was not collected as part of the survey as survey records were linked to program records of fellows. Thus, demographic analysis includes all 220 fellows and other analyses include only the survey respondents. We are explicit about this in the report.

The survey was open for just under two months, from August 21, 2023 to October 29, 2023. During that time, four reminder emails were sent. Email invitations bounced for 34 respondents. We used a google search to find current email addresses for those fellows, as it is likely they had moved jobs. We found 32 new email addresses and resent the invitation which yielded 24 responses after three reminders. We took the same approach for those whose emails did not bounce but who did not respond after two reminders. Out of 66 cases, we found 42 new email addresses, resent the invitation, and after three reminders, yielded 12 responses. Of the 220 fellows surveyed overall, 154 submitted responses for an overall response rate of 70%. The response rate is fairly consistent across the cohorts, with the lowest (60%) for the 2017-18 cohort and highest (79%) for the 2022-23 cohort (Figure 1). The average completion time was seven minutes.

FIGURE 1



Findings

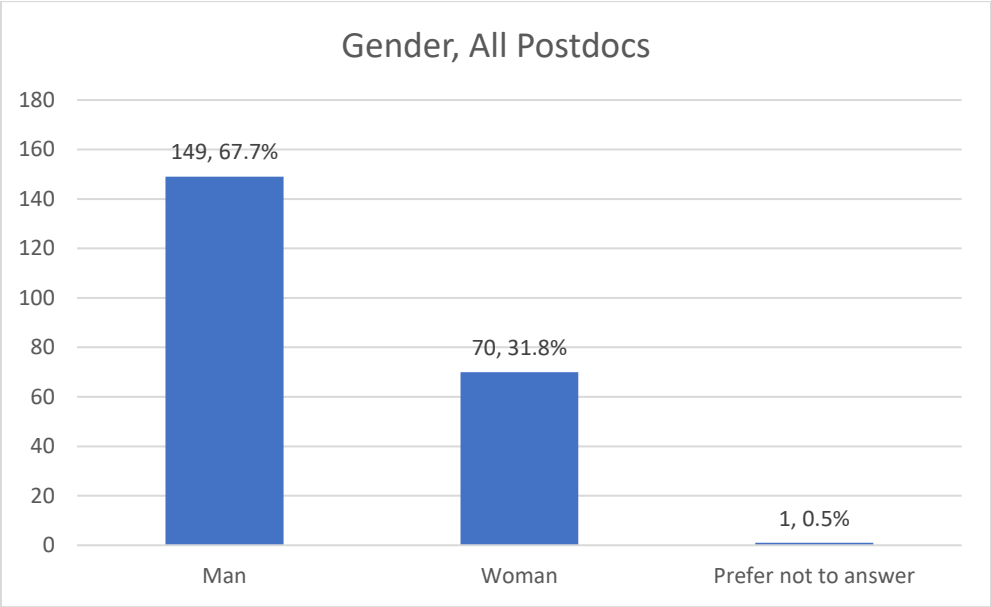
I.A. Description of the Population of Fellows

During the period covered by this survey, Fall 2016 through Spring 2023, MSRI granted 220 postdoctoral fellowship awards with cohorts ranging from 26 fellows in 2021-2022 to 36 fellows in 2016-2017, with an average cohort size of 31.4 per academic year. The Institute collected demographic data on these fellows from their fellowship applications, a check-in form that all fellows complete upon arrival, and a check-out form they complete upon departure.

Gender and Race/Ethnicity

Here we detail the **demographic data** of the postdoctoral fellows from 2016-2023. Of the present 220 fellows, 70 (31.8%) were women (Figure 2). Further, 135 (61.4%) identified themselves as White, 59 (26.8%) identified as Asian, 15 (6.8%) identified themselves as members of non-Asian minority groups including those who identified as bi- or multiracial, and 11 fellows (5%) explicitly declined to specify their race or ethnicity (Figure 3). Note that there is one person each who identified as Native American or Pacific Islander but both of those people also identified as another race/ethnicity so are categorized as bi- or multiracial. Of the 69 fellows who are U.S. Citizens or Permanent Residents (US/PR), 9 (14%, valid percent) are from underrepresented minority groups (URM), defined by the NSF as U.S. citizens and Permanent Residents who are Black, Hispanic/Latino, Native American, or Pacific Islander, or Bi- or Multi-racial (Figure 4). Three (4%) declined to specify their race/ethnicity).

FIGURE 2



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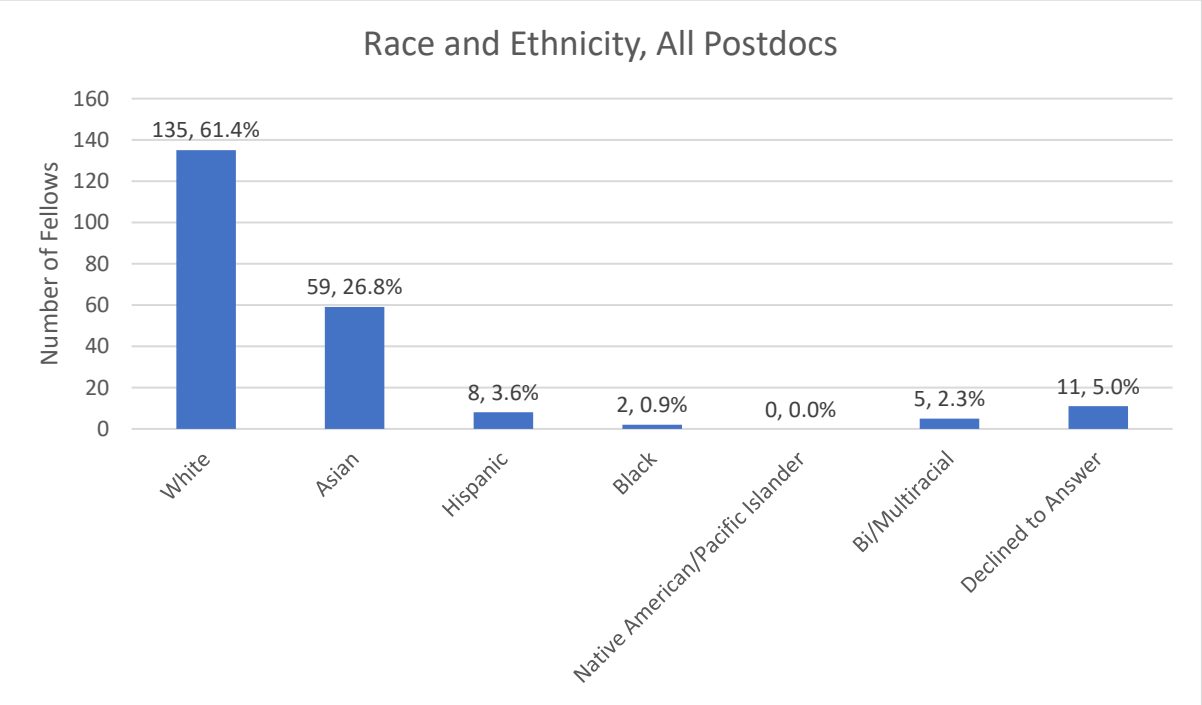
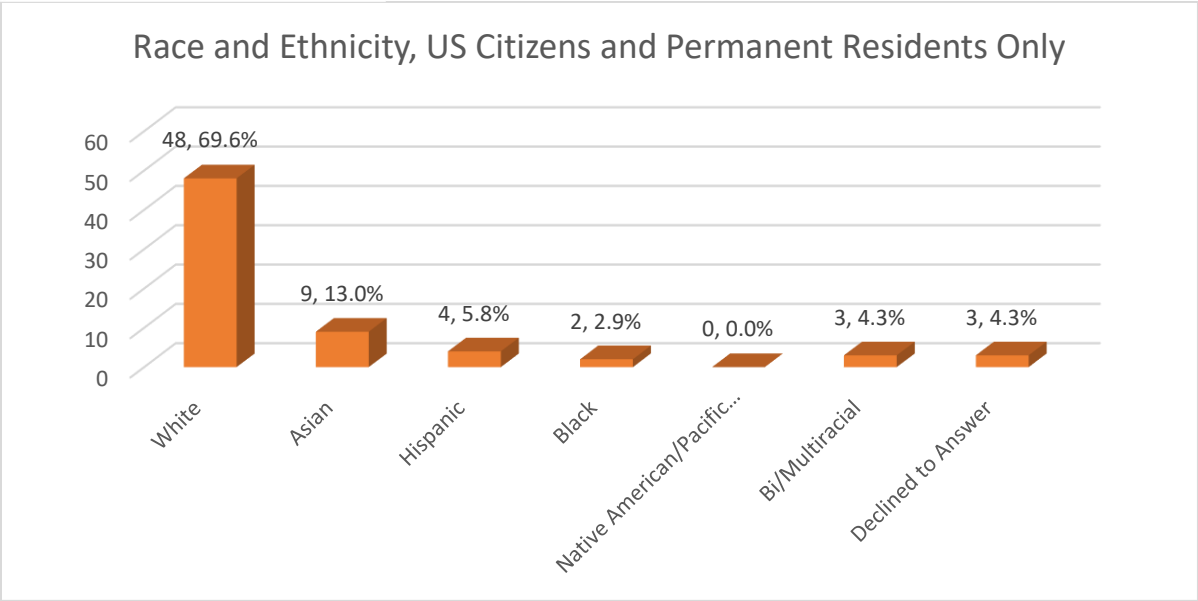
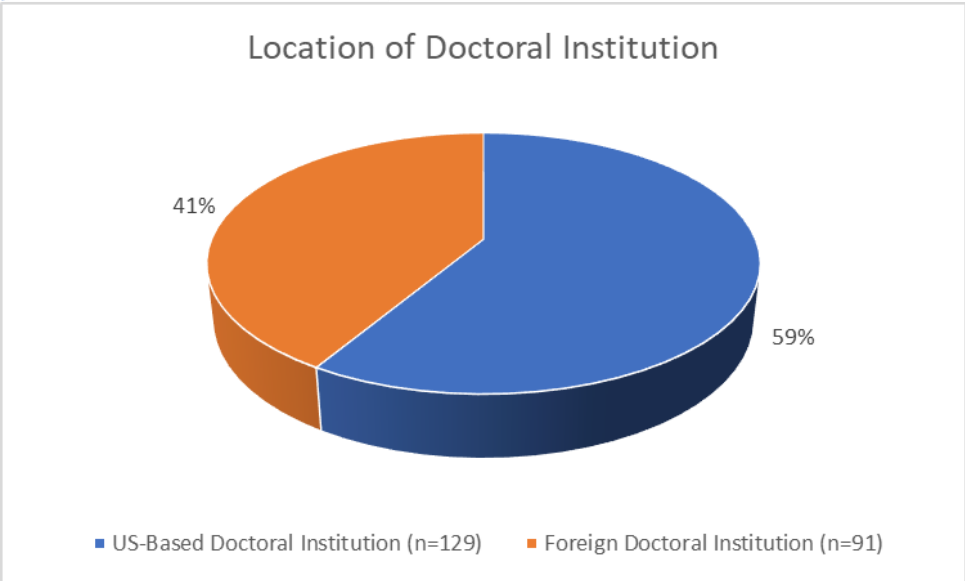


FIGURE 4



MSRI sets a goal of having 60% of its postdoctoral fellows coming from U.S.-based doctoral institutions. Figure 5 shows that over the observation period, they essentially reached that goal with 59% of fellows coming from U.S.-based institutions.

FIGURE 5



I.B. Comparisons of Demographics by Cohort

Table 1 shows descriptive statistics by cohort, including cohort size, US-based cohort size and percentage, percent underrepresented minority (URM), percent women overall and percent of US-based fellows who are women. We can see from this table that MSRI routinely exceeds its goal of having 60% of its fellows from US-based institutions. The average above was drawn down by the 2021-2022 cohort, which was a COVID-19-affected year and some of the program was offered virtually. This may have changed the dynamics of who decided to participate.

Table 1 also shows that the percentage of fellows who are underrepresented minorities is typically between 8-17%, however, in the 2021-2022 cohort, it was unusually high at 43% and unusually low for the 2022-2023 cohort (0%).

The percent of women fellows overall typically ranges from about a quarter to a third of all fellows and is a bit higher among fellows from U.S.-based institutions, again with 2021-22 and 2022-23 as outliers.

TABLE 1

Cohort Size, US Based Cohort Size, % US Based, % URM (US Citizens/PR Only), % Women (Overall), % US Based Women						
Academic Year	Cohort Size	US Based Cohort Size	% US Based	% URM*	% Women*	% USB Women
2016-2017	36	22	61%	8%	33%	36%
2017-2018	35	18	51%	14%	34%	50%
2018-2019	32	21	66%	17%	25%	29%
2019-2020	33	22	67%	8%	33%	36%
2020-2021	26	17	65%	10%	27%	50%
2021-2022	30	12	40%	43%	40%	17%
2022-2023	28	17	61%	0%	30%	25%

*Valid percent, does not count those who choose not to report their race or gender (0-1 postdocs per cohort); % URM is only for those who are US citizens or permanent residents; % Women is for all PDs; % USB Women is the percent of US Based postdocs who are women

There are no statistically significant differences in gender or race/ethnicity between this 2016-2023 wave and the earlier two waves of evaluation.

I.C. Comparison of Demographics with National Data

To compare MSRI cohorts with national data with respect to distributions of gender and race/ethnicity, we use data from the Integrated Postsecondary Education Data System (IPEDS) Completions Survey from the Department of Education that is conducted by the National Center for Education Statistics.

Figure 6 shows the percent of women in MSRI cohorts overall, the percent of US-Based women in MSRI cohorts, and the percent of US women who earned doctorates in mathematics each year. This figure goes back to 2009. After 2011 and until 2020, MSRI has a higher percentage of women overall and US-based women than the percentage of women nationally who earn doctorates in mathematics. In 2020 and 2021, the percentage of women overall remains higher than the national figure (and remains higher in 2022), however, the percentage of US-based women dipped a little below the national figure but then rose to meet the national percentage in 2022. As seen above, the pandemic years seem to deviate from the norm.

FIGURE 6

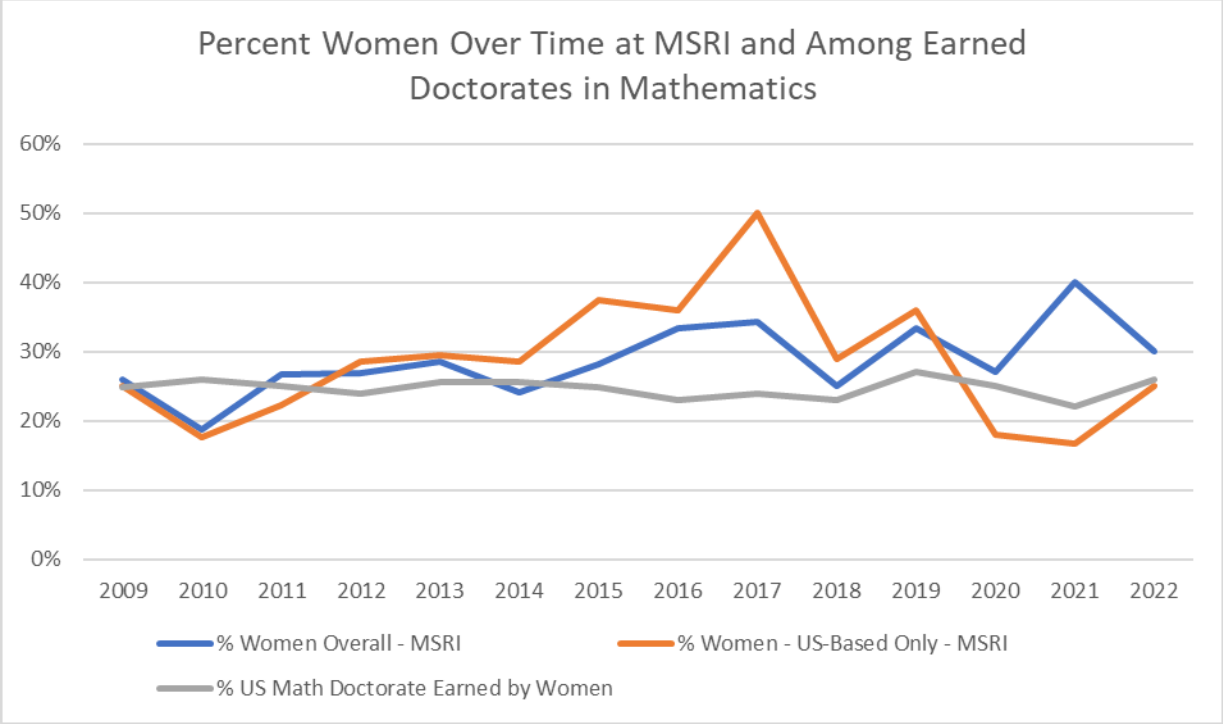
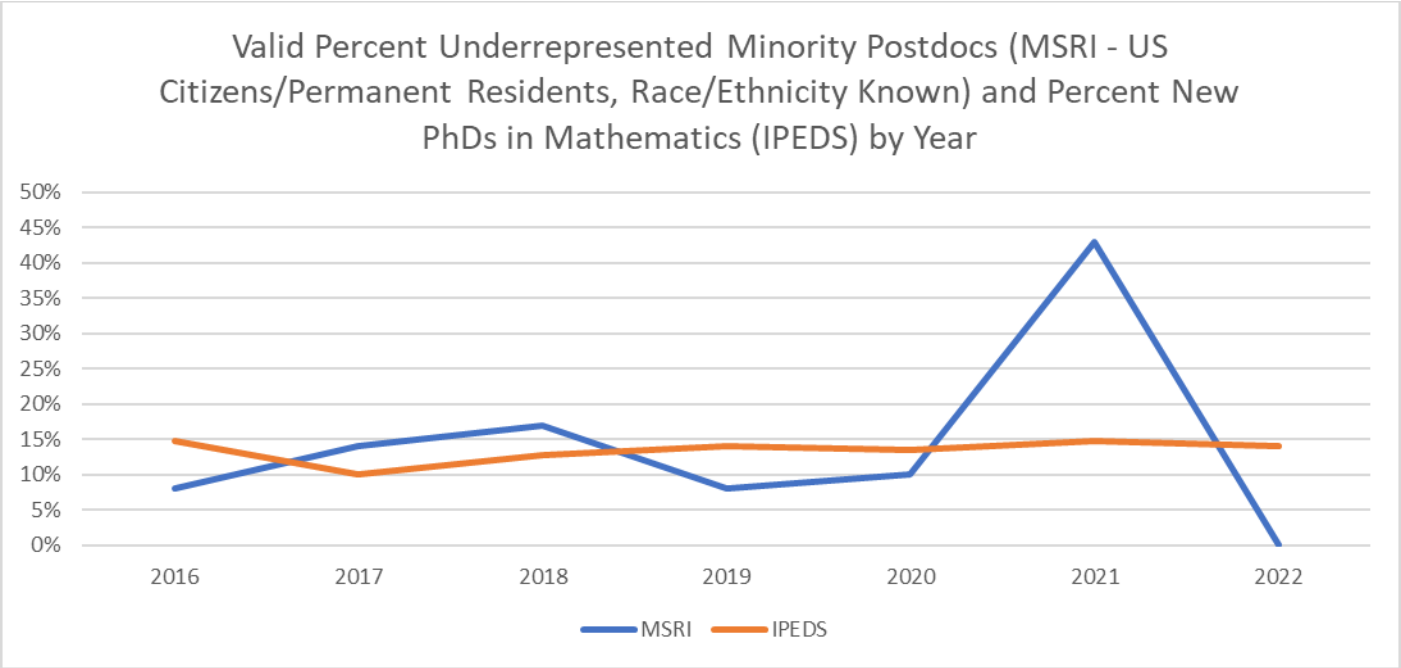


Figure 7 shows the percent of URM fellows and doctoral graduates among US citizens and permanent residents (PR) for the current years under review. We did not show the data starting in 2009 because the numbers of US citizens was small and the percentage of URMs is misleading. In this report we use the definition of URM accepted by the NSF which restricts the term to US citizens and permanent residents. Asians are not considered URM in mathematics. The proportion of URMs at MSRI is very similar to the proportion nationally, being a little higher in 2017 and 2018, much higher in 2021, and a little lower in 2016, 2019, 2020, and 2022. In terms of racial/ethnic diversity, however, this number is incomplete as it does not include the approximately 40% of international fellows in the program.

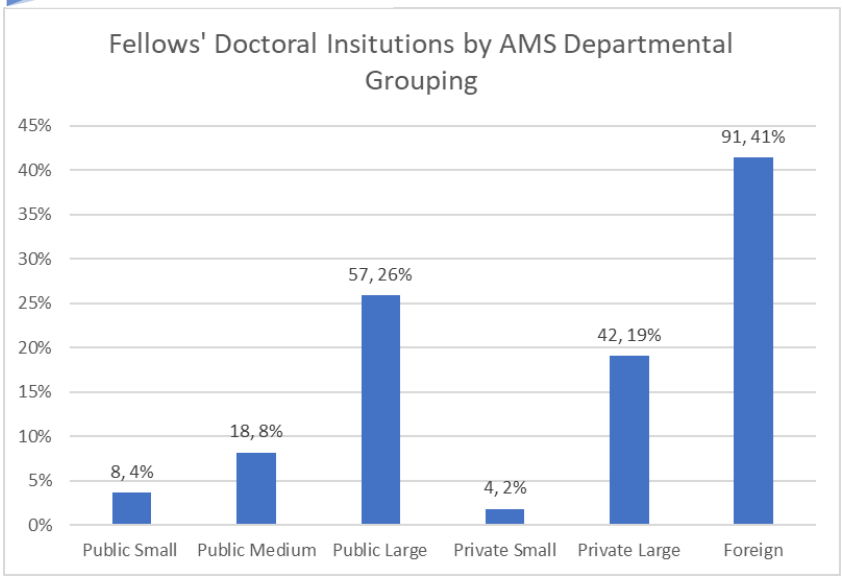
FIGURE 7



II. Ph.D. Granting Institution Category, Years Since Terminal Degree, and Ph.D. Granting Institution by Current Institution Type

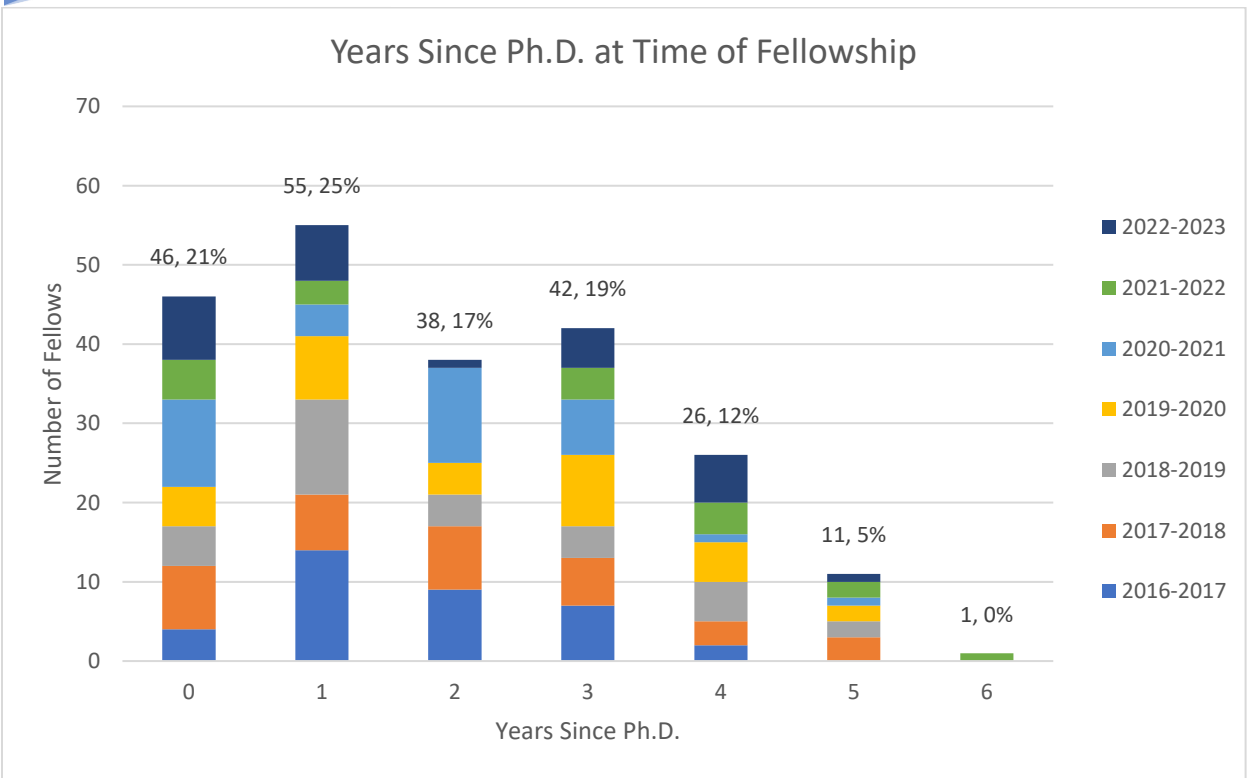
MSRI serves Ph.Ds. all over the world. From 2016-2023, 129 fellows (58.6%) earned their Ph.Ds. at US institutions and 91 (41%) earned their degree at a foreign institution (Figure 8). Most earned their degrees from Large Public (26%) or Large Private (41%) institutions. Furthermore, fellows came from 112 distinct doctoral institutions of which 51 (45.5%) are within the United States and 61 (54.5%) are foreign institutions (results not shown).

FIGURE 8



Of the fellows, 21% came to MSRI directly from graduate school which is down from 41.3% during the last evaluation period. Twenty five percent began their fellowship one year after earning their doctorate and another 19% began 3 years post-degree. On average, fellows began their fellowships 2 years after receiving their Ph.D. (Figure 9).

FIGURE 9



Another snapshot of the participants in the postdoctoral program is given by **comparing the type of fellows' PhD-granting institutions with that of their current home institution** (Table 2).

TABLE 2

AMS Grouping of Ph.D.-Granting Institution vs. Current Institution												
Ph.D. Granting Institution	Current Institution											
	Public Large	Public Medium	Public Small	Private Large	Private Small	Group M	Group B	Foreign	Non-group	N/A	Unemployed	**Totals (100%)**
Public Large	16 (29%)	3 (5%)	3 (5%)	12 (21%)	3 (5%)	1 (2%)		13 (23%)	3 (5%)	2 (4%)		56
Public Medium	5 (29%)	3 (18%)	1 (6%)	3 (18%)	1 (6%)		2 (12%)	1 (6%)		1 (6%)		17
Public Small	3 (38%)	2 (25%)	1 (13%)	1 (13%)				1 (13%)				8
Private Large	9 (23%)	2 (5%)	1 (3%)	13 (33%)				9 (23%)	3 (8%)	2 (5%)		39
Private Small	1 (25%)			3 (75%)								4
Foreign	10 (11%)	4 (4%)		9 (10%)	2 (2%)			58 (64%)	2 (2%)	4 (4%)	1 (1%)	90
Totals (n)	**44 (20%)**	**14 (6%)**	**6 (3%)**	**41 (19%)**	**6 (3%)**	**1 (0%)**	**2 (1%)**	**82 (37%)**	**8 (4%)**	**9 (4%)**	**1 (0%)**	**220**

*Notes: All cells where there were zero responses are blank for readability. For 6 people (3% of total), their institution categories were unknown

Table 2 shows the current institution categorization fellows are working currently by the categorization of their Ph.D. granting institution. The percentages are row percentages so we can see where folks landed by where they went to school. Categorizations come from AMS. Group M are schools with a Master's program (but no doctoral program) and Group B are schools with a Bachelor's degree only. Our hope is that completing a postdoctoral fellowship at MSRI would enable scholars to obtain a job at an institution a tier higher than, or at least at the same level, where they obtained their doctorate. These categorizations are a way to rank institutions in lieu of a formal ranking system.

This hypothesis does appear to be supported. All four students who came from Private Small institutions got a job at either a Public Large or Private Large institution. Similarly, of the eight students who came from Public Small schools, 51% landed at Public or Private Large schools and another 25% at a Public Medium school. Postdocs who came from Public Medium schools found jobs at the same level or above, with only a small percentage who ended up at a lower-level university. Those who came from Large universities mostly found jobs at other Large universities with only a few stepping down to Medium or Small schools. Foreign schools are only categorized as such so we do not know the level of prestige among those. Overall, 82 of 220 (37%) fellows are currently employed at a foreign institution, with 58 (70%) of those fellows also receiving their Ph.D. from a foreign school and 30% receiving their Ph.D. from a U.S. institution.

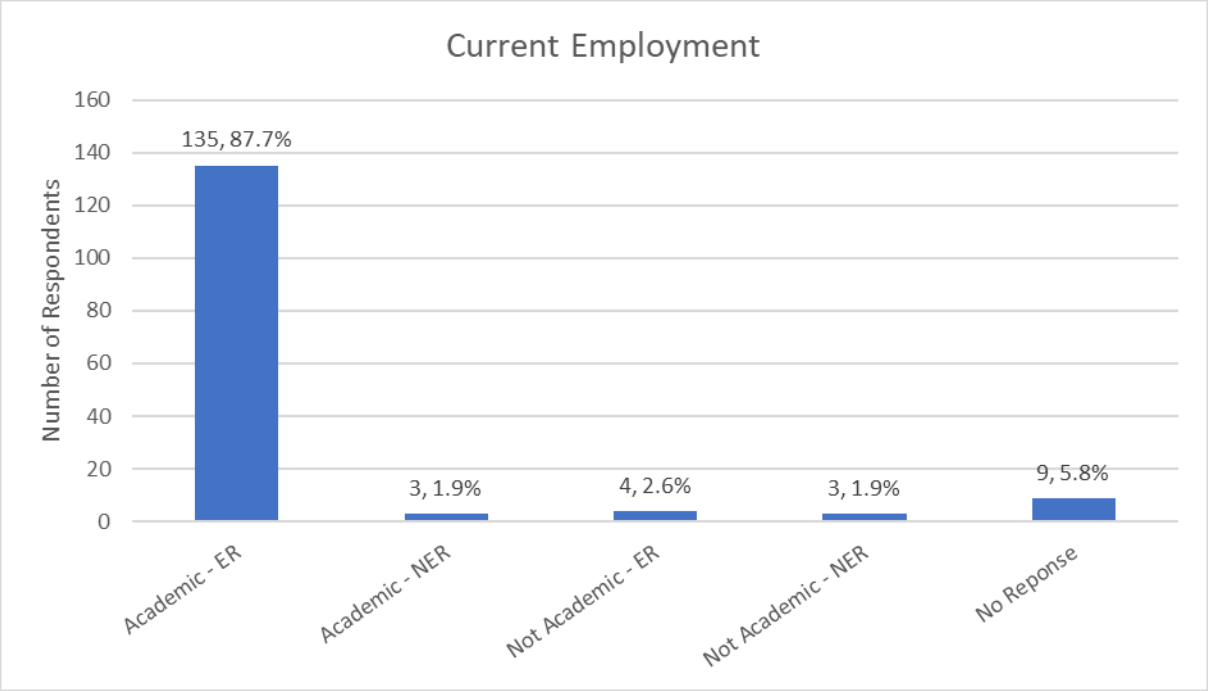
III.A. Current Occupation of Respondents

Similar to the previous survey, we used a series of questions about respondents' current employment with different paths depending on initial answers to try to get a more fine-grained picture of the career paths of fellows.

At the top level we asked respondents to identify **whether they are currently employed in academia, government, or neither and whether or not they engage in research activities** in their current position. None of the respondents classified their current employment as being in government; thus, in Figure 10 we have shortened "non-government, non-academic" to "not academic" to facilitate the plot. We have also abbreviated "engaged in research" as "ER" and "not engaged in research" as "NER" for the same reason.

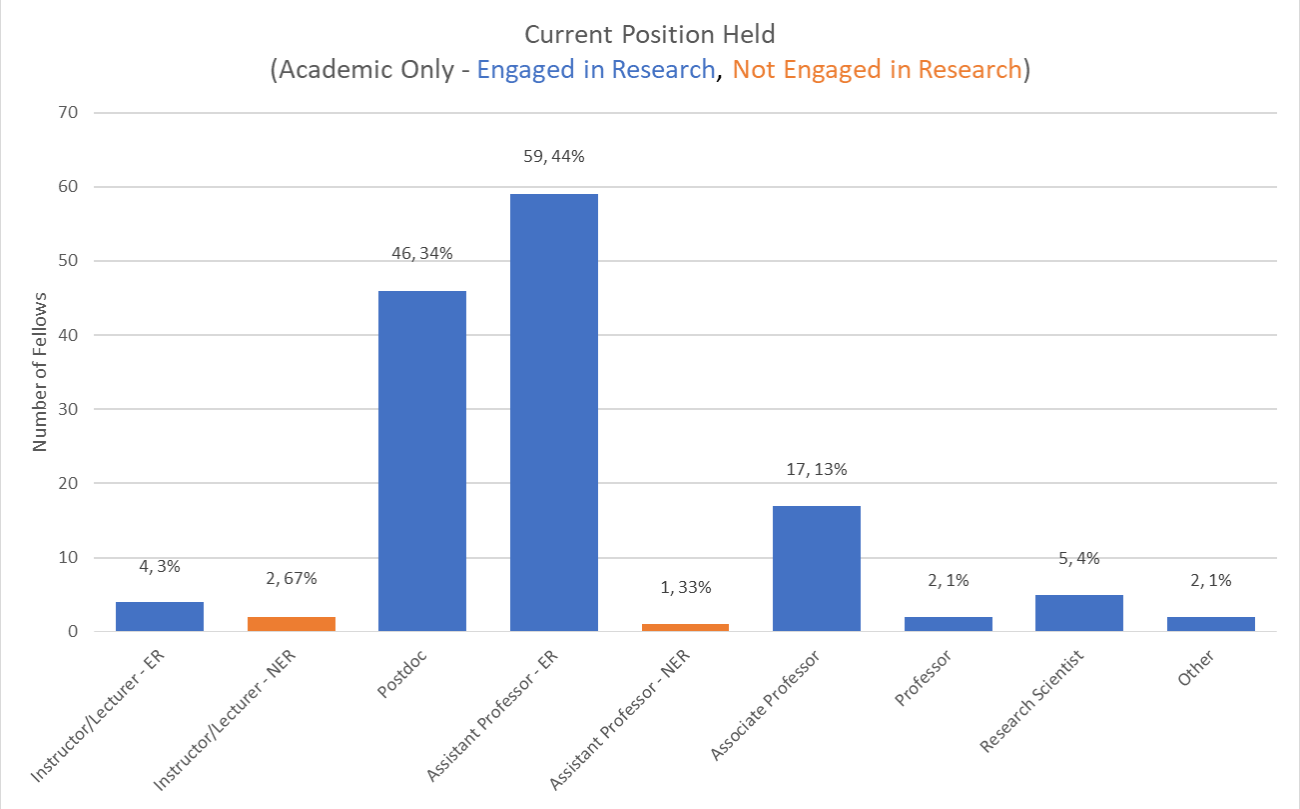
Of the 154 respondents, 89.6% are still in academia while 4.5% are in jobs they classified as neither governmental nor academic and 5.8% did not answer this question (Figure 10). Approximately 90% of respondents from all employment categories engage in research activities in their current positions, while 3.8% do not and 5.8% did not answer this question (Figure 10).

FIGURE 10



We used the question, **"What position do you currently hold?"** to get a picture of the jobs fellows obtain both in academia and for those who shifted away from academic jobs. Using the common responses from the previous evaluation, this was a closed-ended question with an 'Other' option where respondents could write in their current position if it did not fit one of the given options. As most respondents are still in academia, Figure 11 is limited to them. Of the three who are in academic positions not engaged in research, two are Instructors/Lecturers and one is an Assistant Professor. Of those who are in positions engaged in research, 3% are instructors/Lecturers, 34% are in another postdoctoral position, 44% are Assistant Professors, 13% are Associate Professors, 1% are Professors, 4% are Research Scientists, and 1% listed "Other" and wrote that they are a Senior Research Associate and a Research Fellow.

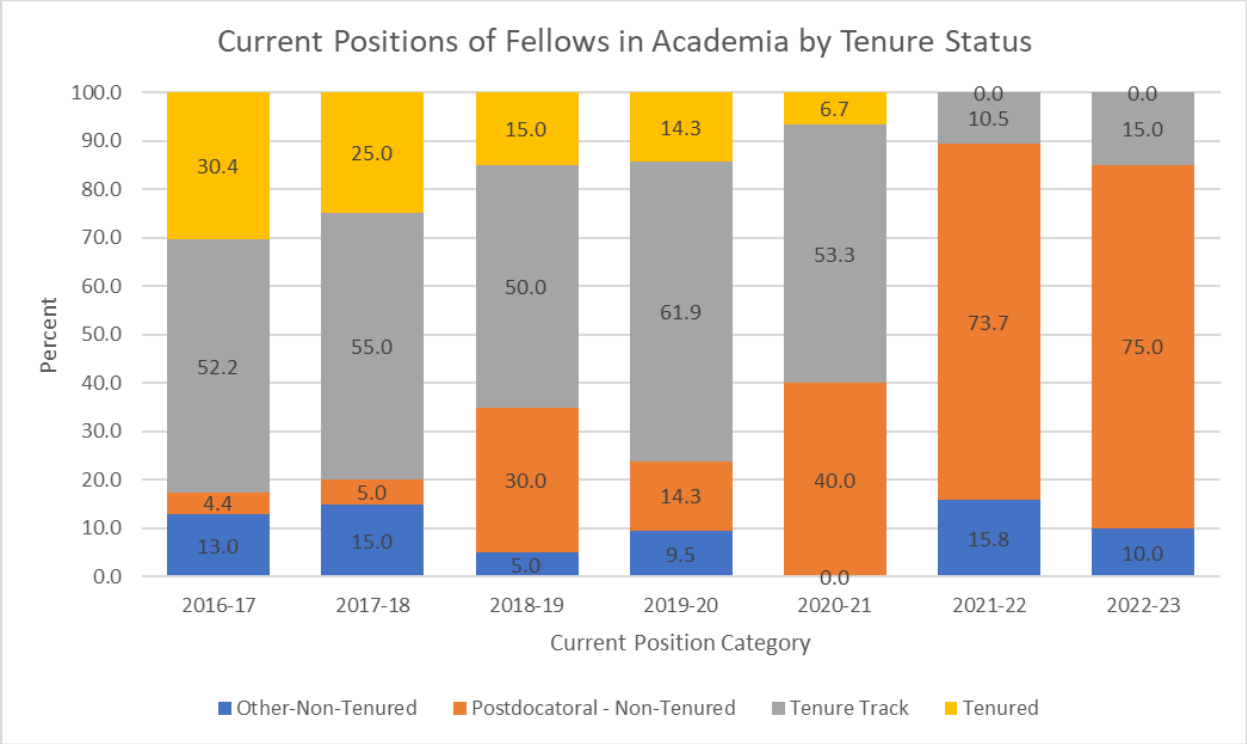
FIGURE 11



Of those who are no longer in academia (7), they hold the following positions: postdoc (1), research scientist (2), software engineer (1), risk manager in banking (1), quantitative researcher (1), and 1 is currently unemployed.

This survey did not formally ask about tenure status. We used the position titles above along with knowledge of mathematics departments around the world to infer tenure status and acknowledge that we should ask this question explicitly in the future. We break the positions out by cohort as this illustrates that, as expected, the number of respondents in the inferred non-tenure positions generally decreases and those in tenure-track and tenured positions generally increase as the cohorts age (Figure 12).

FIGURE 12



III.B. Current Salary

New to the survey this round is a question about salary. Results can be found in Table 3. Twenty-four people did not report their salary. For descriptive statistics, the $10,000 ranges were coded to their midpoint. The category of $50,000 or less was coded to $40,000 and the category of greater than $160,000 was coded to $175,000. The highest paid survey respondents are not academics with an average annual income of $123,333, however, since there are only six non-academics, we are not listing their salaries to protect their identity and privacy. Among academics engaged in research, the salary range is fairly wide with an average of $79,846.15 and a standard deviation of $29,484.84. The minimum is less than $50,000 (coded as $40,000) and the maximum is between $140,001 and $150,000 (coded to $145,000).

TABLE 3

Salary Among Academics Engaged in Research	
	Academic Engaged in Research
	(n=122)
$50,000 or less	17 13.9%
$50,001-$60,000	13 10.7%
$60,001-$70,000	23 18.9%
$70,001-$80,000	15 12.3%
$80,001-$90,000	14 11.5%
$90,001-$100,000	10 8.2%
$100,001-$110,000	16 13.1%
$110,001-$120,000	8 6.6%
$120,001-$130,000	3 2.5%
$130,001-$140,000	2 1.6%
$140,001-$150,000	1 0.8%
Greater than $160,000	0 0%
Total	122 93.9%

III.C. Career Satisfaction and Stability

We added two questions in the current evaluation – "How satisfied are you with your career?" and "How likely are you to change career fields in the next 5 years?" These questions were added as there are is a trend of faculty in higher education being dissatisfied with their careers and leaving academia for industry jobs (Flaherty, 2022; Schmiedehaus, Cordaro, Perrotte, Stern, Dailey, & Howard, 2023). We wanted to see if those who go through the fellowship seem to be more committed to an academic career, if that is in fact the path they took. Tables 4 and 5 show the distribution of career satisfaction and likelihood of changing career fields in the next five years (respectively) for academics and non-academics engaged in research and not engaged in research.

Academics engaged in research report a high level of satisfaction with their careers with 88% reporting that they are satisfied or very satisfied with their careers. Two percent are dissatisfied or very dissatisfied and 10% are neutral. Only one academic not engaged in research is very satisfied with their career while two others are dissatisfied. Non-academics engaged in research are very satisfied or satisfied with their careers (75%) while only one (25%) is neutral. Of the four non-academics not engaged in research, one is at each level of satisfaction except very satisfied.

TABLE 4

Career Satisfaction								
	Academics				Non-Academics			
	Engaged in Research		Not Engaged in Research		Engaged in Research		Not Engaged in Research	
	n	%	n	%	n	%	n	%
Very satisfied	49	36%	1	33%	2	50%	0	0%
Satisfied	70	52%	0	0%	1	25%	1	25%
Neither satisfied nor dissatisfied	13	10%	0	0%	1	25%	1	25%
Dissatisfied	2	1%	2	67%	0	0%	1	25%
Very dissatisfied	1	1%	0	0%	0	0%	1	25%

When it comes to the likelihood of changing careers in the next five years, among non-academics overall, only one reports it is likely while all the others report a neutral likelihood or that it is unlikely. Among academics not engaged in research, one is very likely to change careers, one is neutral, and one is unlikely to change. Since 88% of academics engaged in research are satisfied with their careers (Table 4), it makes sense that 71% are unlikely or very unlikely to change careers in the next five years while 21% are neutral, 6% are likely and 2% are very likely to change careers.

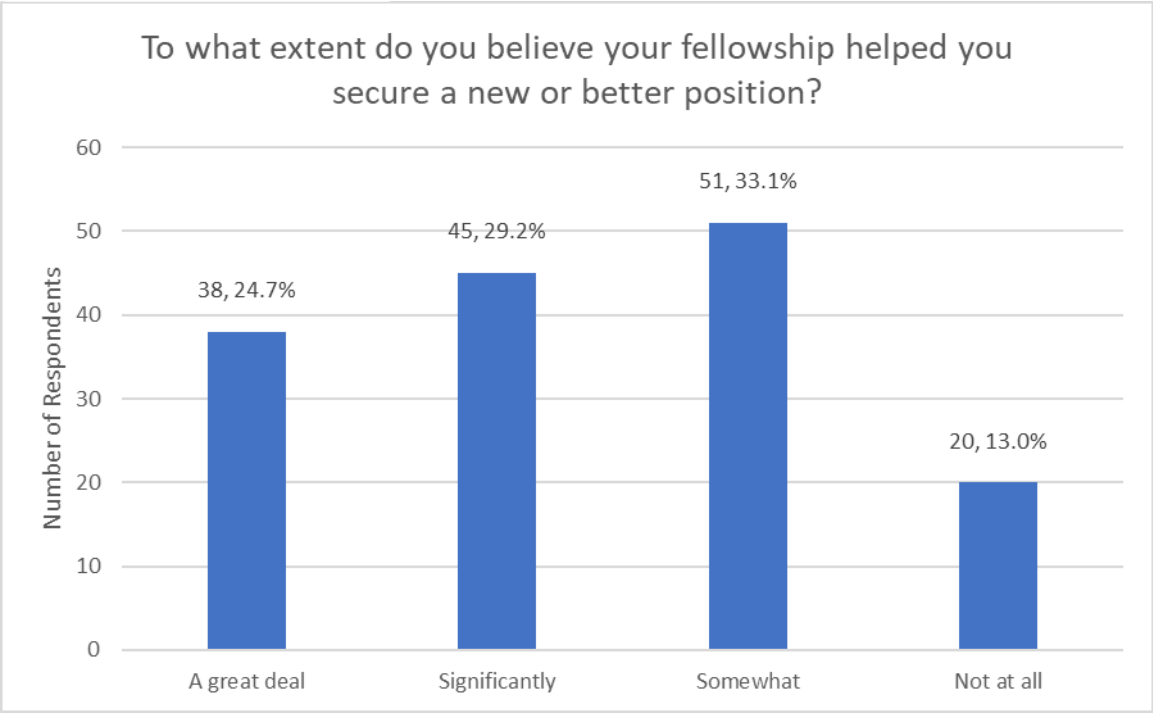
TABLE 5

Likelihood of changing career fields in the next 5 years								
	Academics				Non-Academics			
	Engaged in Research		Not Engaged in Research		Engaged in Research		Not Engaged in Research	
	n	%	n	%	n	%	n	%
Very likely	3	2%	1	33%	0	0%	0	0%
Likely	8	6%	0	0%	1	25%	0	0%
Neither likely nor unlikely	29	21%	1	33%	1	25%	1	33%
Unlikely	48	36%	1	33%	1	25%	1	33%
Very unlikley	47	35%	0	0%	1	25%	1	33%

IV. Impact of Fellowship on Fellows' Careers

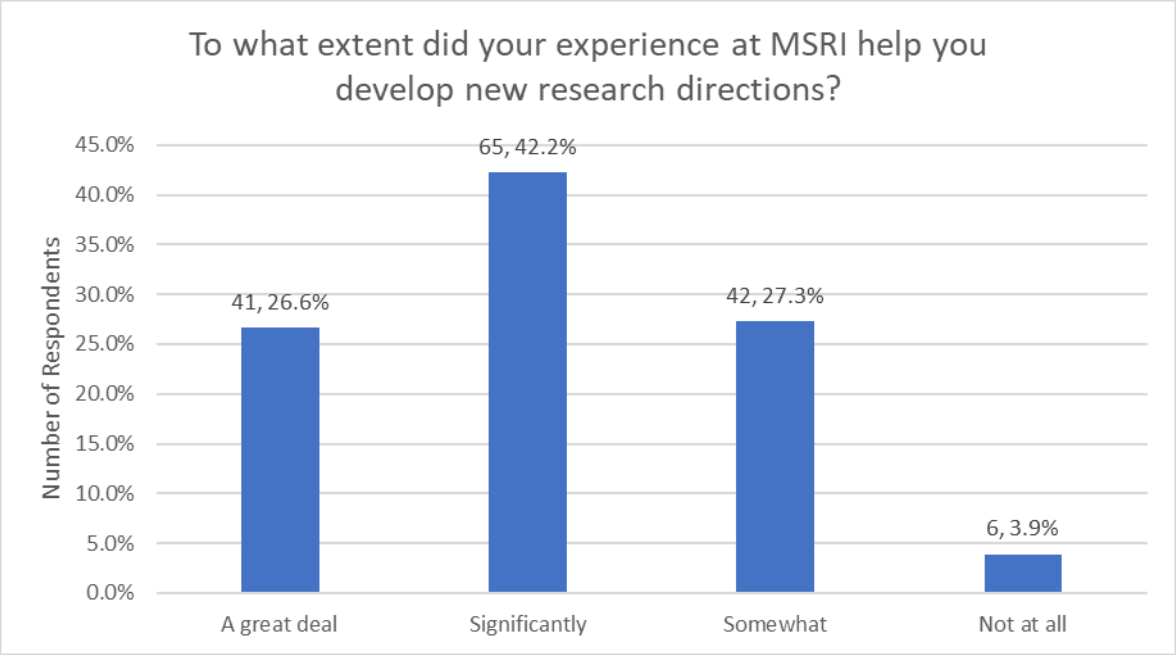
Three survey questions solicited subjective evaluations of the impact the fellowship had on respondents' subsequent careers. When asked **to what extent their fellowship helped them secure a new or better position**, 53.9% of respondents answered either "significantly" or "a great deal" (Figure 13). While the survey was open, we received an inquiry about how to respond if they had not changed positions since the fellowship as this was a required question to continue the survey. We instructed respondents to select "not at all" as that seemed most accurate. After receiving that question, in future reminders, we included that instruction. Therefore, that should be taken into account when examining the 13% of respondents who said their MSRI fellowship did not help them secure a new or better position. In the future, we plan to include a response category to indicate that they have not attempted to secure a new or better position since the fellowship.

FIGURE 13



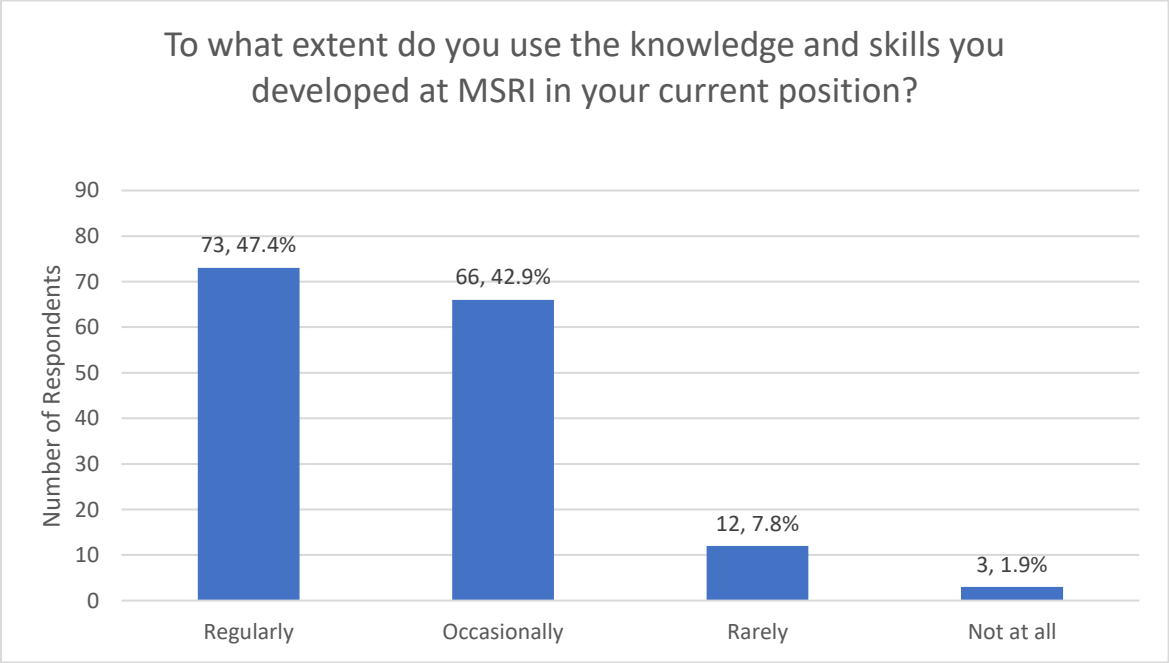
To assess **the degree to which the postdoctoral experience aided in the development of new research**, fellows were asked to what extent their experience at MSRI helped them develop new research directions; 68.8% of respondents answered either "significantly" or "a great deal" (Figure 14).

FIGURE 14



In order to gauge the effect of the postdoctoral fellowship on fellows' research capability, the survey asked about **the extent to which fellows use knowledge and skills obtained during their fellowship in their current position**. We observe that 47.4% of respondents answered "regularly" and another 42.9% answered "occasionally," with only 9.7% answering "rarely" or "not at all" (Figure 15).

FIGURE 15



V.A. Research Outcomes

The survey solicited data on standard measures of research productivity such as the fellows' **number of publications, the number of presentations given, and the amount of funding obtained**. For some of the results that follow (Tables 6-9), fellows were asked to limit their responses to outcomes based at least partly on work done during their time at MSRI. We further asked questions about total papers, funding obtained since the fellowship, and if they applied for any patents (Tables 10-12).

In each table (Tables 6-12), we provide the data by cohort. As we might expect, older cohorts typically have higher numbers, particularly for papers (Tables 6, 11) and presentations (Table 7).

The total number of papers published that resulted from work at MSRI is 342 over 7 cohorts. Further, the median number of papers resulting from work done at MSRI per person ranges from 0.5 for the most recent cohort to 3 for the oldest cohort (Table 6). The total number of presentations resulting from work done at MSRI is 853. The median number of presentations was 1.5 to eight for the current cohorts under review (Table 7).

TABLE 6

Estimate the number of papers you have published which resulted from your work at MSRI					
Program Year	Published papers MSRI Work	Number of Respondents	Mean per Respondent	Median per Respondent	Range per Respondent
2016-2017	97	24	4.04	3	0-15
2017-2018	65	18	3.61	2.5	0-15
2018-2019	44	19	2.32	2	0-5
2019-2020	46	22	2.09	2	0-6
2020-2021	33	16	2.06	1.5	0-6
2021-2022	39	19	2.05	2	0-5
2022-2023	18	20	0.09	0.5	0-3

TABLE 7

Estimate the number of presentations you have given based on your work at MSRI					
Program Year	Total Number of Presentations	Number of Respondents	Mean per Respondent	Median per Respondent	Range per Respondent
2016-2017	224	24	9.33	8	0-30
2017-2018	183	18	10.17	5	0-60
2018-2019	110	19	5.79	5	0-15
2019-2020	151	22	6.86	5	0-25
2020-2021	77	16	4.81	3.5	0-15
2021-2022	90	19	4.74	4	0-10
2022-2023	18	20	2.55	1.5	0-10

MSRI values collaboration on research. Table 8 shows the estimated number of new coauthors fellows gained through their experience at MSRI. While there were some in each cohort who did not gain any new coauthors, the maximum ranged from four to 10 new coauthors with a median per respondents ranging from 0 to 3. The cohort with a median of 0 is the 2019-2020 cohort, which may have been limited in developing lasting collaborative relationships due to the onset of the COVID-19 pandemic.

TABLE 8

Estimate the number of new coauthors you have gained as a result of your experiences at MSRI					
Program Year	Total Number of New Co-authors	Number of Respondents	Mean per Respondent	Median per Respondent	Range per Respondent
2016-2017	78	24	3.25	3	0-10
2017-2018	42	18	2.33	1.5	0-10
2018-2019	34	19	1.79	2	0-5
2019-2020	22	22	1	0	0-5
2020-2021	22	16	1.38	1	0-4
2021-2022	58	19	3.05	3	0-8
2022-2023	35	20	1.75	1	0-6

Table 9 shows the estimated number of professional contacts respondents gained as a result of their experience at MSRI. The total number of estimated contacts across respondents in all cohorts under review is 1,411 contacts. Likely these are not all unique contacts. The range per respondent is 0-60 across cohorts with medians ranging from 5.5 to 10.

TABLE 9

Estimate the number of professional contacts you have gained as a result of your experience at MSRI					
Program Year	New Professional Contacts	Number of Respondents	Mean per Respondent	Median per Respondent	Range per Respondent
2016-2017	317	24	13.21	10	0-50
2017-2018	172	18	9.56	9	0-30
2018-2019	155	19	8.16	6	0-20
2019-2020	203	22	9.23	10	0-30
2020-2021	127	16	7.94	7	1-25
2021-2022	285	19	15	10	1-60
2022-2023	152	20	7.6	5.5	2-20

When looking at **funding obtained** (Table 10), 13 fellows reported successful grant proposals but did not list the funding amount ($0) and two fellows reported only $1 or $2 in funding – this is likely an error or the respondents simply did not want to report the amount but were required to enter a response. In Table 9, these fellows are included in the grant quantity columns (Grant Proposals Submitted, Grant Proposals Funded, Number of Individuals Funded) but are excluded from the funding amount columns (Total Funds, Median per Funded Individual, Range per Funded Individual).

With the exception of the most recent cohort (2022-2023), former fellows who have applied for grant funding have been fairly successful (the percent of submitted proposals that were funded ranges from 45.4% to 61.82%). The median funding amount ranges from $5,000 to $366,500 with six maximums awards of $1 million or more. Note that the 2022-2023 cohort was only 4-9 months out from their postdoc at the time of the survey, which is not sufficient time to secure grant funding.

TABLE 10

Funding Obtained Post Fellowship

Program Year	Total Funds	Grant Proposals Submitted	Grant Proposals Funded	Number of Individuals Funded	% of Submitted Proposals that were Funded	Median $ per Funded Individual	Range per Funded Individual
2016-2017	$29,179,000	78	42	14	53.85%	$366,500	$3,000 - $22,000,000
2017-2018	$3,829,280	55	34	16	61.82%	$170,000	$20,000 - $897,000
2018-2019	$3,347,000	55	31	12	56.36%	$150,000	$10,000 - $2,000,000
2019-2020	$3,285,000	47	20	15	42.55%	$150,000	$1,000 - $1,070,000
2020-2021	$274,000	17	9	5	52.94%	$10,000	$4,000 - $250,000
2021-2022	$1,798,000	22	10	14	45.45%	$10,000	$6,000 - $1,600,000
2022-2023	$5,000	4	1	1	25.00%	$5,000	$5,000

We further asked for fellows' **total number of peer-reviewed publications**, regardless of whether the work was done at MSRI (Table 11). In total, fellows have published 1,524 articles which indicates that approximately 24% of articles published by fellows are from research they conducted while at MSRI.

TABLE 11

How many accepted, peer reviewed articles have you authored or co-authored?						
Program Year	Total Peer Reviewed Papers	% of Papers from Work Done at MSRI	Number of Respondents	Mean per Respondent	Median per Respondent	Range per Respondent
2016-2017	440	22.0%	24	18.33	16.5	2-45
2017-2018	280	23.2%	18	11.56	13	4-32
2018-2019	256	17.2%	19	13.47	10	3-55
2019-2020	252	18.3%	22	11.45	11	4-27
2020-2021	110	30.0%	16	6.88	7	1-15
2021-2022	105	37.1%	19	5.53	5	0-25
2022-2023	81	22.2%	20	4.05	3	0-14

Another way we might assess success is the **number of patents for which fellows applied**, so we included a question about patents in this survey. In the last report, only older fellows reported a positive number of patents, however, in this review period, nine patents came from four fellows in the middle cohorts (Table 12). Further investigation revealed that two of these fellows list their current position as Associate Professor, one as Research Scientist and one as a Risk Manager at a bank.

TABLE 12

Estimate the number of patents (accepted or not) that you have applied for since your postdoctoral fellowship at MSRI			
Program Year	Total Number of Patents	Number of Respondents	Average per Respondent
2018-2019	6	2	3
2019-2020	1	1	1
2021-2022	2	1	2

A qualitative indicator of the fellowships' impact is provided by the **number and quality of research awards won by fellows** (Table 13). MSRI fellows also go on to receive other prestigious postdoctoral fellowships. Of the 154 respondents, 29 (18.8%) reported getting some sort of professional award and 12 of those reported multiple awards.

TABLE 13

Summary of professional awards received	
Post-MSRI Awards:	Outstanding Postdoctoral Fellow
	Postdoctoral Mentoring Award
	Iowa State University Award for Early Career Achievements in Research
	Serrapilheira, FAPERJ, CNPq (in Brazil)
	Teaching award
	Vanderbilt Postdoctoral Prize
	Vicent Caselles 2018 Award (Royal Spanish Mathematical Society)
Post-MSRI Fellowships:	MAA Project NExT Fellow
	US Junior Oberwolfach Fellow
	Emmy Noether Fellowship of the DFG (German National Science Foundation)
	Fields Postdoctoral Fellowship (Nonsmooth Riemannian and Lorentzian Geometry Program)
	EPSRC
	Wolfson College Oxford
	Institut Mittag-Leffler
	MSCA Postdoctoral fellow in Norway
	Marie Curie Fellowship
	Fields Visiting Research Member Funding (Operator Algebras Program)
	NSF Postdoctoral Fellowship (3 fellows)
	Sloan Fellowship (2 fellows)
Post-MSRI Grants:	AMS-Simons Travel Grant (3 fellows)
	NSF Career Award (6 fellows)
	AWM dissertation prize
	Craig A. Tracy Research Prize
	Association for Women in Mathematics Travel Grant
	EPSRC new Investigator Award
	erc start up award
	Kovalevskaya Travel Grant
	NSF standard grant

V.B. Comparing 2016-23 Outcomes by Gender

MSRI has a strong commitment to diversity and to advancing the careers of women mathematicians. To that end, we examined the research outcomes of the 2016-23 cohorts by gender to see if the MSRI fellowship affects men and women differently. The one person who choose not to identify their gender is left out of the following analyses.

We performed the following analyses between the **research outcomes of men and women** and aside from a few isolated cases, we found no statistically meaningful differences.

- When looking at **publications based on work done at MSRI**, there were no significant gender differences across cohorts.

- When we look at **total peer reviewed papers**, the only cohort in which there was a statistically significant gender difference is the 2017-2018 cohort where men had an

average of 19.4 total publications and women had an average of 10.75. Interestingly the men had a wider range of publications (4-32 vs. women, 7-22).

- When comparing the **number of presentations given based on work done at MSRI**, no statistically meaningful differences can be observed between men and women.

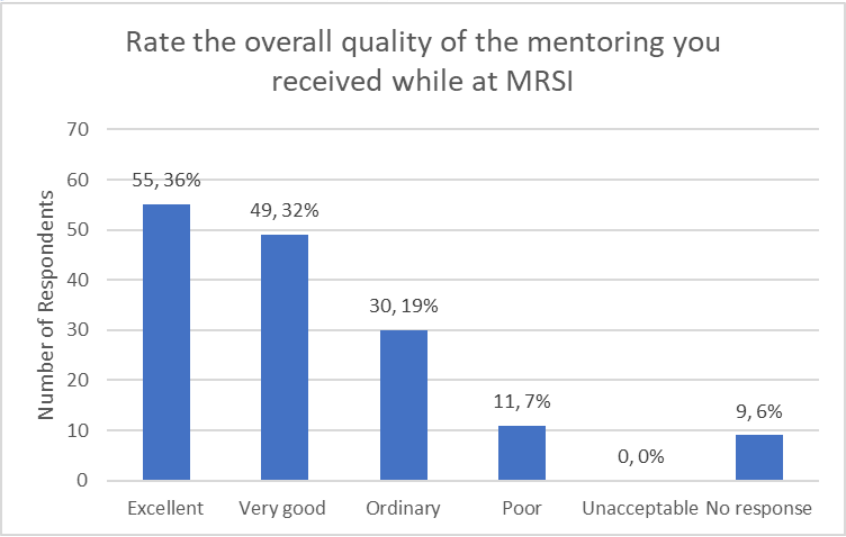
- When examining the **number of new co-authors gained as a result of their fellowship**, there were no statistically significant differences in any cohort.

- Looking at **grant proposal outcomes**, there is no statistically significant gender difference in number of proposals submitted or funded in any cohort year. There is only one difference in funding among the 2019-2020 cohort where men were awarded an average of $201,813 and women were awarded an average of $9,333. The highest awarded amount to a woman in that cohort was $50,000 while the highest awarded amount to a man was $1,070,000.

VI. Mentoring Feedback

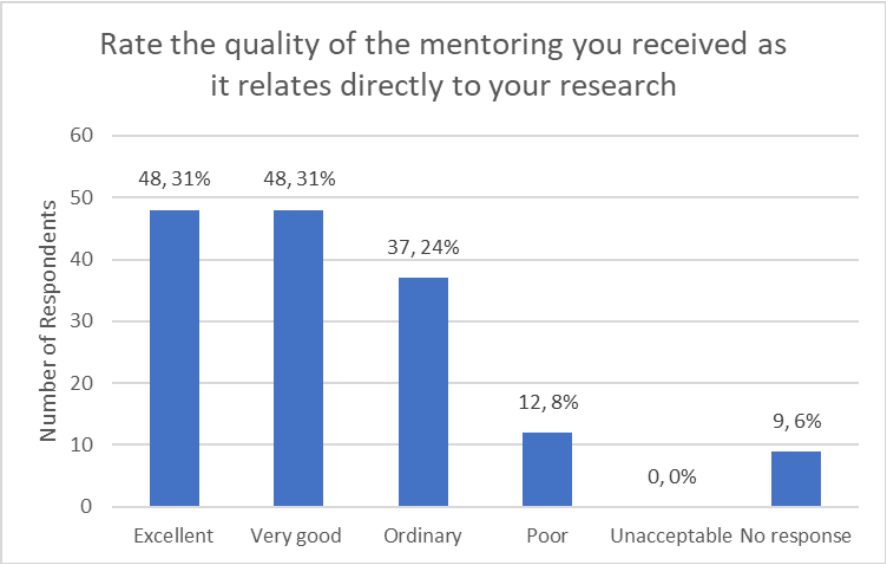
The survey asked fellows for feedback on the mentoring aspects of MSRI's postdoctoral fellowship program. Fellows were asked to rank, on a five-point scale from "unacceptable" to "excellent," certain specific aspects of the program as well as their overall experience. When asked to rate the **overall quality of the mentoring they received while at MSRI**, 68% of respondents chose "very good" or "excellent" (Figure 16). No one rated their overall mentoring experience as unacceptable.

FIGURE 16



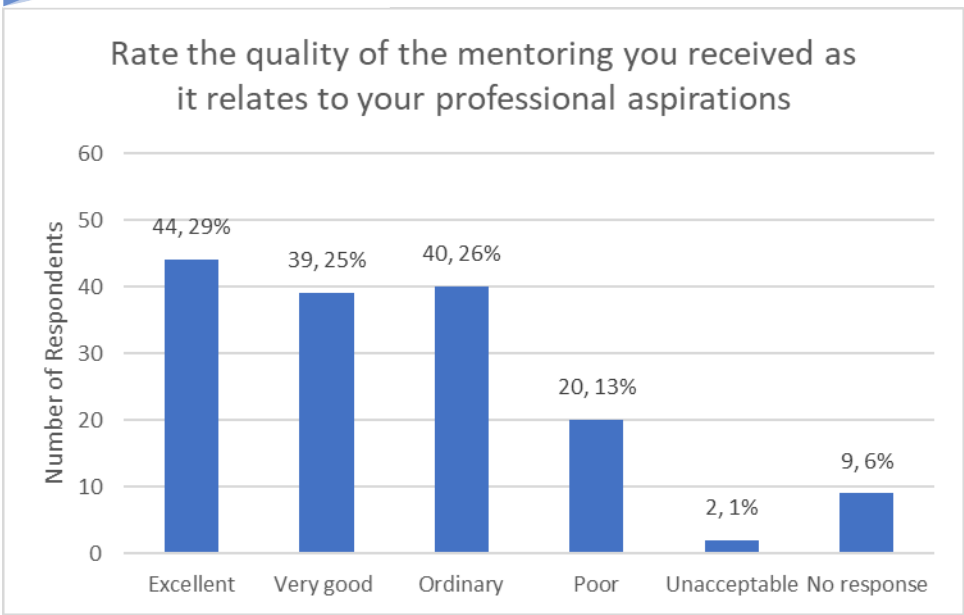
When asked specifically about **mentoring as it related to their research**, "e.g. mentor acting as a collaborator, inspirer, or connector to other collaborators," 62% of respondents ranked the quality as "excellent" or "very good" with 24% rating this mentoring as "ordinary" (Figure 17). Zero respondents rated research-related mentoring as unacceptable.

FIGURE 17



When asked specifically about **mentoring as it related to their professional goals**, "e.g. preparing for job interviews, organizing conferences, writing grants, thinking about alternate paths in mathematics," 54% ranked the quality as "excellent" or "very good" and 26% ranked it as "ordinary" (Figure 18).

FIGURE 18



When looking back at the two previous evaluations, it is interesting to note that there is not a statistically significant difference in mentoring experience over time. Throughout the program's existence, postdoctoral fellows report a high level of quality in their mentoring experience.

For this evaluation, we asked two additional questions about continuous relationships with the faculty mentor: "How often do you stay in touch with your mentor?" (Figures 19 and 20) and "For what purpose do you interact with your mentor?" (Figure 21).

As shown in Figure 19, only 22% stay in touch with their mentor very often (a few times a month or more) or often (once every couple of months). Twenty one percent stay in touch sometimes (a few times a year) and 28% have infrequent contact (once a year or every couple of years). Eighteen percent never talk to their mentor and 10% did not answer the question.

FIGURE 19

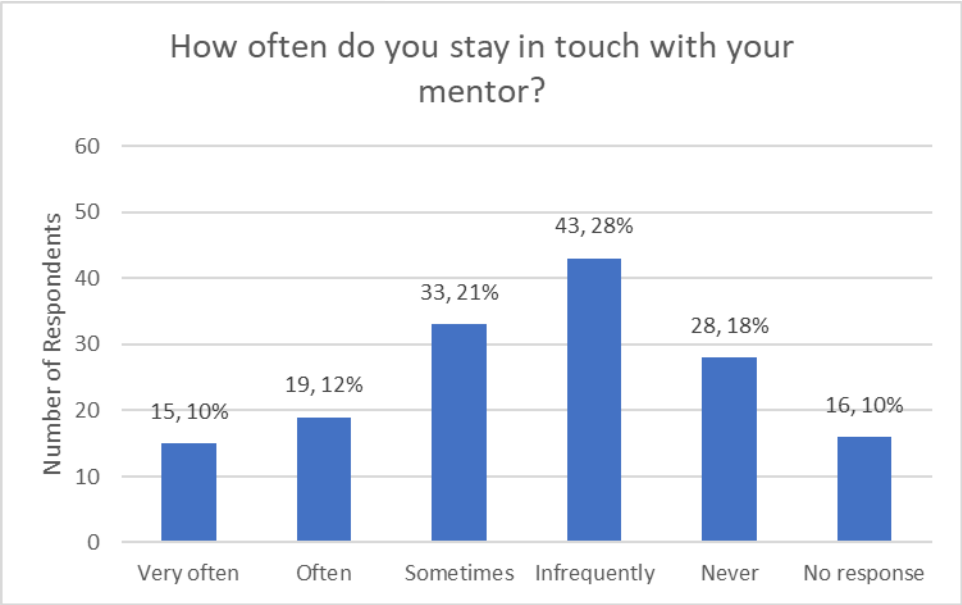


Figure 20 shows the distribution of contact by cohort. It would be expected that contact would wane over time and in fact the frequency of those who never or infrequently have contact with their mentor increases after the two most recent cohorts. Other interesting points emerge from Figure 20. The cohort reporting the most "never" contact is the 2019-2020 cohort and the 2016-2017 cohort has a similar frequency of contact as the 2020-2021 cohort. The 2018-2019 cohort reports that over a quarter have contact very often and over half have contact at least a few times a year or more. Forty percent of the most recent cohort reports having no or infrequent contact with their mentor. None of these differences are statistically significant.

FIGURE 20

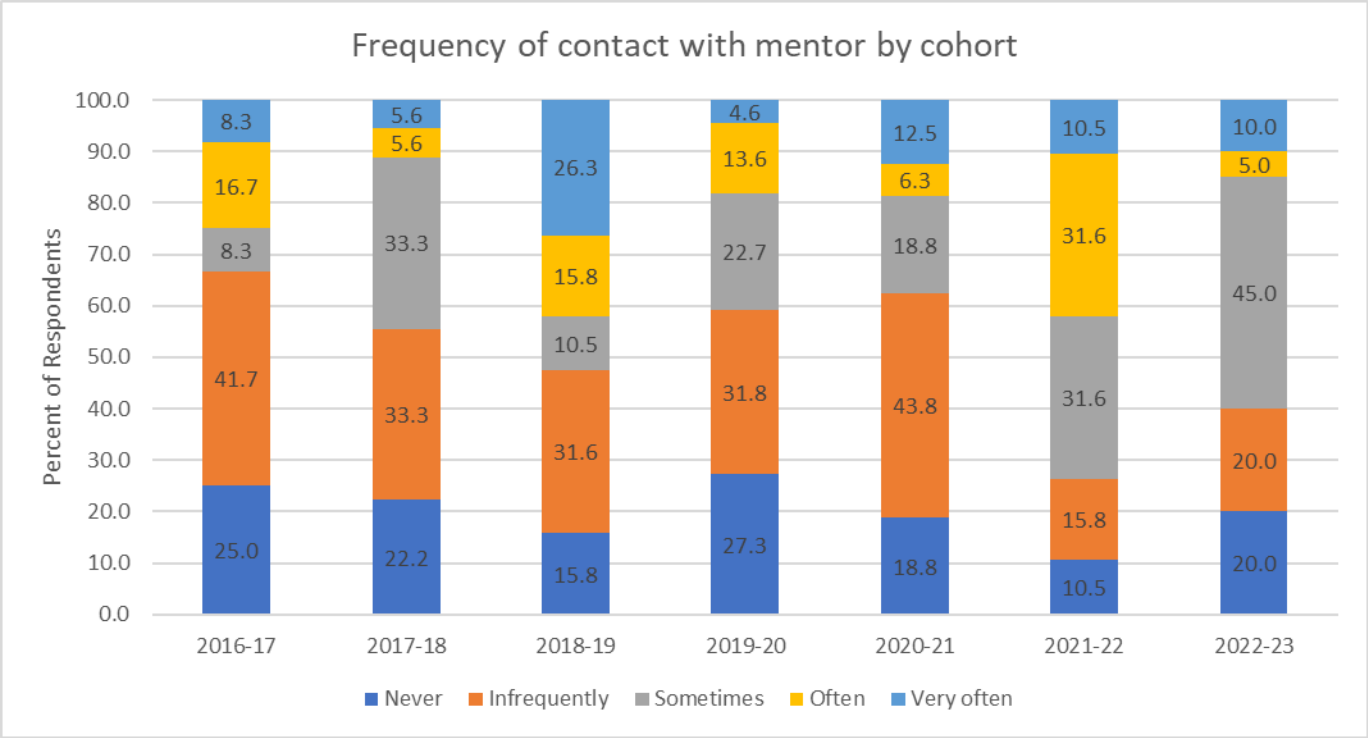


Figure 21 shows responses to the check all that apply question about the purpose of the contact with the mentor. The main reason fellows interact with their mentor is for check-in conversations (38%). Thirty percent interact with their mentor to get career guidance other than letters of recommendation and 29% interact to get letters of recommendation. Just over a quarter engage in ongoing research collaborations and 18% report maintaining a friendship with their mentor. Twelve percent interact with their mentor to seek support.

FIGURE 21

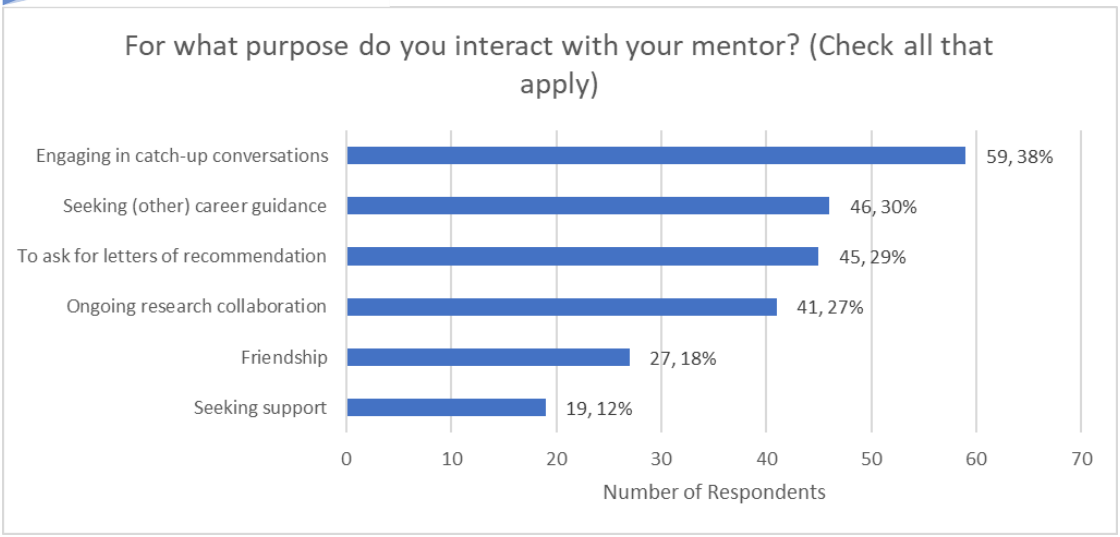


Figure 22 shows the number of reasons for contact with mentors. Twenty seven percent of respondents have no contact with mentors. A third of respondents have contact with mentors for one reason and that is typically to catch up when they see each other at a conference. Forty percent have contact with their mentor for two or more reasons.

FIGURE 22

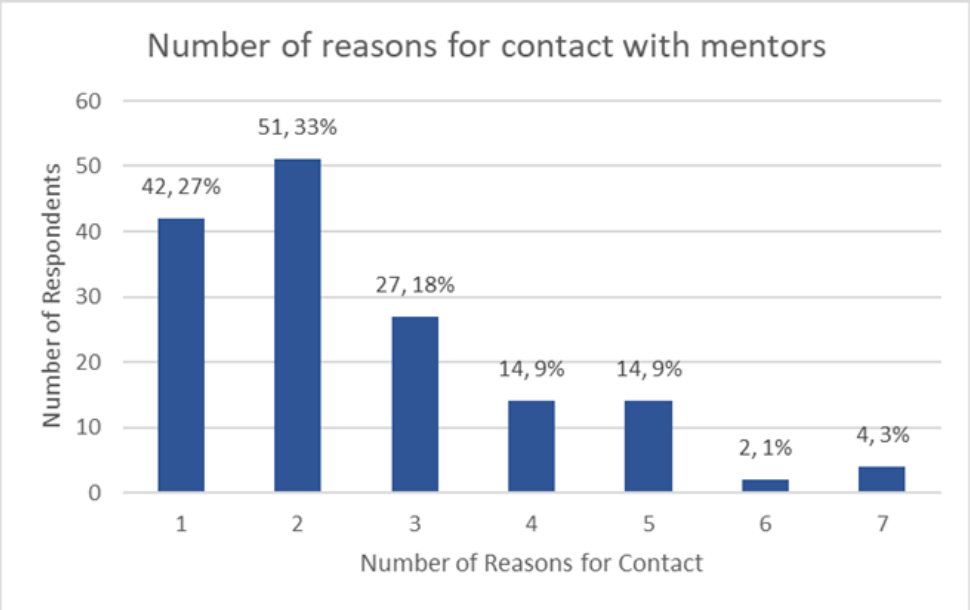


TABLE 14

Correlation Matrix of Mentoring Variables and Outcome Variables			
	Quality of Mentoring		
	Overall	Research	Professional Aspirations
Overall Experience at MSRI	0.46***	0.47***	0.34***
# Professional Contacts^	0.22**	0.22**	0.16
# Co-Authors^	0.31***	0.41***	0.24**
# Conference Presentation^	0.15	0.22**	0.07
# Publications^	0.27**	0.35***	0.17*
# Publications Overall	0.16	0.18*	0.12
^Due to experience at MSRI or with work from MSRI *p<.05; **p<.01; ***p<.001			

Table 14 shows a correlation matrix of the three mentoring variables (overall mentoring quality, and mentoring quality with respect to research and professional aspirations) and their reported overall experience at MSRI and their research outcomes. The fellows' ratings of the quality of mentoring in research is significantly and positively (although only moderately or weakly)

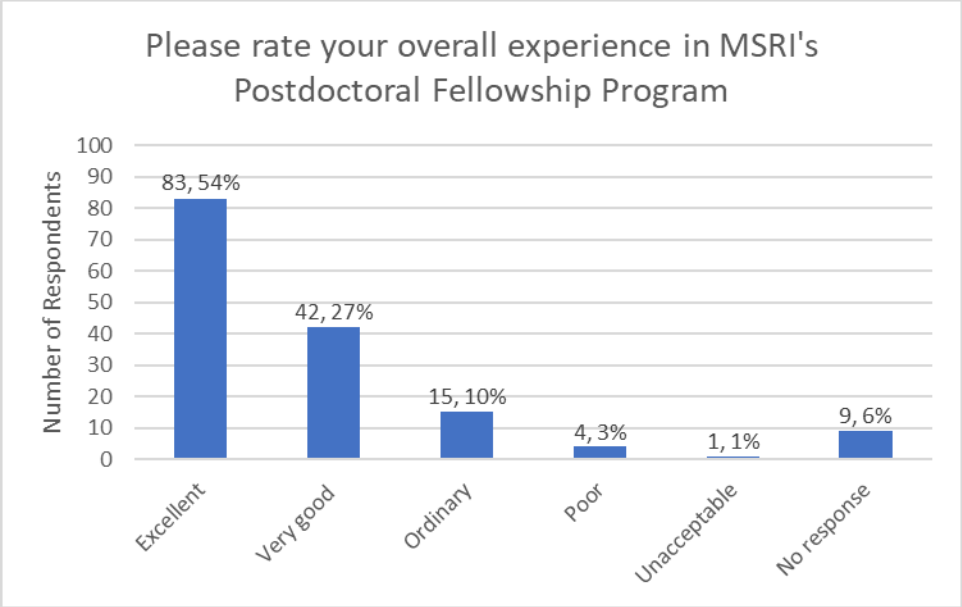
associated with their overall experience at MSRI and the number of professional contacts, co-authors, conference presentations and publications from their work while at MSRI, and their number of publications overall. The overall quality of mentoring and mentoring to help achieve their professional aspirations are both associated with some outcomes. Mentoring quality was not significantly associated with grant submissions or patent submissions.

VII. Experience in the Program

When asked to rate their **overall experience in MSRI's postdoctoral fellowship program**, 81% of respondents chose one of the top two categories ("very good" or "excellent") with 54% choosing "excellent" (Figure 23). This is the highest ratio of "excellent" responses across all questions asked about the quality of the program.

These ratings are higher than mentorship overall or mentorship with respect to research and professional goals. Recall from above that 68% of survey respondents rated mentoring overall as "excellent" or "very good" (Figure 16), 62% similarly rated mentorship with respect to research (Figure 17) and 54% with respect to professional goals (Figure 18). It appears that mentorship is not the only thing that factors into fellows' experiences in the program, although there is a statistically significant positive relationship between overall program rating and rating of the quality of mentorship in research. Fellows highly rate their experience overall.

FIGURE 23



We asked fellows in what **areas they would have "appreciated significantly more training."** They were able to select multiple areas (e.g. "Choose all that apply") including "I did not need significant additional training" and "Other" and were also given a free-form answer option where they could specify any areas that were not among those listed (Table 15).

Nearly one third of fellows indicated they "did not need any significant additional training," which is the same as in the last evaluation, and the same proportion wanted more training in effective collaboration – the latter up from just under a quarter in the previous evaluation. Just over one quarter wanted more preparation on grant proposals, which declined from a third in the previous report. Further, just under one quarter wanted more preparation for job interviews and identifying career options (Figure 24).

FIGURE 24

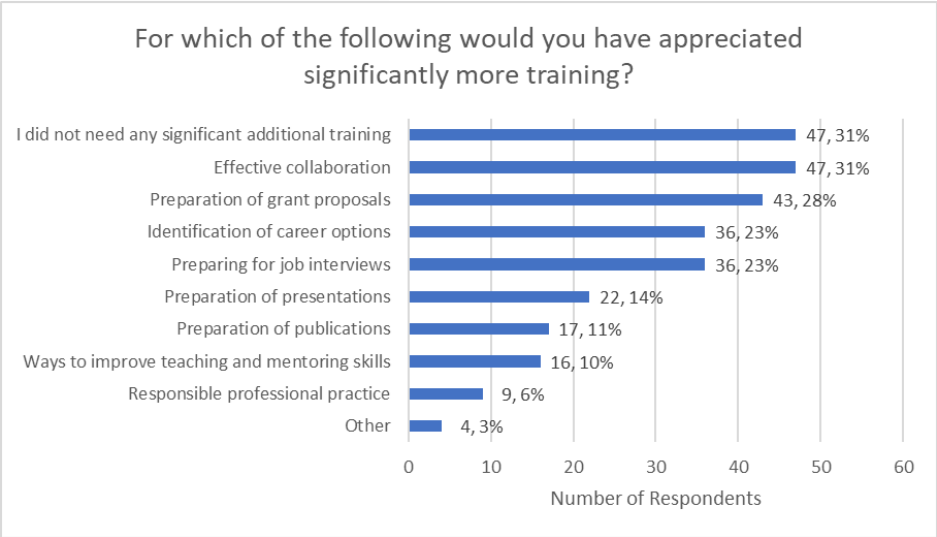


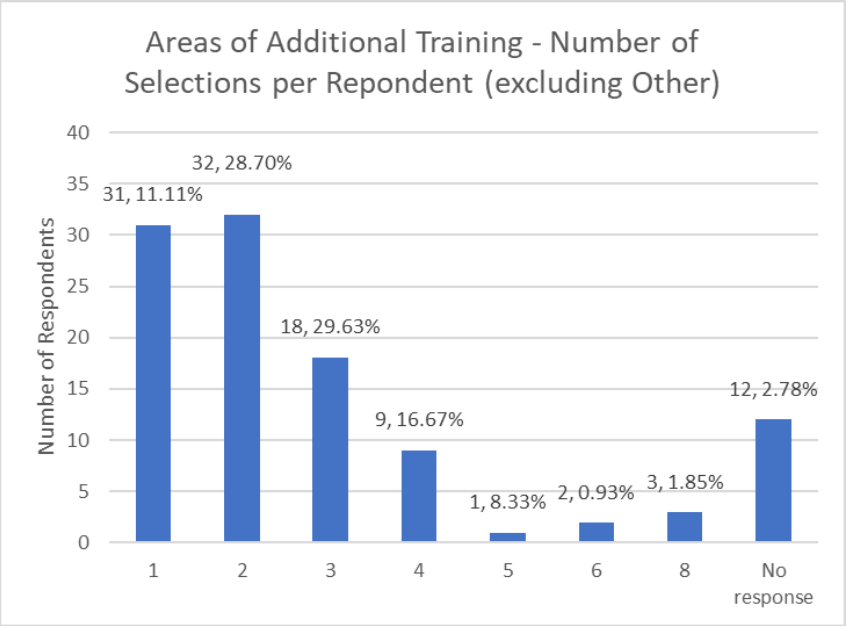
TABLE 15

Free Form Responses to "Other" – Areas They Would Have Appreciated Significantly More Training
Effective review writing
Hard to start new projects with professors and with mentor
I think it might be hard to have appropriate training for job interviews since the experience varies widely depending on where you are interviewing. However, something I personally would have benefitted from was understanding the types of questions I should be prepared to answer, as well as what to do if a portion of the interview gets derailed. Something else that isn't listed but I would have loved to learn more about is what changes happen when you get the tenure-track job. We hear a lot about getting a postdoc, and applying for tenure-track, but I think valuable training is missing on how to transition into a tenure-track role.
The unstructured format was perfect for achieving my research goals during the semester (from someone who responded that no other training was needed)

For those fellows who indicated at least one area of additional training besides "Other," we counted the **total number of additional training areas selected per respondent** (Figure 25). Note, one fellow indicated they "did not need significant additional training" but also selected three areas in which they would have liked additional training. In Figure 25 below, this fellow is considered to have selected three areas of additional training. Additionally, 12 people did not respond to this question and are coded as no response in Figure 25.

We see that 96 fellows (62.3%) indicated that they would have liked additional training in at least one area and 65 fellows (42.2%) indicated they would have liked additional training in at least two areas (Figure 25).

FIGURE 25



The three fellows who indicated the most need for additional training were all men. Two are Asian and one is non-Hispanic white, therefore none are from underrepresented minority groups. Only one earned their Ph.D. at a foreign institution. Interestingly, two rated the mentoring they received as "excellent" on all metrics and the other one rated their mentoring as "ordinary." All three rated their overall experience in the fellowship program as either "very good" or "excellent." One gave a glowing review of the program in the open-ended final question for feedback and the other two left that blank. They were from three different cohorts, none of which was impacted by the COVID-19 pandemic. Even though they reported wanting more training in all areas, it does not appear that their experience was hampered by that.

VIII. Response to the COVID-19 Pandemic

The COVID-19 pandemic began during the spring semester of 2020 and impacted activities at MSRI until spring of 2021 so we would be remiss not to examine fellows' experiences during that

time. Thirty fellows who completed the survey reported that their experience was impacted by the pandemic (19.48% out of 154; 16 people did not answer the question).

FIGURE 26

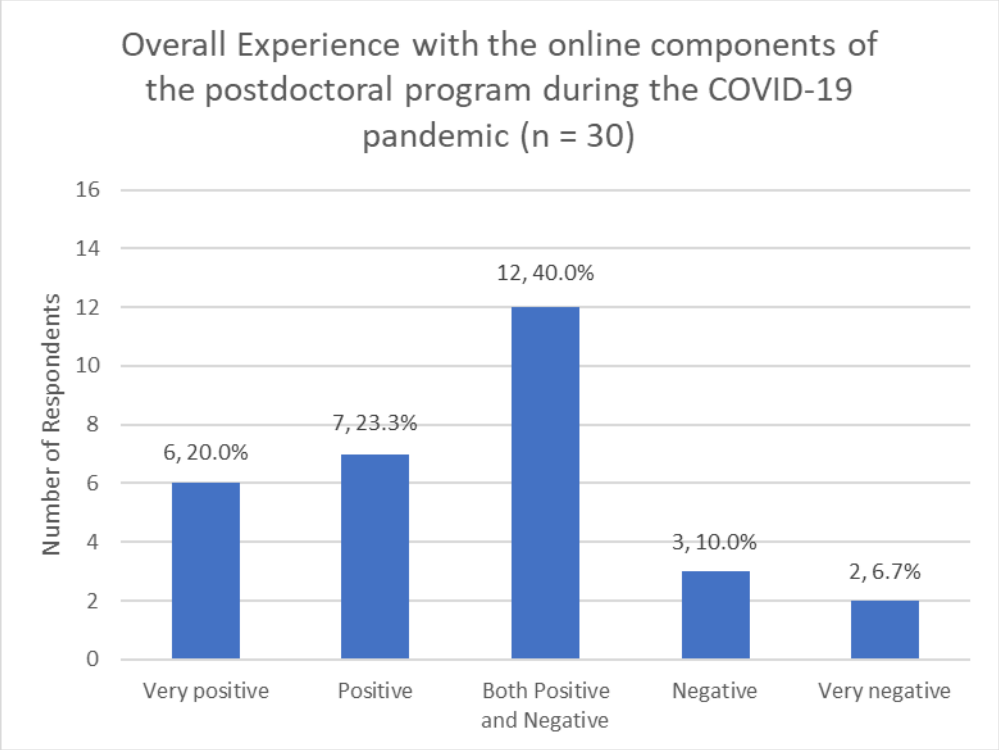
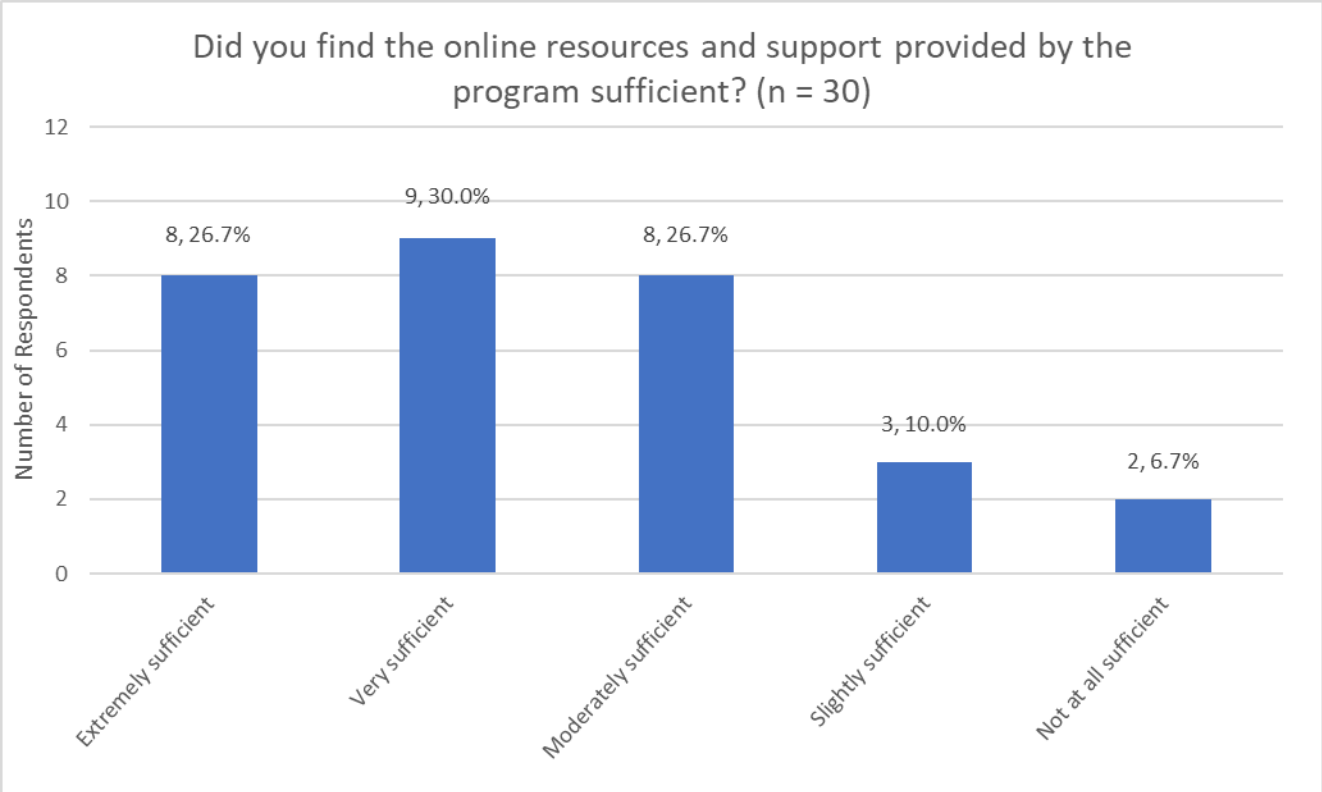


Figure 26 shows their responses to the question "Please rate your overall experience with the online components of the postdoctoral program during the COVID-19 pandemic." Forty percent reported that their experience was both positive and negative. Forty three percent of fellows reported having a very positive or positive experience and 16.7% reported having a negative or very negative experience. Almost 60% of respondents reported that the online resources and support were extremely or very sufficient, 27% said they were moderately sufficient, and 16.7% of fellows said that they were only slightly sufficient or not sufficient at all (Figure 27).

FIGURE 27



Sixteen and 15 people, respectively, wrote comments about the specific challenges they encountered with the online components of the program (Table 16) and the aspects of the online program that worked well for them (Table 17). Most negative comments are about dealing with the pandemic itself and the adjustments everyone had to deal with at that time, which were beyond MSRI's control. Some comments praised MSRI's handling of the pandemic and applauded efforts made to keep things going and provide a quality experience. A few comments do provide helpful reflections for MSRI. For example, some postdocs thought that having more social events would have been helpful, such as the reunion session, some would have liked there to be more discussion during the online talks, and there was a need for private space during Zoom calls.

TABLE 16

Challenges with online component during the pandemic
Doing math online is difficult, and the pandemic was extremely depressing. At a time when the world should be openning up to an early career mathematician, it all shut down instead. Not your fault at all.
Extremely hard to interact with people. Not getting much out of online talks.
Hard to start new collaboration, meet new people, or have a quick chat with people
I was very happy with the way the situation was handled though of course it was more difficult to connect than it would have been in an in person meeting
It was completely useless they should have postponed the program as asked by the organisers
It was difficult to engage with an online environment. I was at MSRI during spring 2020, right when covid started, so online talks were an entirely new phenomenon. I do not believe the problem was due to MSRI doing a bad job, on the contrary, in hindsight they handled the situation incredibly well. My challenges were definitely not the fault of MSRI.
It was difficult to strike up conversations with or otherwise interact with other programme members who I was not already acquainted with. The virtual "teas" largely failed in that regard.
It was hard to focus at the beginning of the pandemic; it wasn't MSRI's fault. We were all adjusting.
It was hard to get people to do things. There was no cohesiveness within the full program.
It was very difficult to engage with speakers after their talks. There was some time we could interact in Gathertown but generally nobody came there and I only had one or two math conversation in the entire semester in these non scheduled meetings.
It would have been nice to have more purely social events.
Making new contacts and reconnecting with acquaintances was not very natural, even with the commendable attempts by the organizers to facilitate interactions (through Sococo, Gathertown, Zoom, etc.)
Not being able to actively collaborate with mentor
Not enough space to take zoom calls privately
There were challenges with having informal talks with a wide range of people, but that was mostly unavoidable. The reunion program really helped with that.
Zoom fatigue made it very difficult to concentrate. Since members of the program were across the globe, all the activities had to be planned in a small window of time, which meant that you were on Zoom for long periods of time without a break.

TABLE 17

Aspects of the online program that worked well for you
None
Got regular meetings with my mentor and time to focus on research
flexibility and no commute
The program was overall extremely stimulating and encouraging for young researchers
none really, only silver lining is it was easier to get industry people to give talk in the career development seminar
None of them worked well, honestly. Spring 2020 was a very difficult semester, but I do not believe this was the fault of MSRI. There was so much happening in the world at the time that participating fully in the online program was just impossible.
The fact that the programme was exclusively online allowed a very wide participation in seminars by people who would not have attended MSRI in any case, both as speakers and audience.
I was able to invite many seminar speakers without worrying about funding.
I really liked the fact that the lectures were recorded so that I can see them again.
Gather town worked really well
Regular meetings with my postdoc mentor were still effective and extremely beneficial, even over Zoom.
Social gathering with postdocs
Watching online talks collectively in the lecture hall and experiencing the post - talk questions in a community
I thought the seminar series was very well run, as well as the substantial attempts to create a feeling of community in difficult circumstances. I also feel much more connected to other members of the online program after the reunion program.
I did appreciate the mentorship I received, as well as the opportunity of help co-organize and implement seminars/activities that I felt would benefit me. It is also a very special experience to have an entire semester where you listen to research talks which interest you, and then most of the rest of your day is spent on the research problems which specifically interest you.

IX. Open Ended Responses

Participants were given the opportunity to respond to two open-ended questions, "Is there anything else you can say about your experience at MSRI that may help us make our case to the NSF?" (46 responses) and "Do you have any further suggestions for ways to improve MSRI's Postdoctoral Fellowship Program?" (27 responses). Findings regarding the first question indicate that respondents enjoyed the MSRI program to a great extent—responses were not neutrally written and they were overwhelmingly positive. Findings regarding the second question had

greater variation and were therefore a bit more difficult to cluster into themes, but are also largely positive even while providing constructive feedback about ideal program adjustments, which is what we were looking for.

Question 1 Themes

"Is there anything else you can say about your experience at MSRI that may help us make our case to the NSF?"

Themes from responses to the first question include discussions of the impact of MSRI on respondents' research and careers, their exposure to experts in the field, and their positive experiences making connections through the program and collaborating with others. Two less often reported but important themes concerned program format and diversity.

The first theme and far and away the most popular was **research**, which was mentioned by about half of the participants who responded to the open-ended questions. Respondents were thankful for opportunities to learn more about research and conduct research on their own or collaborate with others. One respondent's life was deeply impacted by the program and expressed that, "This was a life-changing experience for me, which defined all directions of my research ever since." Another writes, "I thoroughly enjoyed my time as a postdoc at MSRI and my research benefitted greatly." Another respondent connects their research experiences at MSRI to their career progression:

> I had the fortune to stay at MSRI for a semester to talk to a group of leading experts in my field. During the time, I was immersed in many research projects, both ongoing on new. This resulted in many papers and collaborations. My experience as an MSRI postdoc played a vital role in my career development.

A closely-related theme that emerged was the **importance of having mentors and personal contact with experts in one's field**. One respondent writes,

> The experience of having experts of the field gathered around was quite a rare opportunity to learn what the community knows as a whole about certain deep math questions. Having many experts around at the same time was helped me to accelerate my research and finishing the projects I was working on. Moreover, I developed new ideas based on discussions and meetings I had at MSRI with other experts in the field, which affected my research direction.

Another frequently mentioned theme was **the opportunity to make connections and collaborate with others**. One respondent says, "The connections I made at MSRI were invaluable for my career and research!" This theme of connections and collaboration was often tied to **career development**, which is another frequently mentioned theme. One respondent writes, "My experience at MSRI was career transformative. During the program I started one of my longest lasting and best collaborations. Proved one of my best theorems which has shaped part of my research since. And made dozens of other professional and personal connections."

Many participants enthusiastically wrote about the **MSRI's positive impact on their careers**. "Being at MSRI was a turning point of my academic life, as it brought me new international collaborators and better chances in the future jobs." Another writes,

> I feel very strongly that this experience helped me to land a tenure-track job at a university in the area that I wanted to live. Many people view holding these positions at MSRI as very prestigious, but also that the postdocs who leave these programs are well prepared to succeed at a tenure-track position.

It is clear that respondents attribute much of their career success to MSRI: "I am currently employed in a tenure track position, and owe a great amount of thanks to MSRI for putting me in a position to succeed in my work after my semester at the institute."

One respondent's experience includes many of the above themes and is a good demonstration of the program's positive and lasting impact:

> My postdoctoral fellowship at MSRI was one of the most **formative and valuable experiences in my career** thus far. It granted me the opportunity to devote an entire semester to **research**, while surrounded with many of the foremost **experts** in my field. I initiated new research directions and **collaborations** with mathematicians at MSRI which have led to numerous publications. During my time there I learned quite a bit of new mathematics by attending seminars, workshops and conferences hosted at MSRI, and these ideas have greatly increased my understanding and affected how I approach my own research. I am currently **employed** in a tenure track position, and owe a great amount of thanks to MSRI for putting me in a position to succeed in my work after my semester at the institute.

There were only two negative comments where one respondent mentioned that the program was stressful but did not explain further, and another where the respondent had taken an online version of the program who would have preferred an in-person experience. A less frequently mentioned but important theme that arose more than a few times was a **preference for the in-person program format**. Respondents mentioned that "bringing lots of researchers who work on similar topics to the same place so that they can interact in person is always helpful, and I would say I gained more from having lots of people in related areas around than I did from interacting with any one person specifically." Another participant responded similarly and said,

> Though my experience with the semester-long program was completely virtual, I did attend most of the month-long "reunion" program that followed. The weeks I spent there were among the most productive I've had in recent memory. This was due to both the gathering of so many mathematicians from similar fields in one place, and to the Institute's excellent facilities, which are conducive to both discussions and solo work.

Still another respondent reports that "If the NSF is pushing for Zoom-only MSRI, I want to say that the in-person component is really incomparable - a very significant portion of the benefit I got from MSRI was at tea or hanging out with people on the weekends, not just in formal

meetings." It's clear that having an in-person format was important to some respondents as they wrote very passionately and positively about it.

While **diversity and inclusion was not the most frequently mentioned theme**, respondents made important points about MSRI that are worth noting. One respondent mentions the importance of being among others with whom they share a similar background as they write, "My time as a postdoc fellow at MSRI was the time where I was among the most number of junior mathematicians of my own gender. It has a big impact for my mental health and productivity to not being a minority in a research group." Another respondent encapsulates the main themes while speaking of the role of MSRI in helping them to feel included in the mathematical community and to achieve the American Dream:

> My time at MSRI has been foundational for my early **career opportunities** in mathematics. As a first generation [ethnicity omitted]-American, my **American dream** has always been to be a mathematician. As a mother and a [ethnicity omitted], I can also identify with the struggle to **feel valued or even accepted in a mathematical community**. My postdoctoral fellowship at MSRI was my first academic position after graduating from [university name omitted], and was pivotal in helping me to secure academic employment since then, first as a Postdoctoral Fellow [name omitted], and currently, as a Visiting Assistant Professor at [university name omitted]. During my time at MSRI, I gained **new research directions and collaborators**. In addition, I gained access to a community of researchers that has also been generous with their advice for navigating early career decisions. For an early career mathematician, such **professional expertise** is invaluable. As an NSF-funded mathematics institute of international repute, MSRI is uniquely positioned to be a locus of such **professional networks** and to leverage its resources to **broaden participation amongst underrepresented groups**. I credit my ongoing participation in the mathematics community to my time at MSRI and so enthusiastically support any initiative to help MSRI extend its very positive and impactful roles in the mathematics community.

Question 2 Themes

"Do you have any further suggestions for ways to improve MSRI's Postdoctoral Fellowship Program?"

Themes from responses to the second question mostly include comments about **program mentors and about professional development opportunities** such as career advice and exposure to grant writing, in addition to **diversity and inclusivity** and **suggestions regarding office space and travel funding**.

Regarding **mentors**, program participants mainly spoke about matters of fit between mentors and mentees and their exposure to mentors who were not their own. Of those who discussed fit, respondents were interested in either having a say in their choice of mentors or having program organizers focus more closely on mentor/mentee matching. One respondent writes,

> Honestly, it's such a great program. I have nothing but positive things to say about it. The only comment I have is that in my particular case, the mathematical fit between my postdoc mentor and myself was not so great. We became good friends but we never discussed mathematics as our overlap was not big. Given that there were other faculty present at the time who would have been a better fit, I wish I had been paired with a better academically suited mentor.

Another writes, "The MSRI leaders should more carefully plan the mentorship program with the semester organizers…In my case, it worked out great because I got lucky with my mentor. For others it was not as beneficial as it could have been." Respondents expressed that they enjoyed the opportunity to learn from other mentors in the program: "I really appreciated feedback from faculty that were not my mentor or extremely close to my area during my talk at the postdoc seminar." Other respondents mentioned other kinds of mentorship themes such as mentorship training for mentors and mentees and creating opportunities to connect after the program.

Another frequently mentioned theme was **career and professional development**. Suggestions varied, including "grant writing, research statement writing, and job interview prep"; "guidance about how to organize your time and priorities for research"; advice concerning the academic job market, job interviews, and general career advice; "issues such as 'managing a collaboration', 'teaching and mentoring'"; and other general career and professional development programming and activities. A few participants expressed interest in learning more about grant writing. One respondent writes, "It would have been very helpful to have panels relating to grants and grant writing. This is something that I have had very little experience with and with the wealth of knowledge at MSRI I'm sure such a panel would be extremely helpful to early career researchers." Another suggested a workshop where mentors walk-through their funded NSF proposals with participants.

While not frequently mentioned themes, there were a couple of comments regarding diversity and inclusion. One respondent mentions the need for "more mental health support." and another says, "MSRI could benefit from looking into making postdoctoral programs inclusive for people with invisible disabilities, like autism. The very social nature and the extreme multitasking of these programs, currently makes it difficult for autistic postdocs to succeed."

Finally, respondents had **suggestions for improvements regarding office space and travel funding**. A few respondents struggled with availability of office space. One suggests that premium office space should be allotted to the mentors who show up to the offices most often as they are the best, but frequently empty, spaces for collaboration. One participant mentions that it is difficult for them to work in a shared office environment, and another concurs and explains further,

> …it was sometimes a bit awkward to find a quiet place with a blackboard to work with a collaborator. We are paired in an office with a second person, who one generally prefers not to disturb. This means that if two people from different offices want to work together then usually neither of their offices is really convenient. The "free" offices are often occupied (or occasionally locked), and otherwise most of the blackboard space is public-facing, requiring one to think in a potentially noisy public environment. This basically

> leaves two seminar rooms with blackboards, and it was never entirely clear to me whether one was supposed to be able to work in them or not.

Travel funding was also mentioned by a few respondents. One respondent says that "funds to invite visitors would be helpful," and another says that "I would have appreciated help spending the travel money…I think a lot of us didn't really know how one could professionally get the word out that we had money and we're willing to travel to your seminar with it."

Overall, the impression that comes through in the comments for both questions is that respondents really like the MSRI program, and while adjustments to the program can certainly be made to make the program an even better experience, their experiences were positive, memorable, lasting, and impactful for them both personally and professionally.

X. Conclusion

This report reviewed the postdoctoral fellowship program at MSRI from 2016-2023. Using existing data from all fellows and a survey completed by 70% of the fellows, we have explored how the program is fairing and the impact of the program on the fellows' career.

The main takeaway is that MSRI is doing very well in recruiting, training, and placing fellows. About 60% of fellows are U.S.-based, just under a third are women, and 14% of U.S. citizen fellows are under-represented minorities. Nationally in mathematics, 54% of doctoral recipients are U.S. citizens, 24% are women, and 12% of U.S. citizen doctoral graduates are underrepresented minorities. MSRI routinely meets their goal of U.S.-based students and women and typically meets or exceeds their goal of recruiting underrepresented minority fellows although they have been short of that goal in two cohorts. However, it is arguable that in terms of diversity overall, given that 40% of fellows are international, there is quite a bit of racial/ethnic and cultural diversity every year. There isn't necessarily a goal around this but it is interesting to note that in this most recent wave, the average length of time since the fellows completed their doctoral degree was longer than in the previous wave (1.43 versus 1.96 years on average).

Fellows who completed the survey report high levels of satisfaction with the program overall and with the mentorship received. Eighty-one percent rate their overall experience in the program as excellent or very good. When it comes to securing a new or better position, 87% of fellows who completed the survey report that the fellowship helped them a great deal, significantly or somewhat. Almost all fellows say that the fellowship helped take their research in new directions and that they use the knowledge or skills they learned at MSRI in their current positions. The average responses for mentorship satisfaction were a little lower than program satisfaction overall (although still high with 68% reporting mentorship as excellent or very good), which indicates that fellows get more out of the program than mentorship alone. The connections they make, the skills they learn, and the opportunity to advance their research are important and valued by the fellows. Some areas for improvement MSRI could consider is more training around the interview process and interview questions candidates should expect, transitioning to a tenure-track position and how to be a faculty member, and writing quality reviews for manuscripts or grant proposals in the peer review process. These types of trainings would help fellows be more well-rounded and prepared for an academic career.

It is a general "rule" in academia that Ph.Ds. typically land at an institution a tier lower than where they obtained their degree, however, a prestigious postdoctoral fellowship can help elevate the positions they become eligible for. That does appear to be the case among MSRI fellows.

This evaluation of MSRI included the time when the world was impacted by the COVID-19 pandemic. We inquired about fellows' experience during that time. Overall, most fellows who attended during that time indicated that they had a positive experience (very positive, positive, or both positive and negative) with only 16.7% reporting that they had a negative or very negative experience. Most of the comments about their negative experiences were either beyond the control of MSRI (simply the strain of living through a pandemic and the uncertainty and disappointment that come with that) or were things that MSRI couldn't do much about (Zoom fatigue, that it is hard to learn math online, and difficult to engage in social activities, for example). Overall, fellows felt that MSRI did the best they could to engage them and give them the best experience they could under the circumstances.

Overall, fellows thoroughly enjoyed their postdoctoral experience. There were so many comments on the open-ended questions that celebrated the wonderful and impactful experience they had. Words they used were "invaluable," "fabulous," "fruitful," life-changing," "engaging," "productive," "a rare opportunity," "most formative and valuable experiences of my career," "transformative," "fun and enriching," and so much more. One fellow said, "The semester at MSRI made my career."

While these suggestions do not appear to have hampered their experience, the fellows have some suggestions for improvement. One suggestion, noted above, is to have more professional development training around job searching, interviewing, becoming a tenure-track faculty member beyond what is needed to be research productive, time management skills, writing grant proposals, and being a helpful reviewer of journal manuscripts or grant proposals. In terms of mentorship, there were a few suggestions to either allow fellows to choose a mentor or to do a better job of pairing mentors based on research area. While MSRI does have guidelines for mentors and mentees, ensuring that mentors are involved with their mentee during the semester may be needed as a few noted that they did not have good contact with their mentor even though they tried. One person suggested having two mentors, a primary and a secondary, so they have a back-up if they cannot reach their main mentor. Another suggestion on mentoring is to have more mid-career mentors. While it is valuable to have big name, accomplished scholars as mentors, they are very far from where the postdocs are in experience which can make it hard to connect. Another suggestion is to have more private space for fellows to work in, especially if they need to be on a zoom call or have a more personal discussion. There was one suggestion to have more food options available. Finally, but not least significant, there was a suggestion to offer more mental health support and support for fellows with invisible disabilities such as autism.

While there are some suggestions for improvement, overall, fellows are satisfied with the program and are doing well in the program and beyond. MSRI is achieving its recruitment goals with respect to diversity in gender and race/ethnicity. This program is highly significant in the lives of the emerging scholars it supports and should continue into the future.

References

American Mathematics Society Annual Survey Institution Groupings
http://www.ams.org/profession/data/annual-survey/groupings

Flaherty, C. (2002). Calling it Quits. *Inside Higher Ed*.
https://www.insidehighered.com/news/2022/07/05/professors-are-leaving-academe-during-great-resignation

National Center for Science and Engineering Statistics, IPEDS Completion Survey from the Department of Education, Table Builder, https://ncsesdata.nsf.gov/builder/ipeds_c

Schmiedehaus, E., Cordaro, M., Perrotte, J., Stern, M., Dailey, S., & Howard, K. (2023). The great resignation in higher education: An occupational health approach to understanding intentions-to-quit for faculty in higher education. *Teaching and teacher education*, *123*, 103992.

Appendix A: Survey

MSRI Postdoctoral Fellows 2016-23 Impact Assessment

* 1. To what extent do you believe your fellowship at MSRI helped you secure a new or better position?

- ◯ Not at all
- ◯ Significantly
- ◯ Somewhat
- ◯ A great deal

* 2. To what extent did your experience at MSRI help you develop new research directions?

- ◯ Not at all
- ◯ Significantly
- ◯ Somewhat
- ◯ A great deal

* 3. To what extent do you use the knowledge and skills you developed at MSRI in your current position?

- ◯ Not at all
- ◯ Occasionally
- ◯ Rarely
- ◯ Regularly

* 4. Rate the overall quality of the mentoring you received while at MSRI.

unacceptable	poor	ordinary	very good	excellent
○	○	○	○	○

* 5. Rate the quality of the mentoring you received as it relates directly to your research (e.g. mentor acting as a collaborator, inspirer, or connector to other collaborators).

unacceptable	poor	ordinary	very good	excellent
○	○	○	○	○

* 6. Rate the quality of the mentoring you received as it relates to your professional aspirations (e.g. preparing for job interviews, organizing conferences, writing grants, thinking about alternate paths in mathematics).

unacceptable	poor	ordinary	very good	excellent
○	○	○	○	○

* 7. Please rate your overall experience in MSRI's Postdoctoral Fellowship Program.

unacceptable	poor	ordinary	very good	excellent
○	○	○	○	○

* 8. For which of the following would you have appreciated significantly more training? Choose all that apply.

- ☐ Preparation of grant proposals
- ☐ Preparation of publications
- ☐ Preparation of presentations
- ☐ Responsible professional practice
- ☐ Effective collaboration
- ☐ Preparing for job interviews
- ☐ Identification of career options
- ☐ Ways to improve teaching and mentoring skills
- ☐ I did not need any significant additional training
- ☐ Other

Please specify:

* 9. Which of the following best describes your current primary source of employment?

- ◯ Academic - engaged in research
- ◯ Academic - not engaged in research
- ◯ Government, non-academic - engaged in research
- ◯ Government, non-academic - not engaged in research
- ◯ Non-government, non-academic - engaged in research
- ◯ Non-government, non-academic - not engaged in research

* 10. What position do you currently hold?

- ◯ Instructor/Lecturer
- ◯ Postdoc
- ◯ Assistant Professor
- ◯ Associate Professor
- ◯ Professor
- ◯ Research Scientist
- ◯ Consultant
- ◯ Software Engineer
- ◯ Other (please specify)

* 11. Are you currently employed in the United States?

- ◯ Yes
- ◯ No

* 12. How satisfied are you with your career?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied

13. How likely are you to change career fields in the next 5 years?

- ◯ Very likely
- ◯ Likely
- ◯ Neither likely nor unlikely
- ◯ Unlikely
- ◯ Very unlikely

14. Approximately how many years after you received your Ph.D. did you transition out of academia?

[ ]

* 15. Is your research area the same as the one you were pursuing while at MSRI?

- ◯ Yes
- ◯ No

* 16. How satisfied are you with your career?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied

17. How likely are you to change career fields in the next 5 years?

- ◯ Very likely
- ◯ Likely
- ◯ Neither likely nor unlikely
- ◯ Unlikely
- ◯ Very unlikely

18. Approximately how many years after you received your Ph.D. did you transition out of academia?

[ ]

19. Approximately how many years after you received your Ph.D. did you transition away from research?

[ ]

* 20. How satisfied are you with your career?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied

21. How likely are you to change career fields in the next 5 years?

- ◯ Very likely
- ◯ Likely
- ◯ Neither likely nor unlikely
- ◯ Unlikely
- ◯ Very unlikely

22. Approximately how many years after you received your Ph.D. did you transition away from research?

[ ]

* 23. How satisfied are you with your career?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied

24. How likely are you to change career fields in the next 5 years?

- ◯ Very likely
- ◯ Likely
- ◯ Neither likely nor unlikely
- ◯ Unlikely
- ◯ Very unlikely

* 25. Is your research area the same as the one you were pursuing while at MSRI?

- ◯ Yes
- ◯ No

26. Approximately how many years after you left MSRI did you transition away from the research area in which you were working while at MSRI?

* 27. What is/are your current area(s) of research?

* 28. Are you still working in the mathematical sciences?

- ◯ Yes
- ◯ No

29. Approximately how many years after you received your Ph.D. did you transition out of the mathematical sciences?

* 30. What is your current discipline/career field?

While many of you are still in academia, some of you have chosen non-academic professions. Either way, some of the following questions may feel more or less relevant to you. We would appreciate it if you answer all of the questions, even if your answer is “0."

* 31. Estimate how many new professional contacts you have made because of your experience at MSRI.

* 32. Estimate the number of new co-authors you have gained because of your experience at MSRI.

* 33. Estimate the number of papers you have published which resulted from your work at MSRI.

* 34. Estimate the number of presentations you have given based on your work at MSRI.

* 35. Estimate the number of grant proposals (funded or not) you have written since your postdoctoral fellowship at MSRI.

* 36. Estimate the number of grant proposals which were funded since your postdoctoral fellowship at MSRI.

* 37. Estimate the amount of funding that you have received based at least partly on work or ideas generated during your time at MSRI. Please enter a whole number with no monetary symbols ($) or commas (,).

* 38. Estimate the number of patents (accepted or not) that you have applied for since your postdoctoral fellowship at MSRI.

* 39. How many *accepted, peer-reviewed* articles have you authored or co-authored?

40. Please list any professional awards that you have received during or after your time at MSRI.

* 41. How often do you stay in touch with your mentor?

- ◯ Very often (a few times a month or more)
- ◯ Often (once every couple of months)
- ◯ Sometimes (a few times a year)
- ◯ Infrequently (once a year or every couple of years)
- ◯ Never

* 42. For what purpose do you interact with your mentor? Check all that apply.

- ☐ To ask for letters of recommendation
- ☐ Seeking career guidance (other than letters of recommendation)
- ☐ Seeking support
- ☐ Ongoing research collaboration
- ☐ Engaging in catch-up conversations
- ☐ Friendship
- ☐ Other (please specify)

* 43. Were you a post-doctoral fellow at MSRI during the Spring of 2020, Fall of 2020, or Spring of 2021 (i.e., when most or all activities were online due to the COVID pandemic)?

- ◯ Yes
- ◯ No

* 44. Please rate your overall experience with the online components of the postdoctoral program during the COVID-19 pandemic.

- ◯ Very Positive
- ◯ Positive
- ◯ Both Positive and Negative
- ◯ Negative
- ◯ Very Negative

45. What specific challenges did you encounter with the online components of the program?

46. What aspects of the online program worked well for you?

* 47. Did you find the online resources and support provided by the program sufficient?

- ◯ Extremely sufficient
- ◯ Very sufficient
- ◯ Moderately sufficient
- ◯ Slightly sufficient
- ◯ Not at all sufficient

48. What is your current annual base salary (in U.S. dollars)? We know answering questions about salary can be delicate, however, the goal is to compare the earnings of post-doctoral fellows from our programs with the average salary of those in the field. As a reminder, your responses are confidential and will only be reported in aggregate form.

49. Is there anything else you can say about your experience at MSRI that may help us make our case to the NSF?

50. Do you have any further suggestions for ways to improve MSRI's Postdoctoral Fellowship Program? Remember that being specific is most helpful (e.g. specifically address support for research, or professional development).