

# Exploring Harassment and Discrimination Experiences in Astronomy

Results from the Longitudinal Survey of Astronomy Graduate Students (2007–16)

Anne Marie Porter, Courtney Walsh, and Rachel Ivie

## Summary

As documented in the National Academies' 2020 astronomy decadal survey report, harassment and discrimination continue to be problems in astronomical employment and educational settings. In order to document the types of harassment and discrimination in astronomy and the context in which these behaviors occur, this report describes an analysis of qualitative data from the Longitudinal Study of Astronomy Graduate Students (2007-16). Many of the experiences of harassment described by respondents were based on gender, but some were based on other statuses such as race. We found the following four types of harassment and discrimination:

- Biased assumptions that were communicated to the respondents regarding their status, career, and personal life
- Verbal put downs in the form of jokes, criticisms, and undermining comments
- Demographic-based inequitable treatment that limited their social support and professional development
- Unwanted sexual attention, ranging from inappropriate comments to more serious behaviors such as threats, stalking, and assault

We also describe the context around these experiences, specifically, respondents' relationship with the people who harassed or discriminated against them, the locations of the incidents, and respondents' reactions to the harassment and discrimination. Harassment and discrimination were perpetrated by those with power over the respondents, but also by those without power. This highlights the role of harassment and discrimination in reinforcing and realigning power differentials in workplace settings.

Our examination of the context reveals the pervasiveness of harassment and discrimination. Because harassment and discrimination are so pervasive, they seem to be part of the climate and structure of astronomical educational and work settings. Indeed, harassment and discrimination occurred:

- In ongoing relationships and interactions that were limited in number
- In locations that respondents visited frequently and those that were visited infrequently, such as conferences
- Across all career stages
- In front of other people, in one-on-one interactions, and when the respondent was the only woman present

Astronomers had a variety of reactions to harassment and discrimination, which included refusing unwanted advances and avoiding the perpetrator. Some chose not to report but to persist through the incidents. When the behaviors were reported, workplace leaders sometimes stopped the offensive behavior (e.g. firing an individual who engaged in harassment), but sometimes they did not act on reports, and in one case, blamed the respondent. It is our goal that a deeper understanding of the types and context of harassment and discrimination will strengthen efforts to eliminate these behaviors in astronomy and astrophysics.

## Introduction

There is widespread consensus that harassment and discrimination are serious problems in astronomy and astrophysics. For example, the report of the National Academies' 2020 astronomy decadal survey concluded that "The persistence of harassment and discrimination in astronomy and astrophysics . . . must not be tolerated if the astronomy and astrophysics profession is to . . . [avoid] the toxic and corrosive effect that such behaviors have on individuals, organizations, and the entire profession."<sup>[1]</sup> The report goes on to recommend that "NASA, NSF, DOE, and professional societies should ensure that their scientific integrity policies address harassment and discrimination by individuals as forms of scientific misconduct."

The definitions of harassment and discrimination are broad and include a wide range of verbal and behavioral conduct. The American Psychological Association defines discrimination as "the unfair or prejudicial *treatment* of people and groups based on characteristics such as race, gender, age or sexual orientation."<sup>[2]</sup> Harassment, a type of discrimination, is defined by the U.S. Equal Employment Opportunity Commission (EEOC) as "*unwelcome conduct* that is based on race, color, religion, sex (including pregnancy), national origin, age (40 or older), disability or genetic information" (emphasis added in both definitions).<sup>[3]</sup> The EEOC says that workers are protected by law from various types of employment discrimination, including unfair treatment, harassment, and retaliation.<sup>[4]</sup> Nevertheless, discrimination and harassment are still widespread in academic environments, according to a 2018 report by the National Academies of Sciences, Engineering, and Medicine (NASEM).<sup>[5]</sup> The 2018 NASEM report further documents that harassment and discrimination can lead to several negative professional and psychological outcomes, including reduced school performance or work productivity; withdrawal from one's job, school, or field; and decreased psychological well-being due to stress, depression, and anxiety.

In the AIP Longitudinal Survey of Astronomy Graduate Students (2007–16), we found that 33% of respondents experienced harassment and discrimination. The overall goal of this report is to provide greater specificity on the types of harassment and discrimination experienced by the respondents and on the context around these experiences. We hope that a better understanding of the behaviors that could be perceived as harassment in school or work settings will strengthen efforts to eliminate harassment and discrimination in astronomy and astrophysics.

For this analysis, we had three objectives:

- 1) Explore the range of relationships astronomers had with the individuals who harassed or discriminated against them, and the range of locations where these experiences took place.
- 2) Identify the specific types of experiences that astronomers considered to be harassment and discrimination.
- 3) Describe astronomers' reactions to these experiences.

## Data Analysis

The data within this report were collected from the Longitudinal Study of Astronomy Graduate Students (LSAGS, 2007–16). Graduate students who were enrolled in an astronomy or astrophysics master's or doctoral program were surveyed during the 2006–07 academic year, and the same students were surveyed again in the 2012–13 and 2015–16 academic years. In the 2012–13 survey, participants were asked, "Have you ever encountered discrimination or harassment at school or work?" The 33% of participants who indicated "yes" were asked to "Please describe the circumstances of the discrimination/harassment." There were 96 open-ended responses (21% men and 79% women). One respondent's gender was unknown. The questionnaire did not include additional gender identities as possible response options, so we cannot provide information on those groups. At the time of the 2012–13 survey, 96% of respondents had graduated from their program with a master's or doctoral degree in astronomy. Further details on the LSAGS study can be found in the Methodology section at the end of this report.

We analyzed the open-ended responses using qualitative analysis in ATLAS.ti, version 8. Two analysts read through the responses and assigned "codes" to the text. Codes are words or short phrases generated by the analysts that describe or summarize the topics within a portion of text, and multiple codes can be assigned to the same portion of text. We applied inductive qualitative analysis techniques as used in grounded theory.<sup>[6]</sup> In inductive approaches, codes are created *during* the analysis process rather than beforehand, and there are two stages: open coding and focused coding. During open coding, analysts independently assign descriptive codes to the responses. During focused coding, the analysts compare and contrast their open codes through discussions to refine them and identify larger themes that emerge. In this report, we present the refined codes and themes, which are accompanied by direct quotes from the open-ended responses.

## Relationships With Those Who Engaged in Harassment or Discrimination

The first goal of this report was to explore the range of relationships respondents had with the individuals who harassed or discriminated against them. We identified 12 types of relationships with individuals who were the source of harassment and discrimination, and we identified two themes within the relationships: the formal power dynamic and if there was recurring contact.

**Table 1**

Respondents' Relationship with Individuals Who Harassed or Discriminated Against Them, 2012 to 2013

		Formal Power Dynamic		
		Superior	Neither Superior nor Subordinate	Subordinate
Recurring Contact	Yes	<ul style="list-style-type: none"> <li>• Professor or teacher</li> <li>• Graduate school advisor</li> <li>• Department leader or chair</li> <li>• Supervisor or boss</li> </ul>	<ul style="list-style-type: none"> <li>• Classmate or fellow student</li> <li>• Coworker or collaborator</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher's student in a class</li> </ul>
	No	<ul style="list-style-type: none"> <li>• Job interviewer</li> </ul>	<ul style="list-style-type: none"> <li>• Department guest</li> <li>• Member of the public</li> <li>• Peer outside of school or work</li> <li>• Stranger</li> </ul>	

Source: Longitudinal Study of Astronomy Graduate Students (2007 to 2016)


[aip.org/statistics](http://aip.org/statistics)

**Formal power dynamic.** Many respondents were harassed or discriminated by individuals with influence over the respondents' financial, educational, and professional outcomes due to their positions of power within a formal organizational or departmental structure. These individuals included professors or high school teachers, graduate program advisors, department leaders or chairs, supervisors over research or work, and job interviewers. One respondent specified how harassment and discrimination could be more difficult to navigate if the harassing or discriminating individual was in a position of power:

*"He was not in power of position over me, so it was easier to laugh it off."*

Harassment and discrimination can also be perpetuated by those in subordinate positions. One respondent stated that she experienced gender bias from her own students in course evaluations. Therefore, even when someone is in a position of power, their students or employees can have an impact on their career through evaluations or reporting structures. This demonstrates the complexity of formal power dynamics and how harassment and discrimination can be used to undermine authority.

Within other responses, we could not identify a formal superior or subordinate relationship with the respondents, which included classmates, colleagues, coworkers, collaborators, and peers. These individuals may have power or influence over the respondents in other ways outside the formal organizational structure, but that information was not provided in the responses.

**Recurring contact.** Respondents often interacted with individuals who harassed or discriminated against them on a continuous basis at school or work, such as professors, advisors, supervisors, classmates, and colleagues. However, some respondents did not continuously interact with the

individual who harassed or discriminated against them, such as job interviewers, guests visiting their department, members of the public, peers at conferences, or peers outside of their department or workplace. Furthermore, one respondent indicated that she experienced harassment more often from strangers or acquaintances:

*“It can be difficult for some to respect me as a scientist with a PhD. This is most notable with people who don’t know me or my work.”*

Although most respondents did not provide descriptive characteristics of the individuals who harassed or discriminated against them, some individuals were described as “older,” “middle-aged,” or “male.” It is important to note, however, that harassment and discrimination was not only performed by these groups. One respondent was harassed or discriminated against by a “female professor,” and many respondents were harassed or discriminated against by classmates, colleagues, or their own students, who were likely closer to their own age or younger.

### Location of Harassment and Discrimination

In addition to analyzing the relationships with those who engaged in harassment or discrimination, we also explored where these incidents took place. Respondents reported that these events occurred in many stages of their careers, including “early education,” “high school,” “undergraduate school,” “graduate school,” “during a postdoc,” and at a “first job” or “current job.” They indicated six specific locations or environments within these career stages where harassment and discrimination occurred, and three themes emerged: the regularity of visiting the locations, the level of privacy, and demographic isolation.

**Regularity of visiting the locations.** The most common location-based theme that emerged through inductive coding was the regularity with which respondents visited the locations where the harassment or discrimination occurred.

**Table 2**

**Locations of Harassment and Discrimination, 2012 to 2013**

Visits Regularly	Visits Irregularly
<ul style="list-style-type: none"> <li>• Classes or seminars</li> <li>• Email</li> <li>• Meetings, committees, or discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Conferences or symposia</li> <li>• Social event at workplace or department</li> <li>• Job interviews</li> </ul>

Source: Longitudinal Study of Astronomy Graduate Students (2007 to 2016)

Many respondents described locations which they likely visited on a monthly, weekly, or even daily basis. These locations and interactions included classes or seminars, emails, and meetings. Conversely, some experiences of harassment or discrimination occurred in locations which respondents likely only visited a few times a year or less, which included conferences or symposia, social events at the workplace, and job interviews.

**Level of privacy.** Another theme that emerged was whether others were present when the discrimination or harassment occurred. On a few occasions, respondents stated that they were alone with the individual who harassed or discriminated against them when the event took place:

*“A High School teacher (Physics and Calculus teacher) pulled aside all of the girls in our Calculus class individually.”*

*“An undergraduate advisor suggested I should quit physics when I got flustered during a pop quiz at the board in a 1-on-1 meeting.”*

On the other hand, several respondents indicated that discrimination or harassment occurred when they were in front of a group or in public:

*“She was abusive toward the girls, giving them harsher comments on their homework and insulting students in front of the class.”*

**Demographic isolation.** A few women reported specifically being the only woman present in the location where the harassment or discrimination occurred:

*“Inappropriate/rude comments/jokes made during seminars or classes ([with] me usually being the only woman in the room).”*

## **Types of Harassment and Discrimination**

The primary goal of this analysis was to identify the range of behaviors astronomers identified as harassing and discriminating. Respondents discussed 19 types of harassment and discrimination, and we identified four broad categories of these behaviors: biased perceptions, put downs, inequitable treatment, and sexual harassment.

**Table 3**

**Types of Harassment and Discrimination Experienced by Respondents, 2012 to 2013**

<b>Biased Perceptions</b>	Assumptions about status	
	Assumptions about career	
	Assumptions about work–life balance	
<b>Put Downs</b>	Jokes at expense	
	Criticisms	Appearance Family decisions
	Undermining competence	
	Undermining belonging	
<b>Inequitable Treatment Based on Demographics</b>	Less social support	
	Exclusion from events	
	Unfair grades	
	Fewer career opportunities	
<b>Sexual Attention</b>	Inappropriate sexual comments	
	Inappropriate behavior	Inappropriate staring or watching
		Inappropriate romantic relationships
		Inappropriate touching
	Threatening behavior	Making rape threats
		Stalking
		Assault

Source: Longitudinal Study of Astronomy Graduate Students (2007 to 2016)

### **Biased Perceptions**

Respondents discussed how others at school or work made assumptions about their careers and personal lives. Within this survey, almost all reports of biased perceptions were made by women, and many indicated that the biases were related to their gender.

**Assumptions about status.** A common bias reported by women was that others assumed they were in lower status roles, such as TAs or administrators, rather than their actual role of professors or researchers:

*“Assuming that I am a student or TA rather than a professor.”*

*“At a formal dinner for a large conference, a postdoc in a small, random conversation group where I was the only female assumed I was one of the administrative staff, despite my nametag.”*

**Assumptions about career.** Respondents’ colleagues also made assumptions about what pathways women would pursue in their career, specifically, assuming their career would be less related to research:

*“As a newly arrived professor it was assumed that I would take on the ‘outreach’ activities of the department, instead of engaging in research.”*

*“Being a woman, I always felt like I was expected to go into a teaching career rather than a research career.”*

Women also reported that others assumed they would prioritize their partner’s career or leave the field when they had children:

*“I feel that it is often assumed that I will move to be with my partner and not the other way around.”*

*“A lot of people expected me to sacrifice my career for my husband's.”*

*“Being asked when I was going to leave to have kids.”*

**Assumptions about work–life balance.** One woman discussed how male colleagues were unaware of the tasks she performed in her personal life, which affected the amount of time she could work:

*“The guys don't understand that I am my own housewife, so to speak, so that I take care of a huge amount of stuff at home that they don't do.”*

### **Put Downs**

Many respondents discussed how others at school or work directed negative verbal comments that devalued or belittled them. Within this survey, almost all instances of being verbally put down were described by women, and most respondents related the incidents to their gender. However, negative comments were also related to respondents’ race, ethnicity, educational background, appearance, or parental status.

**Jokes at expense.** Respondents experienced feeling put down through inappropriate jokes about their gender, blonde hair, race, or ethnicity:

*“On one occasion, one of my peers made light of my skin color in front of visitors to the department.”*

**Criticisms.** Some comments directly criticized respondents’ appearance:

*“I've been informed by a professor in my graduate program that I needed to lose weight, as my size ‘makes it clear you could not be a good scientist as you obviously don't put in any work elsewhere.’”*

One woman also reported that her family decisions were criticized:

*"When I returned to graduate school after the birth of my children... I was told by a female faculty member that this was absurd, my children should be in daycare, and that I should never have been admitted to the university."*

**Undermining competence.** The largest recurring theme within this category is the putting down of respondents by undermining their competence or ability to perform their work. Many respondents reported that they were called "stupid," "not smart enough," or "had nothing to contribute." Some women were told they were not as capable as men:

*"I've experienced the standard sexual harassment from class members... 'You girls are too stupid to do this.'"*

*"Students leaving tutorials after I correct them on basic arithmetic to go ask their male professor because they didn't think 'girls knew how to do math.'"*

*"[I was] told by the department chair that women are not as capable as men in STEM fields."*

Comments undermining competence could be more indirect as well. When discussing a woman's success, others suggested that their success was due to their gender or that they succeeded despite their gender:

*"Being told by a male colleague that of course they would pick me over him because who wouldn't want to 'work with a cute girl.'"*

*"Telling me I did really well on the GRE for a girl (I scored perfectly)."*

*"The 'supportive' statement about how novel it is that I'm a woman in physics."*

Gender was not the only basis for undermining respondents' competence. Male and female respondents were assumed to be less capable because of their educational background or parental status:

*"I was home schooled and.... in one particular instance, someone expressed doubt as to whether I could do a given job because of this during a job interview."*

*"A researcher telling me that he knows the college I am at (a women's college) and that we are good at some things, but it's not physics."*

*"I have been told by male graduate students that my PhD was a joke because I was doing it part-time while taking care of my children."*

**Undermining belonging.** Finally, female respondents were put down by being told they did not belong in the physics field:

*"I was told several times that women can't be physicists."*

*"Department chair saying that women don't belong in science."*

*"I was told by a professor at the institution that I should just 'stay home and have babies.'"*

*"A high school teacher pulled aside all of the girls in our Calculus class individually and told us we were not cut out for science and math, and should not take the next class in the series."*

### **Inequitable Treatment Based on Demographics**

Many respondents reported being treated differently or inequitably by others due to their demographic characteristics. We identified incidents as inequitable treatment if the respondent specifically mentioned that demographics played a role in the actions of another person. Most respondents in the survey felt discriminated against based on their gender, and it is important to note that both men and women reported incidents of gender-related discrimination. Respondents also reported inequitable treatment based on their race, ethnicity, educational background, age, and disability.

**Less social support.** Both men and women discussed receiving less social support from their professors and advisors, based on their gender:

*"My adviser going out for coffee with the male postdoc and his male grad student, but not me."*

*"I've seen a lot of encouragement of women to go into astronomy where that encouragement is not present for men."*

Women in particular mentioned a lack of support or inclusion with colleagues in study groups, discussions, or meetings:

*"In freshman physics, male students would refuse to study with the small number of female students in the class."*

*"I had to speak very loudly and repeat several times in a row my contributions to a discussion with my classmates in graduate school (all male—I was the only woman in the group of 6). They literally ignored what I said."*

**Exclusion from events.** Men and women also discussed how they believed their gender determined whether they were included in events:

*"I recall an occasion where female graduate students were given the opportunity to meet with the colloquium one week and the male graduate students were not."*

*"Not being chosen for special networking events because I am female."*

**Unfair grades.** Both men and women believed their work was evaluated unfairly, resulting in lower grades or harsher criticisms because of their gender:

*"There were cases where I believe I received a lower grade than average simply because I was a woman."*

*“Going so far as to give me a lower than earned grade while giving female students and his own students higher than earned grades.”*

*“We had a female professor who felt the need to ‘toughen up’ the girls in the class. She was abusive toward the girls, giving them harsher comments on their homework.”*

**Fewer career opportunities.** Men and women believed that gender also played a role in their opportunities for research projects, grants, and jobs:

*“Men with less experience than me were given more ‘research-oriented’ projects.”*

*“I recall that some grants were easy for women to get and hard for men to get.”*

*“I believe I was discriminated for being female when applying for certain jobs.”*

*“I was offered less money for the same job than my male counterparts.”*

These discriminating experiences were not only based on gender. They were also related to respondents’ age and nationality:

*“I was passed over for a management opportunity because of my young age.”*

*“Being fired from a TA job because I was an international student (I am Canadian) and told that it was because they needed to make sure they had TAs who spoke English well enough for the students to understand (I am a native English speaker). I was initially told that it was because I had bad student ratings, but I later found out that my ratings were excellent and they had categorically fired all of the international student TAs because they didn’t think we spoke English.”*

### **Sexual Attention**

Respondents reported several incidents involving unwelcome sexual attention, either in comments or behaviors. Within this survey, all incidents of sexual attention were reported by women.

**Inappropriate sexual comments.** Many women felt discomfort and belittlement when their sexuality was included in jokes, criticisms, or rumors:

*“One senior-level male professor made a joke about my ‘sleeping’ with another female colleague when it was heard that she was a friend staying at my apartment.”*

*“When I [was] sick, I was told I probably had mono because I was so promiscuous.”*

*“False rumors about my sex life were intentionally spread around the department by a woman staff member.”*

**Inappropriate behavior.** In some cases, women received sexual attention when men stared at their chest while talking with them. In other more invasive cases, faculty members walked in on them changing, pursued inappropriate romantic relationships, and requested inappropriate physical contact:

*“Another advisor obtained keys to students offices and came into a locked shared office one day while a female grad was changing.”*

*“An undergraduate professor becoming my friend... only to then use that to try to start a serious relationship (he wanted us to run away together... he was married with kids).”*

*“Another advisor drunkenly demanded hugs of all the female grad students at the holiday party.”*

**Threatening behavior.** The most extreme incidents of sexual attention involved threats, stalking, and assault:

*“As a graduate student I had veiled rape threats sent to my work email accounts by someone who probably worked in my building and who was almost certainly an astronomer—this person knew details about the man I was dating at the time, who was an astronomer at another institution.”*

*“I’ve been stalked and assaulted by an intern from a separate program in the same department as my internship.”*

### **Reactions to Harassment and Discrimination**

The final goal of this report was to describe astronomers’ immediate reactions to experiences of harassment and discrimination. Respondents discussed nine different types of reactions to these incidents. The only theme that emerged during the inductive coding was who reacted to the harassing or discriminating events. Respondents described their own personal reactions and the reactions of individuals in leadership positions within the organization or department. On a few occasions, respondents discussed the reaction of the individual who harassed or discriminated against them, but they did not provide more detail beyond that the individual either stopped or refused to stop the harassment or discrimination.

**Table 4**

**Reactions to Harassment and Discrimination, 2012 to 2013**

<b>Respondent Reactions</b>	<b>Workplace Leadership Reactions</b>
<ul style="list-style-type: none"><li>• Reported incident</li><li>• Refused offender</li><li>• Avoided offender</li><li>• Persisted through issue</li><li>• Did not report incident</li><li>• Experienced negative emotions</li></ul>	<ul style="list-style-type: none"><li>• Addressed incident</li><li>• Did not address incident</li><li>• Blamed reporter of incident</li></ul>

Source: Longitudinal Study of Astronomy Graduate Students (2007 to 2016)

**Respondent reactions.** The most direct way respondents reacted to harassment or discrimination was to report the incident, either through official channels or unofficial conversations with other faculty members:

*“The harassment ended when myself and one of these other women filed a formal complaint.”*

*“I discussed these comments with another professor but did not make an official report.”*

*“I eventually told a female member of the climate committee and she spoke with him.”*

Another constructive way one respondent reacted was by refusing the advances of a professor:

*“I was once the subject of unwanted sexual advances from a senior professor at an astronomy conference dinner. These were quickly rebuffed.”*

Respondents also reacted in ways that were less direct but helped them avert future incidents:

*“[I] made a point to avoid him in the future.”*

*“I actually started dressing down (wearing loose t-shirts, etc.) on days when I knew I would see this particular faculty member.”*

*“These [advances]...resulted in my leaving the dinner because I was very uncomfortable.”*

*“I never felt safe in the building after hours, so I didn't work in my off hours, like so many people do.”*

Several respondents reported that they reacted to the incident by persisting through them:

*"I try not to let it bother me."*

*"It was easier to just laugh it off."*

*"A [high school] teacher told us [girls] we were 'not cut out' for science and math, and should not take the next class in the series. I believed him (despite having a 98% in the class at the time), but [I] stayed in the class because I knew I wanted to do astronomy."*

While most descriptions of respondents' reactions involved some type of behavior, a few respondents specifically chose not to file or escalate a harassment or discrimination report:

*"I did not escalate, because he brought a multi-million-dollar mission to the university, and I knew it would be a he-said-she-said, and was told confidentially that my name would be dragged through the mud."*

Finally, respondents described their emotional reaction. Specifically, they reported negative emotions, such as feeling annoyed or frustrated, overlooked, like an outsider, uncomfortable, and afraid. One respondent reported that another student in their department suffered mental health issues due to their experiences:

*"[He was having] a nervous breakdown... due to being the only minority in the department."*

**Workplace leadership reactions.** Respondents also described reactions from leadership within the workplace or department. Examples of workplace leaders included "the department chair," "my department," "the leadership of the department," "the university," "the climate committee," "another professor," and "my supervisor." Some respondents indicated that the organization directly addressed the issue and, in one instance, provided support to the respondent:

*"He is now barred from working with students."*

*"Fortunately my institution at the time terminated the contract of this person after the investigation."*

*"[I] received A LOT of support from both our graduate department and the University."*

However, at other times the leaders in the organization or department did not address the issue or even blamed the respondent:

*"My department did nothing."*

*"When I brought up my concerns to my department chair (who was also my graduate advisor) it was shrugged off."*

*"Much of the leadership of the department closed ranks, insisting that I was the problem and my removal from the department would be the solution."*

A few respondents also described a general culture of acceptance of harassment and discrimination within the broader field or community:

*“A widespread acceptance of inappropriate sexual behavior of male faculty towards female students.”*

*“His colleagues in the university and in the astronomy community are willing to look the other way because he's a good researcher. This, perhaps more so than the existence of such people in the field, has been a large factor in my decision to leave, since there seems to be no will on the part of his peers to address his behavior or change the institutional structures that enable such blatant abuse.”*

## **Conclusion**

Our results show that the harassment and discrimination experiences of graduate students and early career professionals in astronomy are broad. Harassment and discrimination are pervasive and can reinforce or realign power differentials in astronomy work and educational settings. We found that the individuals who harassed or discriminated against the respondents can be of any gender or within any employment position, and the experiences can occur in a variety of settings. Respondents described several types of harassment and discrimination experiences, including verbal comments, unequal treatment, and sexual attention. Unfortunately, our results showed that these issues are not always addressed in organizations. When these incidents are reported, some departments and workplaces worked to resolve these issues, while others ignored or refused to address the issues.

The valuable stories of these astronomers improve our understanding of what individuals perceive as harassment and discrimination, which can better inform future initiatives to address these issues. The pervasiveness of harassment and discrimination and its relationship to power indicate that these behaviors are part of the structure and climate of astronomy. To improve outcomes for students and employees, it is important for the astronomy community to continue supporting its members who experience harassment and discrimination. It is even more important to begin questioning and restructuring the organizational settings that contribute to its pervasiveness. These changes are essential to a safe and inclusive astronomy for all.

## **Limitations**

The harassment and discrimination experiences within this report are not representative of the entire population of astronomers. Only a subset of respondents in the survey chose to respond to the open-ended question. Therefore, the descriptions of harassment and discrimination presented in this report are not comprehensive, and astronomers may have other experiences that were not analyzed within this report. Because the responses were confidential, we also are not able to follow up with respondents and obtain additional information about the context or details of these experiences.

## Methodology

The goal of the Longitudinal Survey of Graduate Students (LSAGS, 2007–16) was to examine gender differences in the career outcomes of astronomy or astrophysics graduate students over time. Three waves of online surveys were sent to respondents. There were 1,143 respondents to the first online survey sent in the 2006–07 academic year (42% women, 58% men), 837 respondents to the second online survey sent in the 2012–13 academic year (34% women, 66% men), and 797 respondents to the final online survey sent in the 2015–16 academic year (40% women, 60% men). The survey item “Have you ever encountered discrimination or harassment at school or work?” was only asked in the 2012–13 survey. The survey was conducted by the Statistical Research Center at the American Institute of Physics, in partnership with the American Astronomical Society Demographics Committee. The study was supported by the National Science Foundation (Grant No. 134773), and the principal investigator (PI) for the study was Rachel Ivie of the Statistical Research Center.

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1 Physics Ellipse, College Park, MD 20740

[stats@aip.org](mailto:stats@aip.org) | 301.209.3039 | [aip.org/statistics](http://aip.org/statistics)