

# Physics Bachelors' Outcomes: Focus on Graduate School and the Effects of the Pandemic

Data from the degree recipient follow-up survey for the classes of 2019 and 2020  
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While new physics bachelor's degree holders have a breadth of possibilities open to them, the initial post-degree outcomes for physics bachelors generally fall into two main categories: entering the workforce or continuing their education at the graduate or professional level. About two-thirds of those continuing with their studies are enrolled in a physics or astronomy graduate program, with the remaining third pursuing a wide variety of fields, ranging from engineering to law. The type and level of financial support received by students enrolled in graduate programs are affected by the level of the degree program in which they are enrolled. Virtually all students enrolled in a PhD program, regardless of field, receive some type of financial support.

This report focuses on outcomes for physics bachelors who go on to graduate school. The immediate impact of the pandemic on physics bachelors' outcomes is also described. Finally, the report also includes a description of the type of work physics bachelors hope to do ten years after graduation. A separate report will examine initial outcomes for physics bachelors entering the workforce, including sectors of employment, fields of employment, and starting salaries for physics bachelors from the same degree classes.

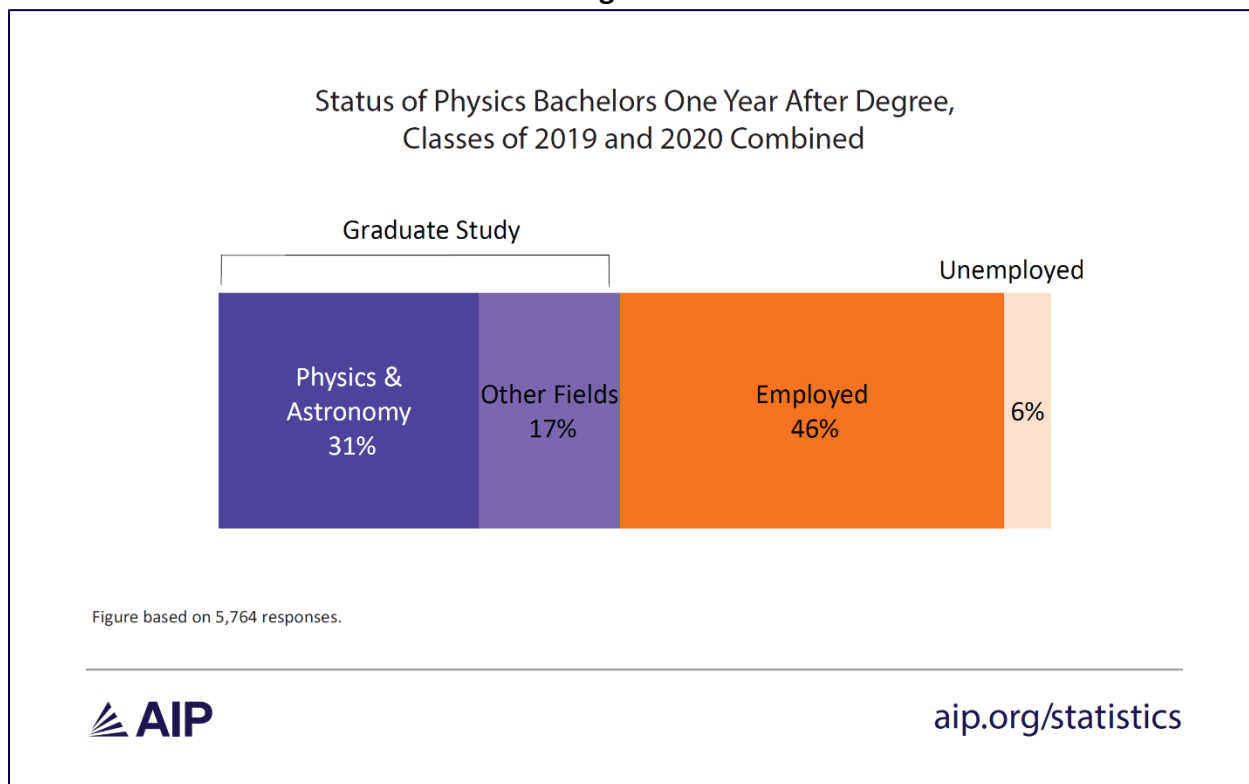
## Initial Outcomes

Initial outcomes for new physics bachelor's degree recipients<sup>1</sup> fall into two broad categories: enter the workforce or enroll in a graduate program (**Figure 1**). In the winter following the year in which they received their bachelor's degree, 46% of the degree recipients in the classes of 2019 and 2020 had secured employment, and 6% indicated they were seeking employment. The remaining 48% of the bachelors were enrolled in graduate school. The majority of these were studying physics or astronomy.

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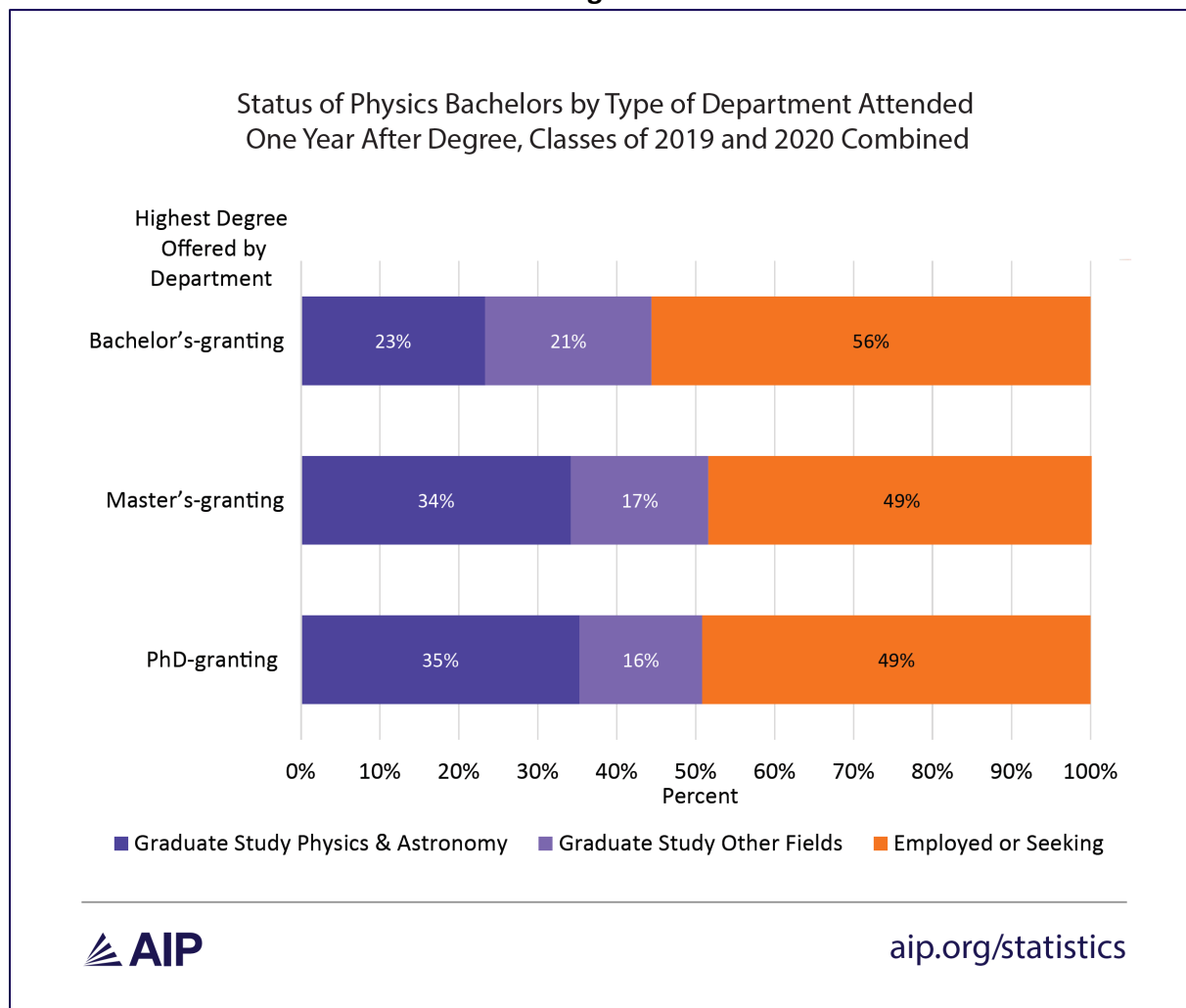
<sup>1</sup> See the Survey Methodology section for general information on the number of physics bachelors and the criteria for inclusion in this report.

**Figure 1**



The distribution of post-degree outcomes was similar for both men and women; however, non-US citizens were more likely to enter into physics graduate study, while US citizens were more likely to enter the workforce. Physics bachelors graduating from a department that also offered graduate-level degrees were more likely to continue on to graduate studies than those graduating from a department where a bachelor's was the highest physics degree offered (**Figure 2**).

Figure 2



## Changes in Initial Outcomes Over Time

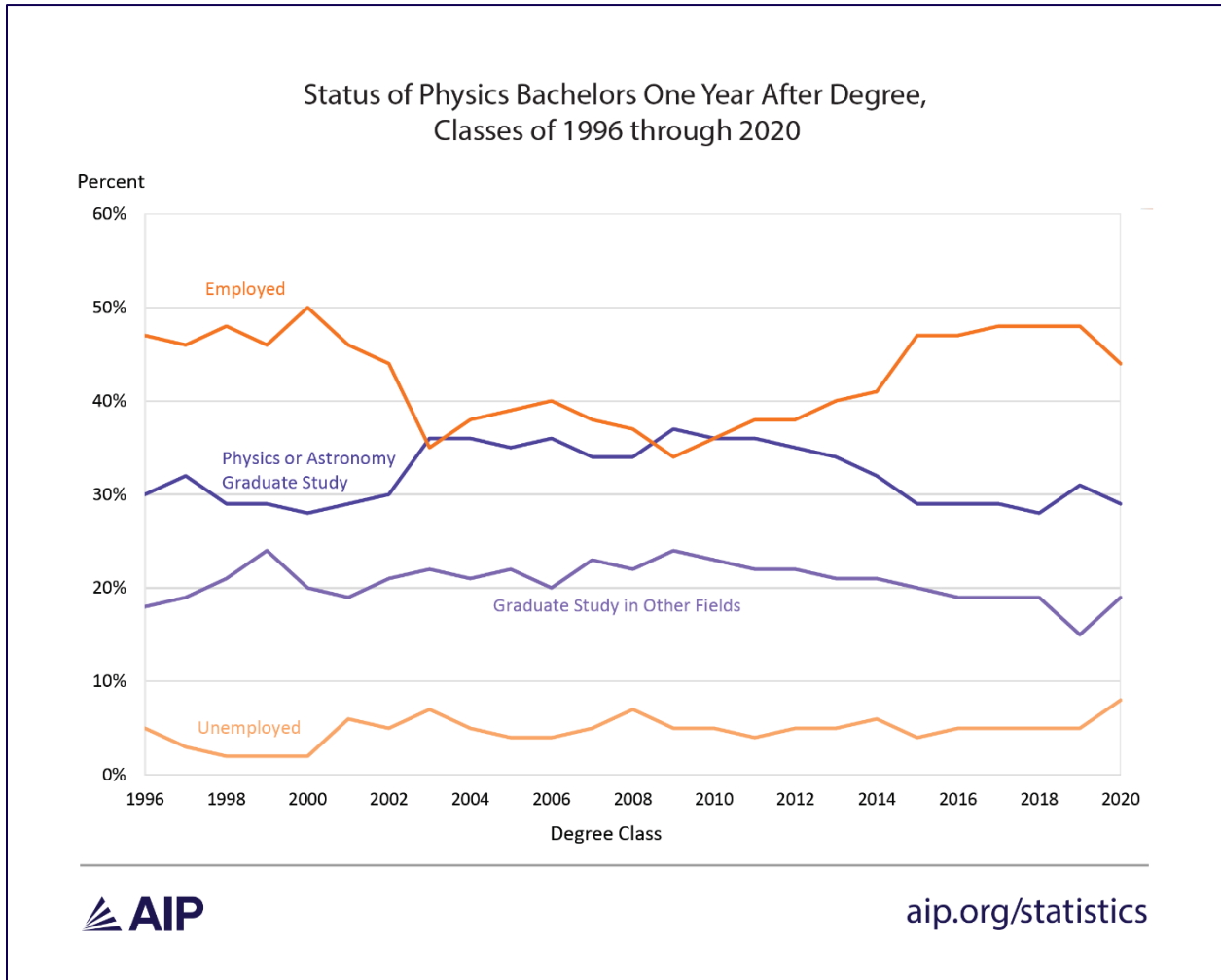
The proportion of new physics bachelors immediately pursuing graduate study in physics, astronomy, or other fields has been relatively unchanged in recent years (**Figure 3**). Typically, two-thirds of the new graduates pursuing graduate study are enrolled in a physics or astronomy program.

After five years of little change, the proportion of new physics bachelors in the class of 2020 who immediately entered the workforce dropped by 4% from the previous year. This drop was primarily offset by a 3% increase in the proportion of new bachelors who reported being unemployed and seeking (to 8%). This is the highest percentage of unemployed and seeking physics bachelors ever measured by this survey series. This shift toward a higher unemployment rate was likely to have been driven by the major recession and stock market crash in 2020, both driven by the uncertainty of COVID-19's impact on the economy.

In the spring of 2020, the COVID-19 pandemic was declared a national emergency, and the vast majority of schools closed their doors and required students to complete their academic year remotely. Almost 30% of respondents to the class of 2020 Bachelor's Follow-Up Survey indicated that their postgraduation plans had changed due to the pandemic. These changes included career-altering decisions affecting both new graduates planning to enter the workforce and those planning to continue with graduate school immediately. Personal lives were also impacted, with new graduates reporting needing to move back home, cancel travel plans, and delay seeing family members.

With institutions being closed, many respondents who were continuing their education indicated that their transition to graduate school had been more challenging than expected due to being unable to meet and develop relationships with other students in the program. Virtually all sectors of the economy were impacted by the pandemic, with employers making a major shift to remote work where possible. As many employers scrambled to adjust to a remote work environment, many also delayed posting or filling open positions. According to the Bureau of Labor Statistics, the number of nonfarm job openings from February 2020 to April 2020 dropped by 2.5 million (34%).

Figure 3



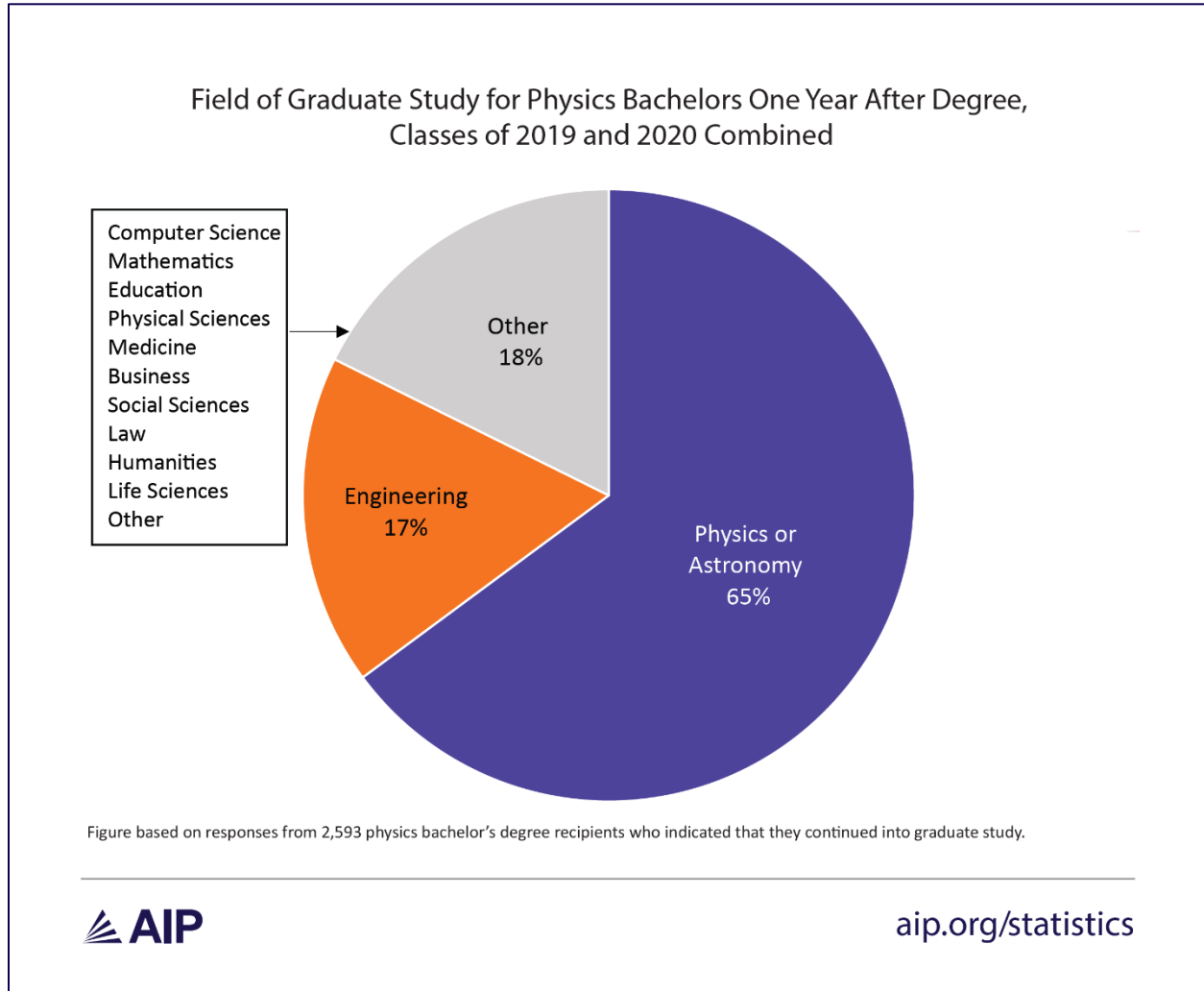
## Graduate Study

About half of physics bachelors in the classes of 2019 and 2020 entered graduate school by the winter following graduation, and almost two-thirds of these decided to do so in the fields of either physics or astronomy (**Figure 4**). As has been true for several years, engineering was the next largest field of graduate study pursued by new physics bachelors. The remainder were enrolled in programs in a variety of subjects, the majority of which were STEM fields. Some new physics bachelors continued their education in non-STEM fields such as business, law, or the humanities, suggesting that a physics bachelor's degree provides an educational background that enables students to pursue diverse educational paths. Of the students immediately continuing their education, 38% were enrolled in a master's program, and the remaining 62% enrolled in a PhD or professional school. Of respondents enrolled in master's programs, about a quarter indicated they intend to continue their graduate studies in pursuit of a PhD after completing their master's.

Among the 52% of new bachelors who were either employed or seeking employment, a third indicated they planned to enroll in a graduate program in the future. About half of these (53%)

planned to enroll in a physics or astronomy graduate program, while the remainder either planned to pursue a different field (18%) or were unsure of what field they would continue their studies in (29%.)

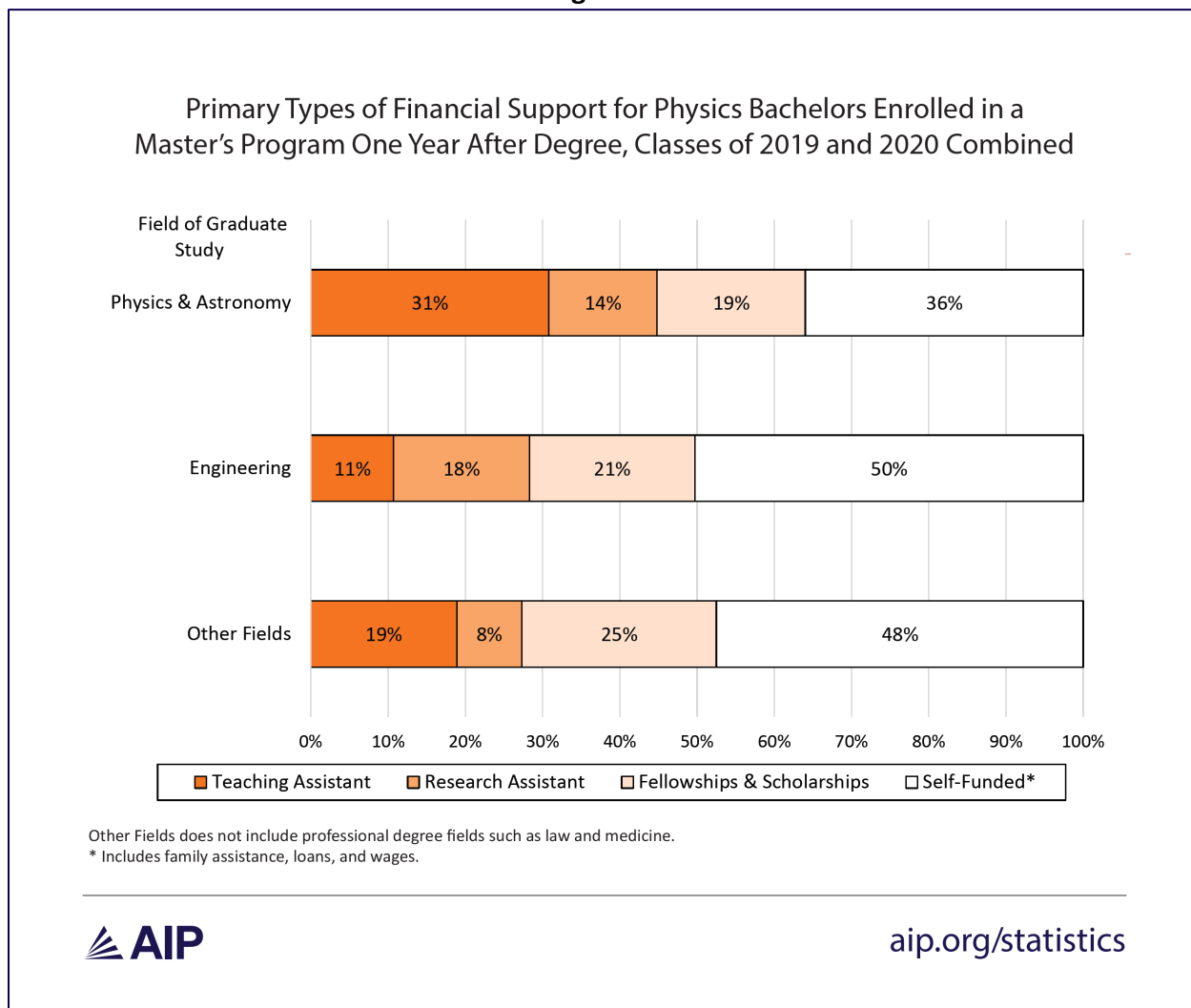
**Figure 4**



## Support for Graduate Study

The type of program in which a student enrolls influences how they fund their continuing education. Virtually all students enrolled in a PhD program, regardless of field, receive some type of financial support from their graduate departments. This contrasts with students enrolled in master's programs, where just over half of the new physics bachelors received funding from a teaching assistantship, research assistantship, or fellowship. Many students enrolled in master's programs who do not receive support from their graduate departments rely on family assistance, loans, and wages from outside employment (**Figure 5**). However, students in a physics or astronomy master's program were more likely to receive financial support (64%) than students pursuing other fields (~50%).

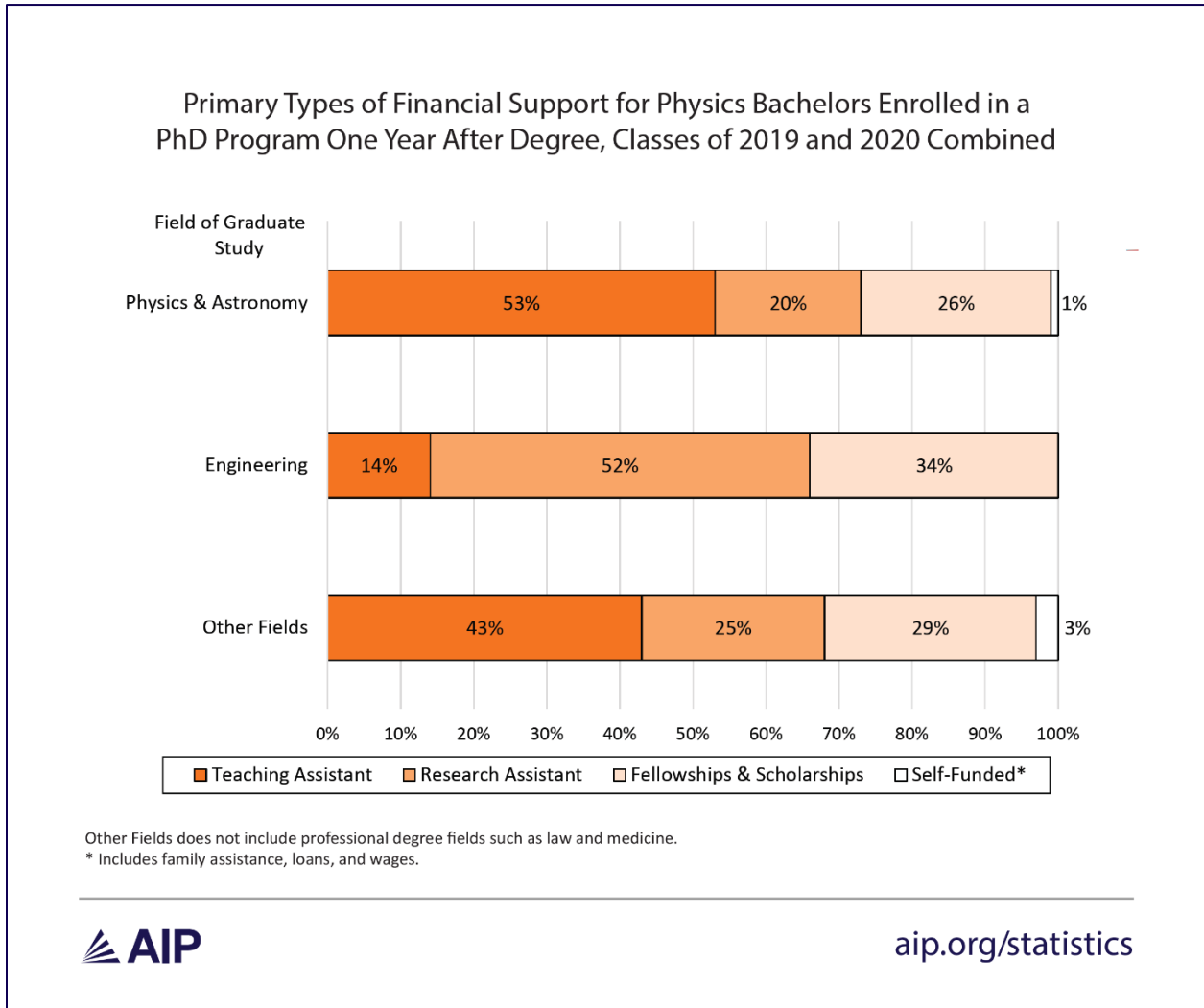
Figure 5



Almost all physics bachelors enrolled in PhD programs were supported by teaching assistantships, research assistantships, or fellowships, regardless of field (**Figure 6**). The majority of new physics bachelors enrolled in a physics or astronomy PhD program were primarily supported by teaching assistantships. In contrast, research assistantships were the primary support for students pursuing an engineering PhD.

Despite the various impacts of the COVID-19 pandemic on new graduates, only 5% of respondents indicated that the pandemic impacted their support. A further 19% were unsure if their support was impacted. Students enrolled in master's programs were more likely to indicate that their support was impacted (10%) than their counterparts enrolled in a PhD program (3%).

Figure 6

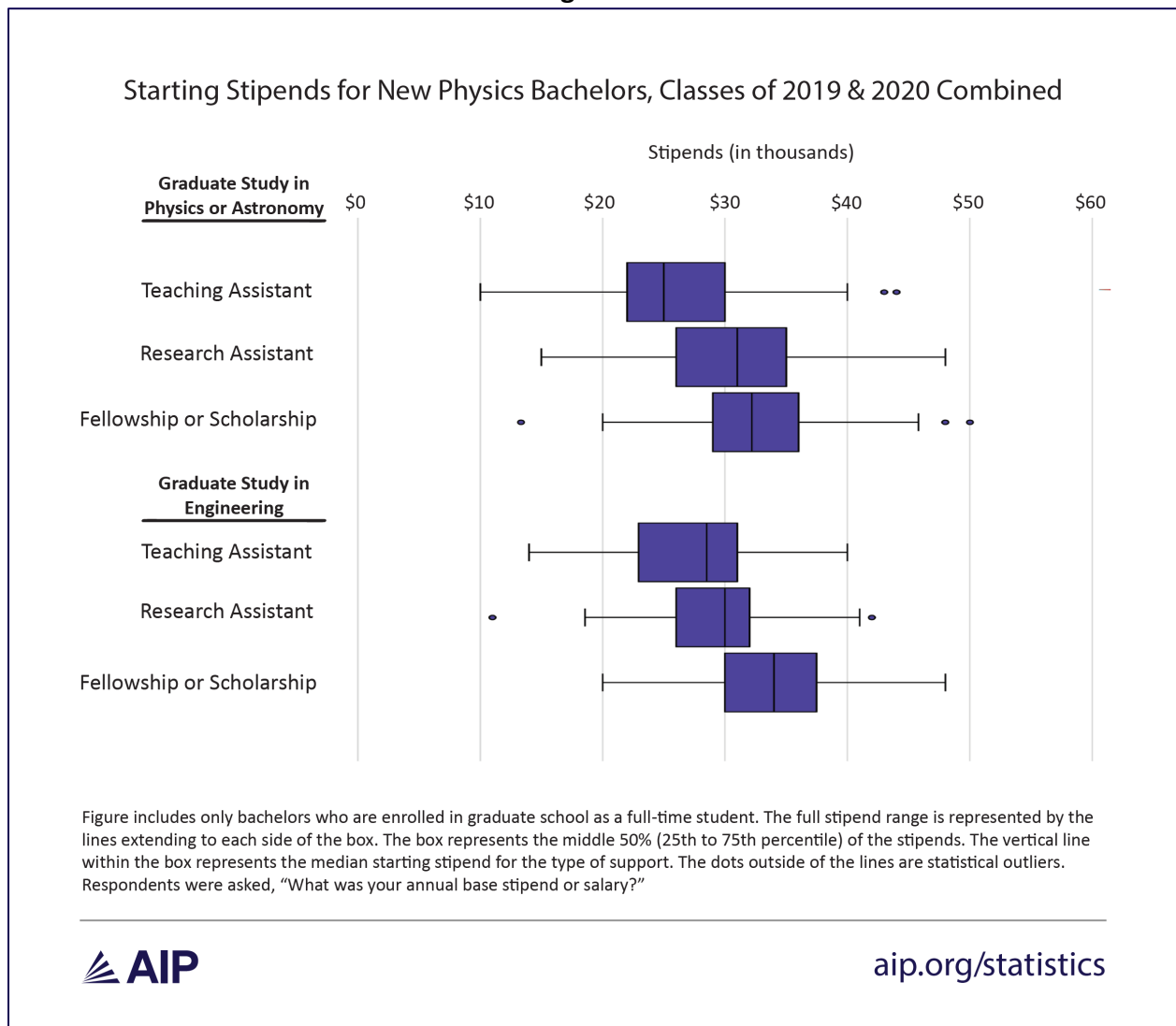


Stipend amounts that new physics bachelors received as full-time, first-year graduate students varied somewhat depending on the type of support they were receiving and what subject and degree level they were pursuing. For those pursuing physics or astronomy PhDs, the median teaching and research assistants stipend was \$25,000 and \$31,000, respectively. Physics bachelors pursuing engineering PhDs and receiving teaching assistantships received a slightly higher median stipend (\$28,000) than their physics counterparts, whereas engineering students with a research assistantship had a median stipend (\$30,000) that was comparable to research assistantships in physics and astronomy (**Figure 7**). Data from an AIP survey of first-year graduate students found that 93% of students enrolled in a physics PhD program received a full tuition waiver, and a further 4% received a partial waiver.<sup>2</sup> Students enrolled in master's programs were not only less likely to hold a teaching or research assistantship, but the stipend amounts for those who did were considerably lower than the students enrolled in doctoral programs.

<sup>2</sup> Source: AIP Survey of First-Year Graduate Students 2014–15 and 2015–16.



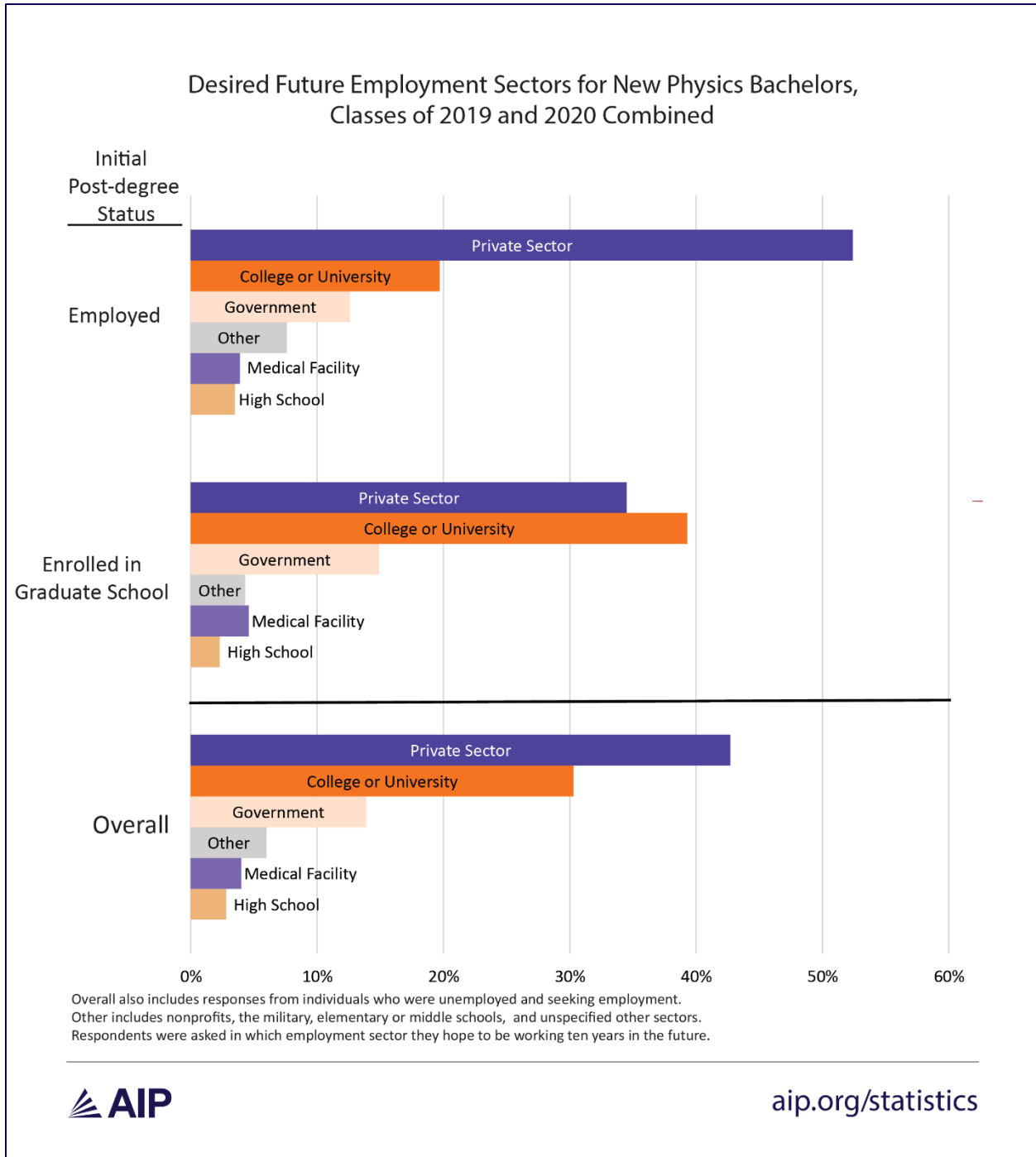
Figure 7



## Looking Forward

The survey asked new physics bachelors in which employment sector they hoped to be working 10 years in the future. As seen in **Figure 8**, degree recipients who initially entered the workforce were more likely to indicate that they hoped to work in the private sector (52%) than those who were enrolled in a graduate program (35%). New bachelors who immediately continued their education at the graduate level were twice as likely as employed bachelors to indicate their long-term career goal was to work at a college or university. Overall, 30% of new physics bachelors indicated they hoped for a career at a college or university. The distribution of sectors in which unemployed respondents hoped to work in 10 years closely mirrored that of the overall distribution.

Figure 8



## Conclusion

About half of physics bachelors in the classes of 2019 and 2020 entered graduate school by the winter following their graduation. Two-thirds of these began graduate work in physics or astronomy. Because of the pandemic, many respondents indicated that their transition to graduate school had been more challenging than expected due to being unable to meet and

develop relationships with other students in the program. Students in PhD programs were more consistently funded than students in master's programs, and most students did not report that the COVID-19 pandemic had any effect on their graduate school stipends. Future reports on physics bachelors' outcomes may show additional effects of the pandemic.

Finally, the new physics bachelors reported their long-term career goals, with more than two-thirds hoping to work in the private sector in ten years.

## Survey Methodology

The Statistical Research Center conducts a Survey of Enrollments and Degrees each fall. This survey asks all degree-granting physics and astronomy departments in the US to provide information concerning the number of students they have enrolled and counts of recent degree recipients. At the same time, we ask for recent degree recipients' names and contact information. This degree recipient information is used to conduct our follow-up survey in the winter following the academic year in which respondents received their degrees. The follow-up surveys were administered in a web-based format. Nonresponding degree recipients were contacted up to six times with invitations to participate in the survey. The post-degree outcome data in this Focus On comes from that survey.

There were 9,193 and 9,296 physics bachelor's degrees conferred in the classes of 2019 and 2020, respectively. Women earned 23%<sup>3</sup> of the physics bachelor's degrees in these classes, and non-US citizens comprised 11%. The findings in this report are based on responses (N = 5,764) to AIP's follow-up surveys of degree recipients from those two classes. The new degree recipients were asked about their post-degree status during the winter following the year in which they received their bachelor's degrees. The analysis did not include degree recipients who were not in the US or those who had post-degree circumstances other than more schooling, employment, or seeking employment in the winter after receiving their physics bachelor's degrees.<sup>4</sup>

Recent degree recipients can be difficult to reach because they tend to relocate after receiving their degrees. Departments often do not provide or do not have accurate contact information for their alums. To help us determine outcome information and obtain updated email addresses, we contact the advisors of nonresponding degree recipients. In addition to current student contact information, advisors are asked if their advisee remained in the US, gender, citizenship, and post-degree outcome. For bachelors who were employed, we asked for sector and broad field of employment, as well as employer name. For bachelors continuing their education, we asked their broad field of study. All advisor questions included a "Don't know" response option. We received post-degree information for about 33% of physics bachelors whom we were able to contact, either personally or through their advisors. Of the outcome information obtained, 75% came directly from the students themselves.

We thank the many physics and astronomy departments, degree recipients, and faculty advisors who made this publication possible.

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<sup>3</sup> Of survey respondents 2% indicated a gender other than "man" or "woman."

<sup>4</sup> Of the degree recipients for whom we have post-degree outcome data, 2% had left the US and 2% had post-degree outcomes in the US that did not include more schooling, employment, or seeking employment.

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