

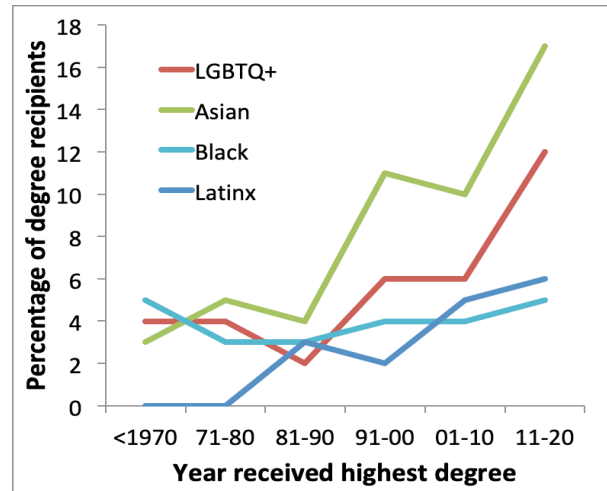
**RESULTS OF THE 2020 PLANETARY SCIENCE WORKFORCE SURVEY, FUNDED BY THE DPS.** J. A. Rathbun<sup>1</sup>, A. R. Hendrix<sup>1</sup>, A. M. Porter<sup>2</sup> and E. G. Rivera-Valentín<sup>3</sup>, <sup>1</sup>Planetary Science Institute ([rathbun@psi.edu](mailto:rathbun@psi.edu)), <sup>2</sup>Statistical Research Center, American Institute of Physics, <sup>3</sup>Lunar and Planetary Institute, USRA.

**Introduction:** In April 2020, a survey was sent to planetary scientists in order to, in part, gather information on the state of the planetary science workforce that might be useful to the 2020 Planetary Science and Astrobiology Decadal Survey. The survey was organized and funded by the American Astronomical Society (AAS)'s Division of Planetary Science (DPS) but was carried out by the Statistical Research Center of the American Institute of Physics (AIP). The survey had two main goals: (1) To act as a survey of DPS members, and (2) To understand the current state of the profession. As such, questions in the survey were based on previous DPS member surveys, AAS member surveys, and the 2011 planetary workforce survey. Here, we focus on the second goal of the survey.

The survey was sent to members of DPS, members of the Geological Society of America's Planetary Geology Division, and the mailing list of the Lunar and Planetary Institute (LPI). The last of these includes attendees of the Lunar and Planetary Science Conference (LPSC). The survey had 2,367 respondents (48% response rate) while the 2011 survey had a 62% response rate and the 2005 DPS members survey had a 32% response rate [1]. For the AIP full report, preliminary raw data, and raw version of the questionnaire, see <https://dps.aas.org/reports>. A white paper summarizing findings and recommendations based on the survey results was also submitted to the Planetary Science and Astrobiology Decadal Survey [2].

**Planetary Science as a field is getting larger and more diverse:** The 2020 survey was sent to ~35% more people than the 2011 survey. While the e-mail lists used differed (2011 included AGU but not GSA), this suggests substantially more people in the field than 9 years ago. The increase amount is in remarkable agreement with the results of the 2020 survey, which showed that 35% of respondents had received their highest degree after 2010 and wouldn't have been included in the 2011 survey.

The AIP analysis included significance testing and found that respondents who identified as LGBTQ+, Hispanic/Latinx, and Asian/Asian-American earned a significantly greater proportion of degrees in recent years while respondents who identified as white earned a significantly smaller proportion of degrees in recent years. Unfortunately, the percentage of degrees earned respondents identifying as Black/African-American



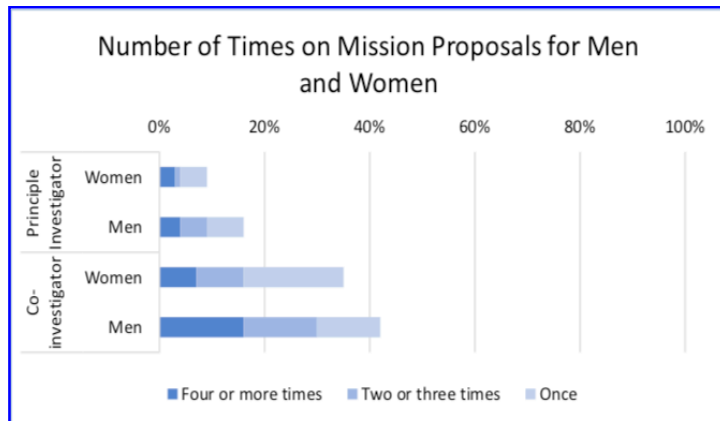
**Figure 1: Percentage of respondents who received their highest degree in a given year range that also identified as LGBTQ+, Asian/Asian-American, Black/African-American, and Latinx/Hispanic.**

has remained flat (Figure 1). For a more robust study of demographics in the planetary science workforce, see the presentation by Rivera-Valentín [3].

**Most Planetary Scientists work at either Universities (42%) or Research Institutions (31%):** The only statistically significant difference among demographic groups was that LGBTQ+ respondents were less likely to work at a University and more likely to work at a Research Institute. However, type of position did vary significantly by race, gender, and LGBTQ+ status. Women and LGBTQ+ respondents were less likely to work in tenured positions and more likely to work in tenure-track, limited term, or postdoctoral positions. Respondents who are Black/African-American or another race/ethnicity were also less likely to work in tenured positions.

**Most Planetary Scientists use NASA grants to fund their research activities:** The vast majority of respondents (64%) have submitted at least one research proposal as PI. Respondents receive funding from NASA grants (63%) more than by NSF grants (19%) or NASA missions (43%). Over a half of non-faculty respondents (54%) receive the majority of their funding from NASA grants and over a third (43%) receive the majority of their funding from NASA missions. This indicates that R&A is an important funding source for the community.

We reiterate the recommendation from [2] that NASA should increase funding to R&A programs to



**Figure 3: Number of times respondents who identified as Men or Women served at PI or Co-I on a mission proposal.**

significantly increase selection rates, which should be no less than 20% and, ideally more than 30%. Low selection rates are likely to disproportionately affect members of underrepresented groups [4].

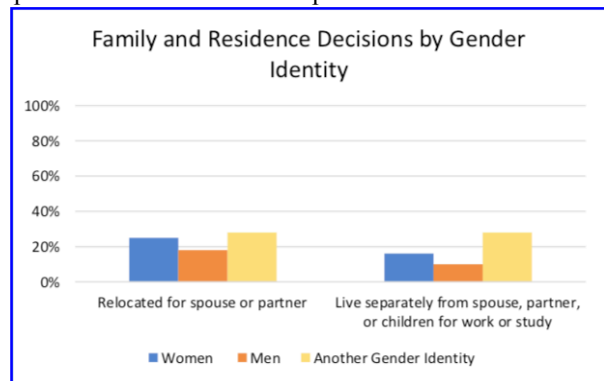
**Mission involvement had significant differences across all demographic groups:** The vast majority of respondents have never been the PI of a mission (88%) or instrument (82%) proposal. However, for each demographic group studied (race/ethnicity, gender, LGBTQ+ status, and disability status) members of the majority group were significantly more likely to be involved in missions as PI or Co-I than members of the underrepresented groups. For example, while 16% of men respondents have been the PI of a proposed mission, only 9% of women respondents have. Furthermore, while 37% of non-disabled respondents have been the Co-I of at least one proposed mission, only 28% of disabled respondents have. And, while 16% of non-LGBTQ+ respondents have been the Co-I of more than 4 proposed missions, only 7% of LGBTQ+ respondents have.

As a result of these data, we (again, following [2]) recommend that NASA should continue, and increase, their efforts to diversify mission leadership and participation. Furthermore, these efforts must consider multiple axes of identity beyond gender and results should be tracked and published publicly.

**Career opportunities:** While 49% of respondents listed opportunities to interact with colleagues as an opportunity that positively influenced their career satisfaction and 40% listed interactions with well-established scientists, responses differed significantly by demographic group. Respondents that identified as women, LGBTQ+, and race/ethnicities other than white were significantly more likely to appreciate opportunities for career progression, career development, mentorship from senior colleagues, and interactions with managers and colleagues.

Nearly half (48%) of all planetary scientists listed balance between work and personal life as something that negatively affects their careers. This number was higher for members of Underrepresented Minority groups, women, and LGBTQ+ scientists (all between 50-55%) but highest for scientists identifying as a gender other than male or female (64%). It was lowest for Asian-American scientists (40%). The next most popular answers overall were balance between different work activities (47%), level of success in obtaining funding (39%), and current level of funding (36%). Respondents who identify as women, LGBTQ+, or with a race/ethnicity other than white were significantly more likely to face limited opportunities for career progression, lack of career development, and lack of mentorship from senior colleagues.

**Family and residence:** 21% of respondents have relocated for a partner and 12% live separately from their partner or children. Respondents who identified as women or another gender identity were significantly more likely to have relocated for a partner, and significantly more likely to live separately from their partner or children than respondents who identified as men.



**Figure 2: Percentage of respondents who relocated for a spouse or partner or live separately from a spouse, partner, or children based on gender.**

**References:** [1] White, S. et al. (2011) <https://lasp.colorado.edu/home/mop/files/2015/08/Report.pdf> [2] Hendrix A. R. and Rathbun J. A. (2020) <https://drive.google.com/file/d/15491eLGCWeeZURiMPuevPzfR6PtxUMC/view> [3] Rivera-Valentin E. G. (2021) *LPS LII*. [4] Rathbun J. A., et al. (2020) <https://docs.google.com/document/d/1fQUB-PK47ecCvtnGeFAdSQIVILMyrbqQhUJw7oDj6uM/edit#>