Final Report of The American Astronomical Society's Task Force on Early Career Engagement

Delivered to the Board of the American Astronomical Society, December 2023
By ECETF Members: Kate Follette (chair), Diane Frendak, Dave Principe, Katy Rodroguez-Wimberly, Maggie Thompson, and Maurice Wilson

Introduction and Overview

This report reflects the findings and recommendations of the American Astronomical Society's Early Career Engagement Task Force (ECETF), a six member group convened in December 2022 with the charge outlined below.

AAS Early Career Engagement Task Force Charge

Goals:
1. To better understand how to engage with and support junior career astronomers.
2. Examine what factors encourage or dissuade junior career astronomers from joining the AAS and contributing to the community.

Task:
Consider the following questions and provide input and advice to the AAS board.
1. Statistics and demographics: What fraction of early career astronomers become AAS members? How has this changed over time? Is there more granular information in the demographics that is informative?
2. What issues are most important to early career people? How are these the same or different than in the past?
3. What current AAS activities are successful at engaging early career people? What are the essential elements of these activities that enable their success?
4. What current AAS activities are least successful at engaging early career people? What elements of these activities contribute to this?

Our report begins in section 1 with a brief description of the task force's membership and how we chose to approach our charge, an effort that culminated in the distribution and analysis of an online survey taken by 430 Astronomers, including 264 (61%) who identified as "Early Career"[1]. Throughout this report, we refer to these participants as "Early Career Astronomers (ECA)" and other participants as "non-Early Career Astronomers (non-ECA)".

The full text of our survey, as well as detailed analyses of each of its questions, is provided in Appendix A of this report. Survey data products that we believe will prove valuable to various AAS committees and other interested groups are also linked in Appendix A. In Section 2 of the report, we present the findings and recommendations of our six-member task force. We conclude in Section 3 with a brief summary of key themes from our work.

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[1] The committee chose to interpret this term broadly, and gave the following guidance to survey participants: *The most traditional definition of this term includes students (undergraduate, graduate) and those within 5-7 years of receiving a PhD, however we encourage you to self-identify as "early career" if you consider yourself such*

1.   Membership and Workflow

1.1 Task Force Membership

The ECETF was composed of six members, half of whom were either graduate students or postdocs when the committee was formed - Maggie Thompson, Katy Rodriguez-Wimberly, and Maurice Wilson. The remaining three members of the task force served as representatives of standing American Astronomical Society committees whose charge overlaps with that of the ECETF - Diane Frendak (AAS Director of Membership Services), Dave Principe, (member of the AAS Employment Committee), and Kate Follette (member of the AAS Education Committee).

1.2 Workflow

The committee's work was conducted in three phases over the course of one year, from December 2022 to December 2023. The committee met biweekly from January through May, and again from September through December, 2023.

      Phase 1: Listening/Brainstorming began at the 241st AAS meeting in Seattle, Washington, in January 2023. Task Force members collected data from attendees through two hour-long listening sessions in the exhibit hall, as well as free response (write in) posters hung near the AAS booth, and a brief online survey. The central question of all three activities was the open-ended query "What can AAS do to (better) support you?" Our investigatory work at AAS 241 formed the foundation of the ECETF's discussions. Many ideas generated through these informal means were reflected in our survey and, ultimately, our findings and recommendations. The committee spent several months following the 241st AAS meeting discussing the data we collected there, which we categorized into three primary themes: (1) AAS meetings, (2) other AAS services (publishing, job register, etc), and (3) AAS membership. Though it was less well reflected in our initial data, since AAS' advocacy and public policy efforts are a key

component of its mission, we also interviewed AAS Deputy Director of Public Policy Bethany Johns in April, 2023.

   Phase 2: Survey Drafting took place from April-August 2023 The final product was a 29 question survey with distinct paths for ECA and non-ECA. A draft of this survey was presented to the AAS Strategic Assembly at the 242nd AAS meeting in Albuquerque, New Mexico. AAS leadership and a number of members of committees not represented on the task force provided valuable feedback on the questions and survey flow. Rachel Ivie, a statistician with the American Institute of Physics with deep expertise in survey design and analysis, consulted on drafts 2 and 3 of the survey, resulting in many additional improvements. The final survey was distributed through direct AAS mailings, social media, and the AAS Newsletter in mid-August, 2023.

   Phase 3: Survey Analysis and Drafting of Findings and Recommendations took place from September to December 2023. Individual Task Force members conducted quantitative analyses of responses to the multiple choice questions on the survey and thematic analyses of the free response questions. Graphical, tabular, and written summaries of these analyses are outlined in detail in Appendix A of this report, which also links the raw data products. We hope that these data will be of use to other AAS committees, and to the community more broadly, in generating additional ideas for improving the experience of ECA with the AAS and more broadly.

   While analyses were conducted initially by individual members of the task force, all results were presented to and iterated upon by the full task force and served as the basis for the findings and recommendations below, which were drafted and reviewed collaboratively by the full Task Force.

2. Findings and Recommendations

Those wishing to understand more of the motivation behind the ECETF's findings and recommendations, listed below, should visit the relevant section of Appendix A for more information. Clickable links to each Appendix Section, which correspond to the types of questions asked on our survey, appear in the list below

We have chosen to direct our recommendations to specific AAS committees, task forces, and other entities wherever possible, though we acknowledge that we may not have identified the most appropriate entity in every case.

2.1 Principal Recommendations

Finding 1: Among ECA, the most commonly-raised general concerns were (1) the oversupply of PhD astronomers relative to the number of post-PhD academic positions, (2) a perceived lack of adequate preparation for industry jobs, and (3) frustration with early career wages, particularly for graduate students.

- ***Recommendation 1a:*** The ECETF applauds the formation of the Beyond Academic Careers Advisory Committee (BACAC), which we hope will work to address concerns 1 and 2.
- ***Recommendation 1b:*** The AAS Education Committee and BACAC should work together to develop a set of recommendations for undergraduate and graduate curricula that adequately prepare students for careers in **both** academia and industry.
- ***Recommendation 1c:*** The AAS Meetings staff and the Employment Committee should explore ways in which career development offerings and resources might be enhanced to better support ECA who are considering a move to industry. The AAS Employment Committee and BCAC might also consider whether there are ways for AAS to offer or support professional development opportunities (e.g. internships, workshops, financial support) that help fill gaps in preparation left by current curricula, something that could be facilitated or run by industry partners.
- ***Recommendation 1d:*** We believe that there is a vast, currently largely untapped, network of former AAS members working in industry who could be called upon for guidance, mentorship, and networking of ECA. The AAS should work to keep this community included and involved in the AAS community.
- ***Recommendation 1e:*** AAS' Public Policy initiatives should include advocacy for a living wage and health care for all graduate students.

Finding 2: Early career researchers reported a variety of struggles in finding sources of funding for smaller research expenses, such as publication fees and conference attendance.

- ***Recommendation 2a:*** In consideration of the generally low wages of early career researchers and the variation in financial support by institution and advisor, we recommend that the AAS

Board consider reinstating a small research grant program (discontinued in 2010), perhaps in partnership with the NSF or NASA.
- **Recommendation 2b:** The AAS meeting website and newsletter should more prominently advertise volunteer opportunities that provide free meeting registration (and perhaps also AAS membership, see Recommendation 12b) for ECA.

Finding 3: Survey participants were overwhelmingly in favor of the ECETF's suggestion that an option be implemented to link AAS posters from the Astrophysics Data System (ADS) entries for AAS abstracts.
- **Recommendation 3a:** The AAS Meetings Task Force or another appropriate AAS committee should work with NASA, the Center for Astrophysics, and the iPoster contractor to enable participants to opt in to having their iPoster content linked directly from AAS abstract entries in ADS. This initiative, in tandem with the AAS' existing *Research Notes of the American Astronomical Society*, will allow early career participants multiple opportunities to advertise work that is not yet (and perhaps will never be) ready for publication on a timescale appropriate for graduate and job applications.

Finding 4: Many ECA reported difficulty navigating the AAS meeting, as well as various degrees of support for navigating the conference from their research mentors and programs.
- **Recommendation 4a:** AAS should offer more events and resources geared towards welcoming and orienting ECAs to the AAS. The ECETF applauds the organizers of the "How to Conference Successfully" workshop being offered this year, and feel that the AAS should regularize this workshop and offer it on the first day of the conference, when more ECA will be able to attend without increasing the cost of conference attendance. We also suggest that a conference guide specifically aimed at helping first-time attendees navigate the meeting be developed and distributed at the registration desk.
- **Recommendation 4b:** The AAS board should explore forming (or tasking a AAS committee to form) an onsite peer-mentorship program at AAS meetings in which several first-time attendees or other ECA are paired with a more senior member. This ECETF suggestion, which appeared on the survey, was met with enthusiasm from both early career (potential mentee) and non-early career (potential mentor) participants.

Finding 5: A number of participants expressed frustration with compensation and recognition of service to the AAS, such as reviewing journal articles, judging Chambliss posters, and serving on committees.
- **Recommendation 5**: We applaud the formation of the AAS' Volunteer Compensation Task Force, and believe that the AAS Board should explore a revision of meeting registration and publication fees to provide financial incentives (e.g. direct compensation, discounted registration/publication fees) for important professional service to AAS, such as refereeing AAS Journals' articles, Chambliss judging, and participating in a AAS on-site mentorship program. It might also consider other forms of recognition, such as awards or prizes for service to the community, however we do not believe that this should take the place of direct compensation.

Finding 6: Many participants expressed an interest in professional development around research skills that astronomers need but are not part of formal curricula, such as abstract writing, effective communication, networking, submitting and reviewing papers, teaching, and writing good job applications. Although we recognize that AAS has limited resources and staff, we believe that partnerships with existing programs such as Cal-Bridge and NSF MPS Ascend may allow the AAS to expand their services in this area in a more economical way, while also providing support for and raising the profile of these programs.

- **Recommendation 6a:** We recommend that an appropriate AAS Committee (perhaps the Doxsey Travel Prize Committee or its outgoing members) offer a regular virtual workshop on abstract writing ahead of the first AAS abstract submission deadline. This will enhance the quality of abstracts submitted by ECA, many of whom have never written one before.
- **Recommendation 6b:** The AAS Publications Committee should provide a concise guide to each step in the process of article submission appropriate for authors who have never before submitted a paper (e.g., information on anticipated timelines, guidance on paper formatting, resources for preparing figures, tables, movies, and references), and a similar guide or workshop for first time *reviewers* of articles.
- **Recommendation 6c:** The AAS Board should create more opportunities at AAS Meetings for ECA to strengthen their community, such as an early career networking reception at the winter AAS meeting.
- **Recommendation 6d:** As virtually all careers in Astronomy include (and some focus primarily on) teaching and science communication, any recommendations made by the AAS regarding graduate and undergraduate curricula (see Recommendation 1b) should include explicit training in the areas of science writing, informal science communication, and teaching.
- **Recommendation 6e:** The AAS Employment Committee should consider hosting virtual workshops each Spring or Summer that provide guidance on application statement writing including graduate program applications, fellowship applications, and job applications (e.g. faculty position applications).

2.2 AAS Services

Finding 7: The AAS services most frequently used by early career participants were (from most to least used): the AAS Job Register, the AAS Newsletter, Astrobites, AAS Social Media, AAS Career Resources, AAS Professional Development, the AAS YouTube channel, and the AAS Education Blog.
- **Recommendation 7:** AAS should increase advertisement of its YouTube channel and Education Blog, perhaps through more frequently used AAS services such as the Newsletter and Astrobites

Finding 8: The AAS Job Register was the most frequently utilized service by ECA (particularly postdocs) and survey participants also felt that it was the most important AAS service to maintain. In our analysis of free response survey items, enhancements to the Job Register were often mentioned as things that the AAS could do to improve its services for ECA.
- **Recommendation 8a:** We commend the AAS Employment Committee for its work to implement and maintain the Job Register. Our recommendations for improving it are: (1) to include job advertisements that are posted on other related platforms (e.g., Physics Today, Planetary Exploration Newsletter) (2) to add a more robust listing of jobs in industry, including more entry-level positions, and (3) to keep the registry more updated (e.g., ensuring that job listings are not removed before the application deadline and encouraging job posters to remove their post once the position has been filled).
- **Recommendation 8b:** The AAS Employment Committee and BACAC should consider other avenues for advertising non-academic careers that are relevant for ECA, such as through Astrobites, an information session at the AAS winter meeting, and a virtual job fair.

Finding 9: The AAS services participants felt were most important to maintain were, in order from most important to least: the AAS Job Register, AAS Winter Meetings, Astrobites, AAS Division Meetings, AAS Career Resources, AAS Professional Development, AAS Summer Meetings, the AAS Newsletter, AAS

Social Media, the AAS Education Blog, and the AAS YouTube channel. Though we provide the rankings, we note that none of the above services were deemed non-essential by more than 15% of respondents.

- ● **Recommendation 9**: The AAS should continue offering all services listed above, and the AAS Meetings Task Force should make note of the high importance of the winter meeting to early career respondents.

Finding 10: Both ECA and non-ECA see AAS' career and professional development resources as either essential or very important, but few (<6 %) ECA report using them frequently. Furthermore, when asked what one benefit or service that the AAS could provide that is vital to the career development of early career scientists, the most common theme among responses was better access to career information, services, and employment opportunities.

- ● **Recommendation 10**: AAS should find ways to increase awareness of its existing career resources among ECA and enhance its career-related offerings. Our specific suggestions, generated based on survey participants' write-in responses, are: a AAS career resources informational session at every AAS meeting, a "job seeker's" booth in the exhibit hall, a career resources informational brochure available at the AAS booth in the exhibit hall, and frequent advertising of AAS career resources through Astrobites and the Newsletter.

2.2 AAS Membership

Finding 11: In order of importance (as indicated by being ranked as "very important" or "important"), early career participants joined the AAS to (a) get discounted meeting registration (80%), (b) feel connected to their professional community (66%), (c) support AAS advocacy and education efforts (47%), (d) get the annual AAS journal publication discount (45%), (e) stay up to date on astronomical news and events (44%), (f) be listed in the membership directory (17%), and (g) be eligible for the Chambliss competition (14%).

- ● **Recommendation 11:** AAS should continue to offer discounted meeting registration for ECA AAS members, as well as an annual publication discount.

Finding 12: Among undergraduate survey participants, more than half ranked eligibility for Chambliss as "very important" or "important" to their decision to join the AAS. At the same time, 37% of undergraduate and 17% of graduate student survey respondents indicated that they have not elected to become AAS members. Furthermore, some participants in the survey and listening sessions reported confusion regarding the link between membership and Chambliss eligibility, as well as difficulty getting membership fees reimbursed by their institutions.

- ● **Recommendation 12a:** AAS should consider removing the membership requirement for Chambliss eligibility altogether in order to open up the competition up to **all** ECA.
- ● **Recommendation 12b:** The AAS should consider integrating a membership fee into the meeting registration fee for students in order to (a) increase early career membership (as some ECA do not yet see the value of AAS membership) and (b) increase the likelihood that early career participants will be able to be fully reimbursed for the conference, as registration and membership fees are categorized differently by most college and university finance departments.
- ● **Recommendation 12c:** If the membership requirement is maintained for Chambliss eligibility, the AAS should advertise the Society of Physics Students affiliate partnership more broadly and clearly so that more ECA are eligible to participate in the Chambliss competition.
- ● **Recommendation 12d:** With the increase in post-baccalaureate research opportunities, the AAS should provide a vehicle for these participants to participate in the Chambliss competition, perhaps in the graduate student category.

2.3 AAS Journals

Finding 13: Among write-in responses to the question "What one thing can be done to improve your experience publishing in AAS Journals" (N_{total} = 118), 38% (N=45) of ECA expressed frustration at the cost, 23% (N=27)) reported technical issues with drafting (N=8), submission (N=8), and proofing (N=11) tools, 11% (N=13) described negative experiences with reviewers, and 5% (N=6) lamented the length of the review timeline.

- ***Recommendation 13a***: The AAS Publications Committee and Journals staff should think creatively about ways to make publishing more affordable for ECA (and others), for example by offering subsidized page costs for members who review for AAS journals, reducing page fees, or offering small grants for ECA who cannot afford publishing fees.
- ***Recommendation 13b***: The AAS Publications Committee should facilitate professional communication between author and referee by publishing clear guidelines for communication and enforcing them. Article submissions by ECA should receive enhanced scrutiny in this regard from AAS Journals staff to ensure that referee suggestions are both formative and professional.
- ***Recommendation 13c***: The AAS Publications Committee should review the tools used in AAS Journals article submission, including its drafting, submission, and proofing tools, to ensure that they are streamlined and user-friendly.
- ***Recommendation 13d***: The AAS Publications staff should send more frequent reminder emails to referees who haven't submitted their referee reports by the stated deadline for review.
- ***Recommendation 13e***: The AAS Publication Committee should consider implementing a system that asks authors to give a desired timescale for publication when they submit a paper and then attempt to match to a referee prepared to work on that timescale. AAS could prioritize faster turnaround for papers submitted by graduate students and postdocs whose positions are more transient. Although we recognize the difficulty of making such requests under the current system, we believe that a system that offers referee compensation could help to facilitate this.

Finding 14: Among ECA who indicated that they had been invited to **review** at least one paper for a AAS journal, the most frequent suggestions for how to improve the experience were: providing compensation (28%, N=12), providing more guidance on how to review manuscripts for first-time reviewers (21%, N=9), and implementing the ability to request an additional reviewer if part of an article is outside of their area of expertise (7%, N=3).

- ***Recommendation 14a:*** AAS Publications should provide financial compensation in some form to reviewers. This could involve direct payments, page charge waivers or discounts for use toward their own publications, or membership fee reductions.
- ***Recommendation 14b:*** The AAS Publications Committee should provide organized and constructive guidelines for ECA about how to review a paper, including specific guidance on when to recommend rejection if it is warranted. They should also provide a sample referee report as a resource to demonstrate what is expected of referees, and might consider running a regular AAS workshop series to train new reviewers.
- ***Recommendation 14c:*** AAS Publications should implement a system that involves multiple referees under certain circumstances. In particular, this would help ECA (and others) feel comfortable reviewing papers that involve multiple types of data or techniques, for which one referee may not consider themselves an expert in all aspects of the paper.

2.4 AAS Meetings

2.4.1 Navigating the Meeting

Finding 15: Opinions were divided among both ECA and non-ECA regarding the desirability of AAS offering longer (8min) contributed talks. At the same time, many of the comments we received at our listening sessions indicated that ECA meeting attendees find many contributed talk sessions difficult to access because of the tendency of presenters to skip background in order to meet the short 5 minute allotted time. We believe that this makes many/most contributed talk sessions at AAS relatively inaccessible to ECA.

- **Recommendation 15a:** AAS Meetings staff should consider piloting an option for participants to elect to forego Q&A in favor of a longer talk, and survey participants as to how this change affects their experience.
- **Recommendation 15b:** The AAS should consider allowing presenters to select a "beginner-accessible" talk flag at the time of abstract submission, and implementing it into the meeting program, so that ECA can more easily find talks accessible to them.

Finding 16: Participants at our AAS listening sessions and respondents to our survey expressed frustration at building meeting schedules and figuring out when an individual will be presenting.

- **Recommendation 16a**: AAS should reinstate an online schedule builder tool or application to help ECA (and others) navigate the meeting.
- **Recommendation 16b**: AAS should implement an abstract search function by presenting author in the AAS meeting portal, as the current option to search by author returns all sessions on which that author is a contributor (which for many authors is a sufficiently large number to make it difficult to discern when that person is presenting themselves).

Finding 17: Survey participants reported that they were generally able to find the talks they want to attend during the meetings but write-in responses reveal frustration with schedule overlaps on similar topics, which result in participants not being able to attend all the talks/events they would like to.

- **Recommendation 17:** While recognizing that schedule overlaps are inevitable at large meetings, where possible, we recommend putting sessions on similar topics in adjacent rooms so that people can more easily move between them.

2.4.2 Networking at the Meeting

Finding 18: Although many participants reported attending and appreciating the regular Graduate School and REU Fair at the AAS Winter Meeting, a frequent lament was its timing relative to graduate applications and the fact that it is not accessible to graduate/REU applicants who do not attend the meeting.

- **Recommendation 18:** The AAS should consider offering a virtual graduate school fair in the early fall, in addition to the in person reception at the AAS Winter meeting. We believe that a virtual REU fair in January would be similarly valuable.

Finding 19: Many ECA reported they attend AAS conference sessions or events with the primary goal of networking or community building. However, many survey respondents indicated a desire for more AAS facilitation of these activities. For example, over 50% of ECA respondents indicated on our survey that an ECA networking reception and an on-site mentorship program would be useful.

- ***Recommendation 19***: In order to make enhanced ECA networking activities effective, and because ECA span a wide range, the AAS should provide more opportunities at meetings for ECA to network with astronomers who are at a similar career stage, in a similar institutional context, work in a similar subfield, or share a common minoritized identity. We note that several AAS committees, such as the Committee on the Status of Minorities in Astronomy, already do this regularly, and we would encourage the AAS Board to think strategically about how to support and incentivize other enhanced networking opportunities.

Finding 20: 22% of ECA respondents and 52% of non-ECA respondents indicated that they have been recruited or interviewed for a position at a AAS meeting at some point (albeit generally "rarely").
- ***Recommendation 20:*** It is important to note that interviewing/recruiting for jobs at a AAS meeting presents an accessibility and equity issue, as it disadvantages those that are not able to attend the meeting in person. Therefore, we recommend that all organizations conducting informational interviews or job fair-type events at AAS meetings provide a virtual option for those that cannot attend in-person.

2.4.3 The Chambliss Competition

Finding 21: The majority of ECA respondents reported having a positive or very positive experience participating in the Chambliss competition. When ECA were asked what one thing AAS could do to improve their Chambliss experience, the most common theme was a desire for a better judging experience.
- ***Recommendation 21a:*** The AAS Education Committee can improve the Chambliss experience for participants by: (1) Mandating that judges identify themselves, (2) Confirming that all Chambliss entrants have the correct number of judges visit their posters, and providing recourse if this is not the case, (3) Giving both judges and participants guidance on how much time is appropriate to spend at each poster, and (4) Having judges provide brief constructive feedback to participants on what they did well and how to improve, preferably in written form
- ***Recommendation 21b:*** AAS should communicate to participants at the time of registration how judges will be grading posters for the Chambliss competition, ideally by providing a grading rubric and examples of previous winning posters.
- ***Recommendation 21c:*** The AAS should provide more communication about Chambliss logistics, including who is eligible, when awards will be announced, how many judges the participants can expect to visit, and what to do if they are not visited by the requisite number of judges.

Finding 22: Among ECA respondents who reported that they have <u>not</u> participated in a Chambliss competition, 19% indicated they didn't want to participate, 11% indicated they didn't know about the competition, and 3% didn't know whether they were eligible.
- ***Recommendation 22:*** To provide equitable access to the competition, clearer messaging should be implemented at the time of registration that includes the benefits of participation in the Chambliss competition. The AAS might also consider an opt-out rather than an opt-in approach to the competition to improve equity.

3. Summary and Conclusion

The ECETF feels that the AAS has gone to considerable effort to welcome ECA into the society by providing a range of important services and resources, for example the Job Register, Graduate School and REU Fair, and Chambliss poster competition. We appreciate the thoughtfulness with which this has been done, and the initiative of the AAS President and Board to institute this Task Force to brainstorm further improvements.

Our 22 Findings and 45 Recommendations share a number of key themes, namely:

1. ECA are generally enthusiastic about AAS Membership, AAS conferences (especially the annual winter meeting), and a range of non-conference AAS services. Though they have ideas for how to improve all three, we find no evidence that ECA feel unwelcome or unsupported by AAS.
2. ECA feel a sense of belonging to the AAS as their professional society and see engagement with the AAS as something that makes them feel like "real" Astronomers.
3. During the transient and financially vulnerable stages of Astronomers' early careers, a range of natural anxieties arise about career prospects, financing of professional expenses, and preparation for jobs. The AAS can help to alleviate or otherwise address many of these anxieties with more and better information and services targeted at ECA.
4. ECA experiences vary widely, and the ad hoc, "learn by doing" nature of professional training in many research skills (as opposed to content knowledge) leaves many ECA feeling that they are not adequately trained for the profession. This is another area in which AAS, as the leading professional society for US Astronomers, can provide support and supplemental training for ECA, as well as guidance to the programs through which they are educated and trained.

We appreciate the opportunity to have engaged with the AAS on the important topic of making the profession more accessible and welcoming to young Astronomers, and hope that our report and data prove useful in helping the AAS improve its services for ECA.

Acknowledgments

Appendix A

This appendix contains analyses of survey data done by members of the ECETF, and these analyses formed the basis for our findings and recommendations. Each analysis section was led by one member of the Task Force, and audited by at least one additional member. All analyses were presented to the full task force for comment, and revised. Survey data products are available in the following documents

1. [Raw Survey Responses](#)
2. [Free Response Survey Responses and Thematic Analyses](#)

In the above, all survey data are provided in their unaltered format except in cases where we felt that a response compromised the anonymity of the respondent (N=3), in which case we redacted certain identifiable phrases. **We feel that, in many cases, we were not able to do justice to the wealth of potentially impactful thoughts and suggestions made by survey participants.** We link our collected data in (largely) unaltered form here in the hopes that they will prove useful to other groups interested in improving the experiences of ECA.

Each section below begins with a table listing the full text of the questions and available responses in that section, as well as text describing who was asked the question(s). This is followed by a "Summary and Key Takeaways" subsection with a high-level summary of our analyses. The final subsection lists quantitative and qualitative (thematic) analyses[2] for each question and a text summary of our interpretation.

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[2] We are not experts in qualitative data analyses. Other interested parties may identify additional or different themes in the free response data.

1. Basic Demographics

This section consisted of 4 questions, summarized below. Participants who selected "no" for Question 2, indicating that they do not consider themselves to be an astronomer or astrophysicist, were taken directly to Question 29 (see Section 8). Participants who did not identify as "Early Career" in their response to Question 4 were directed to Question 20 (see Section 6).

Table 1. Basic Demographic Questions on the ECETF Survey

No.	Question Category	Who Asked	Question Text	Answer Text (Display Logic)
1	Basic Demographics	All Survey Participants	What is the best description of your current career level?	undergraduate graduate student postdoc faculty research staff/technician educator or EPO professional other
2	Basic Demographics	All Survey Participants	Do you consider yourself to be an astronomer or astrophysicist?	yes → Q3 no → Q29
3	Basic Demographics	All Astronomers	If you are actively engaged in research, what is your primary area of research?	galactic stellar extragalactic high energy multi-messenger planetary science exoplanets instrumentation education and public outreach not currently research active other
4	Basic Demographics	All Astronomers	Do you consider yourself to be "early career"? *Note: the most traditional definition of this term includes students (undergraduate, graduate) and those within 5-7 years of receiving a PhD, however we encourage you to self-identify as "early career" if you consider yourself such*	yes → Q5 no→ Q20

1.1 Summary and Key Takeaways

Survey participants were predominantly Faculty (26.9%), Graduate Students (22.1%), Postdocs (18.5%),or Research staff (14.7%), though a significant number of Undergraduate (6.5%), Educator (1.8%), and Retired (1.4%) astronomers also took the survey. A majority (63%) of respondents indicated that they consider themselves to be "early career", and the vast majority (96%) considered themselves to be an "astronomer or astrophysicist." Participants indicated a wide range of areas of expertise, with substantial representation from the extragalactic, stellar, exoplanet, high energy, galactic, and planetary science communities (>10% each). Smaller numbers of participants indicated a primary focus on instrumentation (4.8%), education and public outreach (1.4%), or multimessenger (2.5%) astronomy, while 5.5% indicated that they are "not currently research active".

1.2 Data Summary and Analysis

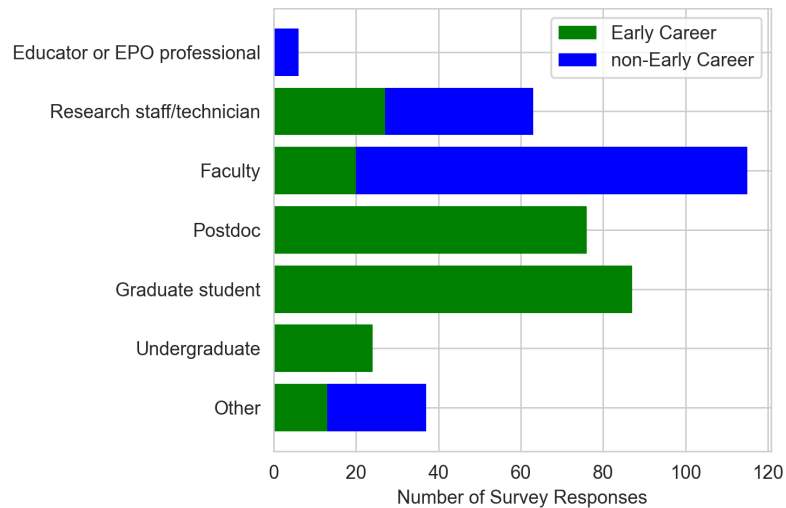### Question 1: What is the best description of your current career level?

Figure 1: Summary of ECETF survey respondents' career levels (Question 1). Respondents who self-identified as "Early Career" are indicated in green, and those who did not in blue.

Question 2: Do you consider yourself to be an astronomer or astrophysicist?

430 of 446 respondents replied yes to this question. The remaining 16 respondents were directed to the final question on the assessment (Question 29)

Question 3: If you are actively engaged in research, what is your primary area of research?
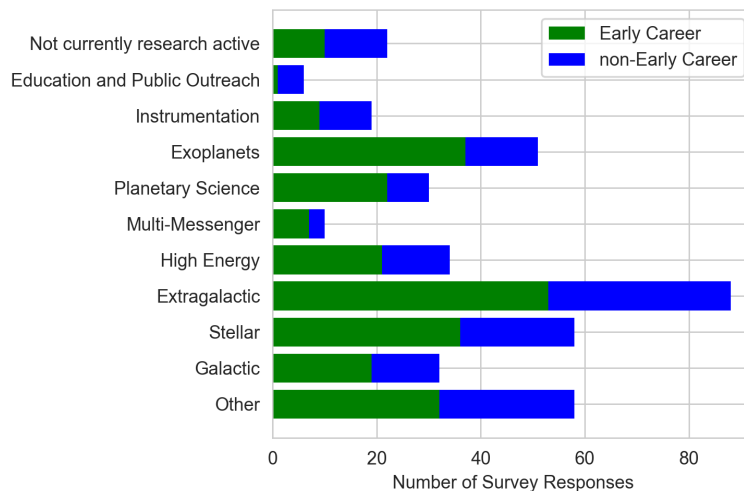

Figure 2: Summary of areas of research specialization among ECETF survey respondents. Respondents who self-identified as "Early Career" are indicated in green, and those who did not in blue.

Question 4: Do you consider yourself to be "early career"?

Respondents to this question were given the following additional guidance in selecting their answers:

Note: The most traditional definition of this term includes students (undergraduate, graduate) and those within 5-7 years of receiving a PhD, however we encourage you to self-identify as "early career" if you consider yourself such

264 of the astronomer/astrophysicist participants indicated that they identified as "early career" and 166 did not. All undergraduate, graduate student, and postdocs participants indicated that they identified as early career, as well as 17% of faculty, and 43% of research staff/technicians.

2. AAS Services

This block of 3 questions, summarized below, was asked only of ECA.

Table 2. ECETF survey questions about AAS services

No.	Question Category	Who Asked	Question Text	Answer Text (Display Logic)
5	AAS Services	Early Career	How frequently do you make use of or engage with the following AAS services?	AAS social media accounts (twitter, instagram, facebook) AAS YouTube channel AAS Education blog AAS job register Astrobites AAS Newsletter (AAS News Digest) AAS career resources page AAS professional development webinars/offerings
6	AAS Services	Early Career	Whether you personally engage with them or not, how important do you feel it is that the following AAS services be supported and maintained?	Annual winter meetings Annual summer meetings Division meetings AAS social media accounts (twitter, instagram, facebook) AAS YouTube channel AAS Education blog AAS job register Astrobites AAS Newsletter (AAS News Digest) AAS career resources page AAS professional development webinars/offerings
7	AAS Services	Early Career	How many AAS meetings (winter, summer, or division) have you attended since June of 2020?	three or more two one none

2.1 Summary and Key Takeaways

In this section of the survey, we asked respondents that identified as ECA how frequently they engage with the various services offered by the AAS and whether they think these services should be supported and maintained (Question 5). Based on the responses, the most frequently used AAS service is the Job Register, followed by the AAS Newsletter/News Digest and Astrobites. The Education Blog and the AAS YouTube channel are not frequently used by respondents, and these two services had the highest number of respondents saying that they never use or engage with them. However, it is important to note that the Education Blog is a new service that began in 2021, and the AAS YouTube channel added a new feature (the AAS Journal Author Series) three years ago.

In analyzing responses to these questions by career stage, postdocs reported using the Job Register most frequently (~68% selected "frequently"). For the Newsletter/News Digest, faculty and research staff/technicians reported using them the most frequently (~33% and 30%, respectively). Undergraduates, graduate students and research staff/technicians reported the most frequent use of Astrobites (19, 18, and 19%, respectively).

When we asked ECA how important they feel it is to support and maintain various AAS services (regardless of whether they personally engage with them or not, Question 6), we found that most respondents believe that all the AAS services are at least "somewhat important" to support and maintain. The Job Register was the most frequently ranked "essential" (~81%), followed by the AAS winter meetings, ~61%) and astrobites (~44%). The AAS YouTube channel and Education Blog had the

largest portion of respondents say that these services were not important (~15% and 11%, respectively), but again we note that these services are generally newer compared to others.

These trends extend across early career stages for the Job Register. For the AAS winter meetings, over 40% of respondents at all career stages ranked it as "essential." 50% or more of both undergraduate and graduate student respondents also ranked Astrobites as "essential". Overall, the responses to this question are broadly consistent with responses to the prior question about frequency of use of these services. However, there are some services that most respondents rarely or never engage with, but nevertheless claim are either very important or essential to maintain (e.g., professional development and career resources). In terms of AAS meeting attendance, most ECA said that they had attended one or two meetings since June 2020 (36% and 29%, respectively).

2.2 Data Summary and Analysis

Question 5: How frequently do you make use of or engage with the following AAS services?
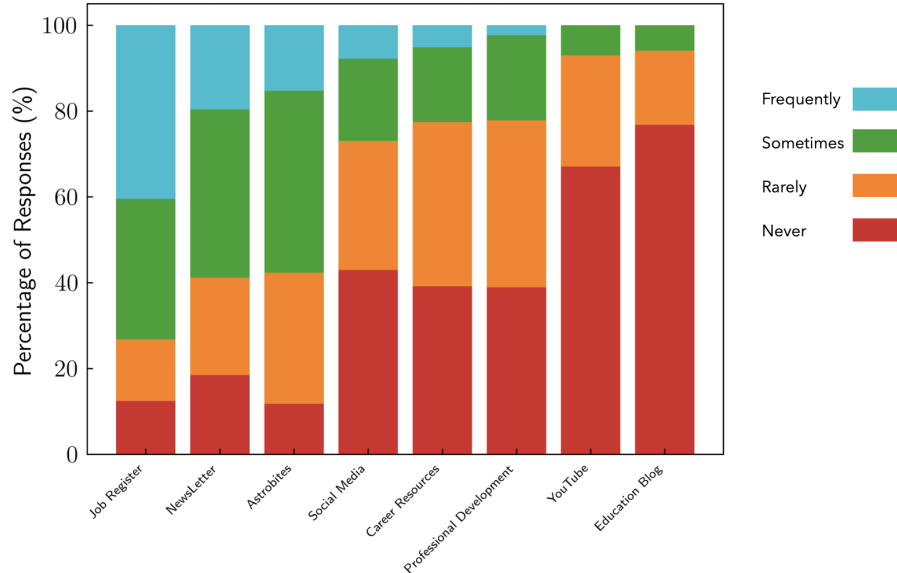

Figure 3: Breakdown of responses to Question 5 for each AAS service according to career stage (undergraduate student, graduate student, postdoc, faculty, and research staff/technician). Same color scheme as the above figure.

Question 6: Whether you personally engage with them or not, how important do you feel it is that the following AAS services be supported and maintained?
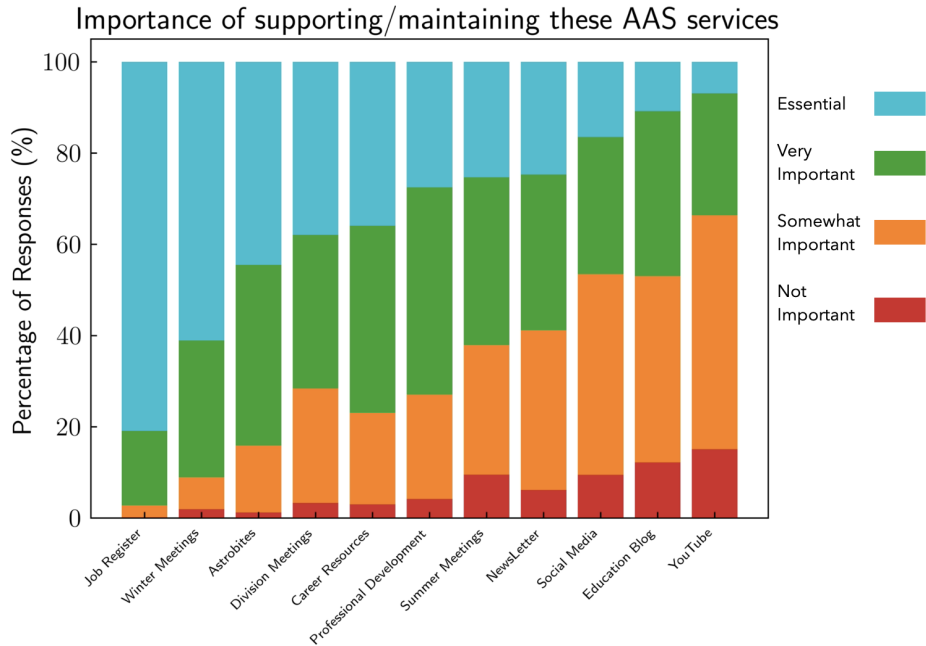
Figure 4: Responses to Question 6 reported as percentages. Various AAS services are shown on the x-axis as vertical bar charts. Colors correspond to ranked importance: blue is essential, green is very important, orange is somewhat important and red is not important.
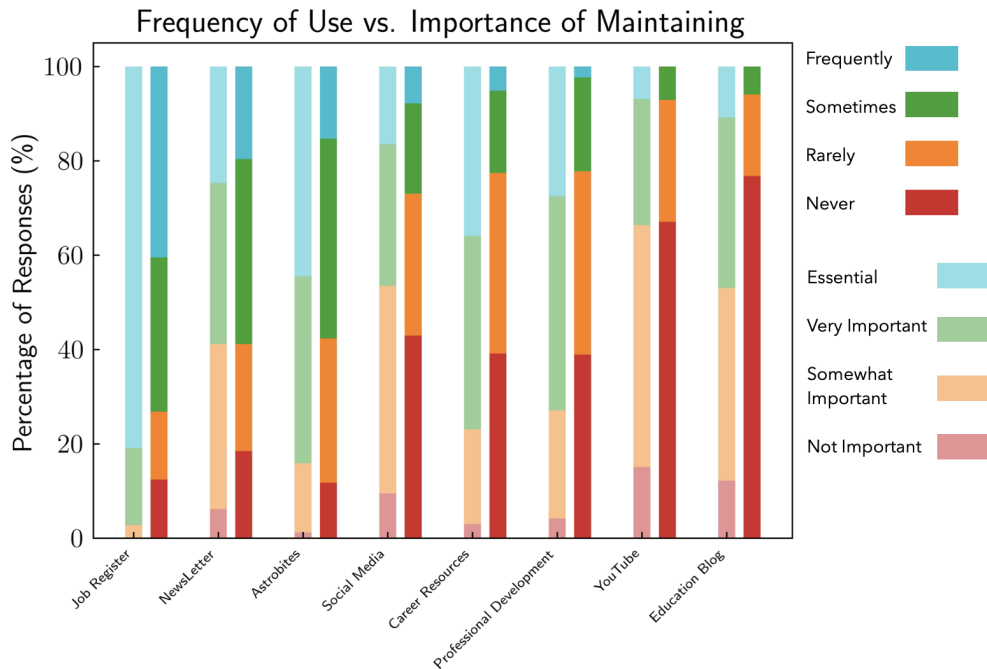

Figure 5: Comparison of responses to Questions 5 and 6. The light-shaded responses correspond to Question 6 whereas the bolder responses correspond to Question 5. In general, there is a correlation between services that respondents use most frequently and those that they deem are important to support and maintain (e.g., job register, newsletter). However, there are some services that the majority of respondents rarely or never engage with but they claim are still very important or essential to maintain (e.g., professional development and career resources).
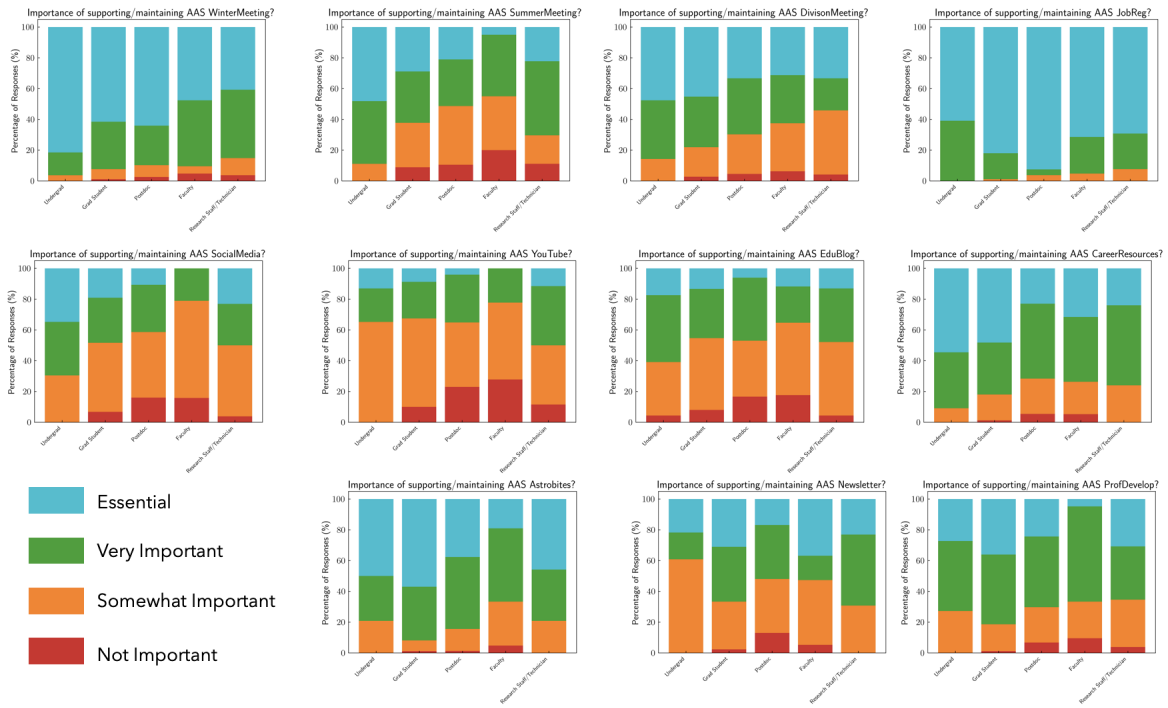
Figure 6: Breakdown of responses to Question 6 for each AAS service according to career stage (undergraduate student, graduate student, postdoc, faculty, and research staff/technician). Same format as the above figures.

Question 7: *How many AAS meetings (winter, summer, or division) have you attended since June of 2020?*
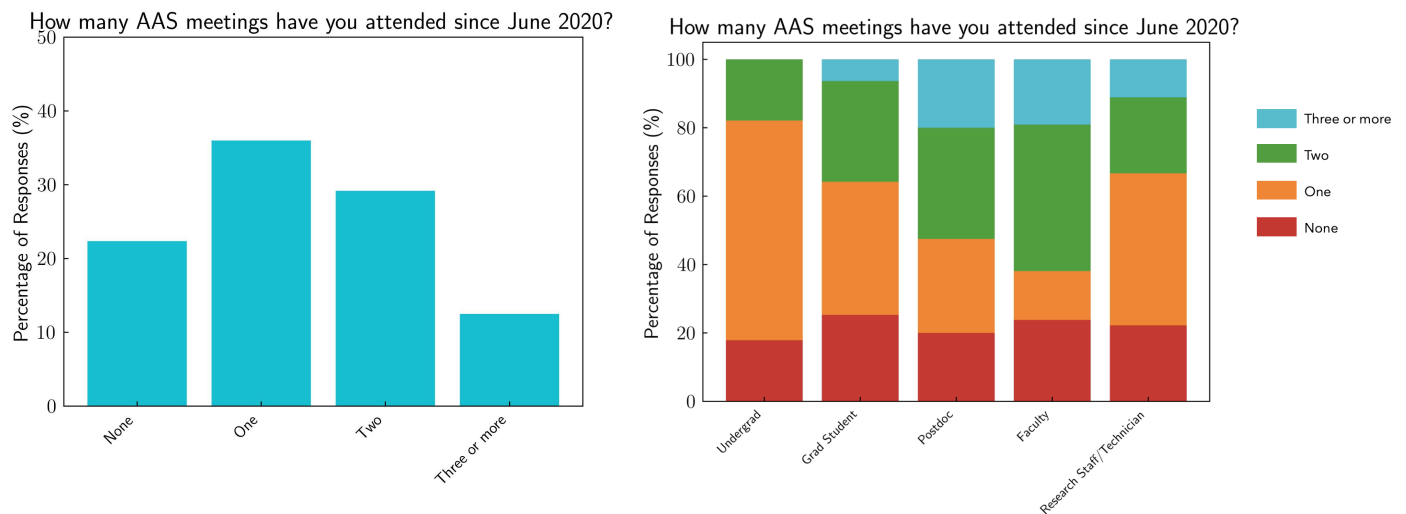

Figure 7: Responses to Question 7 (left) for all early career respondents and responses broken down by career stage (right).

3. AAS Journals

This block of 2-4 questions, summarized below, was asked only of Early Career Participants. Participants who selected "no" for either Question 8 or Question 10 were not asked the followup questions (9 and 11)

Table 3. ECETF survey questions about publishing in and reviewing for AAS journals.

No.	Question Category	Who Asked	Question Text	Answer Text (Display Logic)
8	AAS Journals	Early Career	Have you ever submitted an article to a AAS journal (*The Astrophysical Journal, The Astronomical Journal, The Planetary Science Journal,* and/or *Research Notes of the AAS*)?	yes → Q9 no → Q10
9	AAS Journals	Early Career	What is one thing that the AAS could do to improve your experience publishing in AAS journals?	Free response
10	AAS Journals	Early Career	Have you ever been invited to <u>review</u> an article submitted to a AAS journal (*The Astrophysical Journal, The Astronomical Journal, The Planetary Science Journal*)?	yes → Q11 no → Q12
11	AAS Journals	Early Career	What is one thing that the AAS could do to improve your experience reviewing articles for AAS journals?	free response

3.1 Summary and Key Takeaways

ECA survey participants were asked what one thing AAS could do to improve their publishing experience. Respondents to this question were primarily postdocs (48%) and graduate students (25%). Respondents overwhelmingly indicated that publishing in AAS journals should be more affordable. They also suggested numerous improvements in the way referees and editors communicate with authors. Other common response themes included improving the proofing stage with a more user-friendly editor, improving overleaf and latex support, providing clear guidelines and expectations for submitting articles, and improving turnaround time for referee reports.

Survey participants were also asked what one thing AAS can do to improve their experience *reviewing* AAS journal articles. Respondents to this question were primarily postdocs (61%) and research staff/technicians (23%). Respondents indicated that AAS could improve the review process by providing financial compensation or incentives to referees. Respondents also indicated a desire for clear guidelines on how to review manuscripts and suggested allowing multiple referees for a single paper.

3.2 Data Summary and Analysis

Question 8: Have you ever submitted an article to a AAS journal?

Of the 265 respondents when asked if they have ever submitted an article to a AAS journal, 65% (N=172) indicated 'yes' and 35 % indicated 'no' (N=92). Of the 172 respondents that indicated 'yes', 41% (N=71) were postdocs, 27% (N=47) were graduate students, 12 % (N=20) were faculty, 10% (N=17) were research staff/technician, 6% (N=10) were other, and 4% (N=7) were undergraduates. A subset (N=117) of the 'yes' respondents answered question 9 with approximately the same ratio of career stage as those that answered yes to question 8.

Question 9: What is one thing that the AAS could do to improve your experience publishing in AAS journals?

When asked what one thing can be done to improve their experience in publishing in AAS journals, the most popular response theme by far (N=45) was to make the cost of publishing more affordable. Respondents suggested many solutions including: reducing the cost of page charges, providing AAS funds for authors who cannot afford the publishing fees and offering page fee waivers to authors who review AAS articles. The next most common theme from respondents (N=13) was to improve professionalism of communication between authors and referees/editors. Respondents identified issues of reviewers being needlessly harsh or mean, reviewers failing to provide informative feedback on referee reports, and editors using their position to influence authors to cite reviewers' previous works.

Respondents also (N=11) indicated that the AAS journal proofing stage could be improved. They cited various issues including: incorrect proof changes, lack of communication about changes, and the DigiEdit software being slow and unnecessarily complicated. Several respondents (N=8) also wanted better integration and support for overleaf and latex including bug fixes in AASTeX. Other respondents (N=8)indicated that the process of submitting an article can be opaque, especially for first time authors. They suggested new resources or more concise and consolidated information about the submission process and what is expected from the author before the paper is published. Several respondents (N=6) indicated they wanted faster turnaround for questions asked to the referee, as well as faster timescale from acceptance to proof to publication.

Table 4. Thematic Analysis of ECETF survey Question 9

Theme Description	N	Sample Quote(s)
Make publishing more affordable	45	• Offer page fee waivers or at least discounts to reviewers. I have reviewed more papers for AAS journals this year than I anticipate being able to afford to publish in AAS journals, since the exhorbitant cost is not covered by my grant. • Create a model that pays authors and reviewers, rather than charging authors and expecting volunteer reviewers. • Have a fund to pay for publication charges for people who can't afford it? • Reduce publishing fees for students from smaller institutions or students who don't have much funding • The new open access publishing fees structure places pressure on researchers to stay within the Tier 1 quanta limit, sometimes to the detriment of their science. A more granular fee structure (such as the previous fee structure, with charges per quanta) could help alleviate this pressure.
Improve professional communication between author and referee/editor	13	• Have referees identify essential versus non-essential feedback for revisions - it's very daunting and time-consuming to get a HUUUUGGGE list and while it improves the publication, if you get a detail-oriented referee it doesn't necessarily align with the advice to do only what is necessary instead of making things perfect • Peer review seems to be getting worse. Reports are less informative, and there have been a higher number of typos and/or document errors that are making their way through accepted versions . Perhaps financially compensating referees, finding ways to reward proficient reviewers, double blinding authorship, and a more heavy hand from the editors to address poor/uninformative referee reports would help. • Some reviewers are needlessly harsh/mean. These are especially difficult reports for ECR. Is there a code of conduct for reviewers? Or instructions that their review should be respectful, even if the paper has issues? • Create stricter (end enforced) rules to prevent editors from forcing their personal scientific biases on the scientific community by abusing their authority as editor to essentially require authors to cite their work over other member of the community.
Improve the proofing stage (more user friendly editor for proofing, better proofing edits,	11	• The proofs process has been very difficult. It used different systems both times I have used it, and neither were good or easy to use. The proof editor frequently made changes that changed the scientific meaning or style corrections that were not outlined in the style guide. One time, they failed to include any URLs or DOIs in my citations even though they were part of my submitted manuscript and made me go back through and add them all by hand. • Copy editing + production improvements: ensure copy editors universally mark changes in proofs, and improve PDF figure support.

Theme Description	N	Sample Quote(s)
make clear when edits were made)		• Copy editing post acceptance is often not universally marked, and sometimes the suggested changes (while acceptable synonyms in layperson's English) very much go against the specific scientific meanings. • Additionally, there have been a number of occasions where proof images of supplied PDFs (with vector graphics) have been rasterized at very poor image quality. This shouldn't be an issue if high-quality vectorized PDFs were originally supplied by the authors. • I have had a lot of problems with the proofs stage. Lots of incorrect changes. Trouble with references. Clunky software to use. Lack of communication about changes. Anything to streamline this process would be much appreciated. • The DigiEdit interface is very slow and frustrating to work with, especially when editing tables and equations are involved.
Improve overleaf/latex /aastex support	8	• The automatic tools for compiling LaTeX submissions never seem to work right and I have to upload self-compiled PDFs that cause problems down the line for finalizing proofs. • Streamline submission site, fix bugs in AASTeX, and make it easy for referees to know what changed in a manuscript and for the authors to make it easy to indicate that. • Provide latex class files that more closely match the final journal articles, so reformatting is not needed.
Provide clear guidelines and expectations for submission (especially for ECRs)	8	• More concise and consolidated information regarding the submission process, topical corridors, copyright, payment, etc. Current webpages can be quite verbose, which makes finding relevant information tedious. • The process of submitting to a journal, and particularly to the arXiv, can be very opaque if you've never done it before. Typically a student's first experience with the process is submitting, revising, and proofing their first first-author paper, and short of having their advisor next to their computer at each step of the way to direct them through, the process is time-consuming, unintuitive, and easy to screw up. • AAS could provide resources like "how to write your first paper" whether that's in seminar form, video, writing, etc. • Better guidance on desired formatting. It's never really clear for example how editors/referees want changes to manuscripts between resubmissions to be indicated (e.g. with LaTeX), and I think there's just generally not enough documentation on how to make this process go smoothly without having to constantly revise submissions. • Offer more assistance in preparing movies, images, tables, documents, bib, that are associated with submitted papers. A tutorial or workshop would be nice. It would be nice to somehow have help with writing journal articles for inexperienced authors. Maybe AAS sponsored virtual writing groups would be useful. Also, it would be great to be kept up to date on related APJ and AAS publishings. Something like research highlights/interviews/science nuggets would be cute.
Faster turnaround for referee reports	6	• Streamlined responses would be great. In my opinion, the worst part of publishing is the delay in response time which delays everything else about the publishing process. I don't have a perfect solution, but maybe establishing maximum wait times per review/revision could be a crucial step to improving this process and allow scientists to more effectively disseminate information. • Faster timescale from acceptance, to proof, to publication.
Other Responses of Note (one-off responses that we still think important to highlight)	7	• Ensure that for an early-career author's first first-author publication that there are two reviewers. It gives twice the feedback on a early-career astronomer's important first publication, and it means that if one reviewer does entirely miss the point of the paper, it does not cause a year-long delay, which may impact the student's job prospects. • The biggest thing that MNRAS does better than the other journals is to inform all authors by email of the referee reports and submission details. AAS could make life a lot easier with something like that. • making the anonymous submission process better by sealing the loophole that the referee can find out who the authors are simply by looking up the paper preprint on arxiv. It's tricky, but hopefully can be improved. Perhaps redact the title of the paper as well from the manuscript that the referee gets? • Make it more accessible to visually impaired people. The language could be made more approachable to undergraduates for working on their first submission and other early-career authors. • further support for supporting materials e.g., github/ code repositories and encouragement to authors to provide their code (if applicable) during the review process • make the abstract word count not include latex symbols, please • The first time I received referee feedback, I was a bit confused on what was supposed to go into the "confidential author reply" box and the "reply to referee text only" box. It might be helpful if there could be a little subtitle under the "confidential author reply" giving examples of what could be put in that box.

Question 10: Have you ever been invited to review an article submitted to a AAS journal?

Of the 265 respondents when asked if they have ever submitted an article to a AAS journal, 31% (N=81) indicated 'yes' and 69 % indicated 'no' (N=183). Of the respondents that indicated 'yes', 62% (N=50) were postdocs, 16% (N=13) were research staff/technician, 12% (N=10) were faculty, 9% (N=7) were graduate students, 1% (N=1) were other, and 0% (N=0) were undergraduates. A subset (N=43) of the 'yes' respondents answered question 11 with approximately the same ratio of career stage as those that answered yes to question 10.

Question 11: What is one thing that the AAS could do to improve your experience reviewing articles for AAS journals?

Of those who responded 'yes to Question 10', there were 43 unique responses to question 11. The largest portion of respondents (N=12) indicated that the one thing AAS could do to improve their reviewing experience is to provide either direct financial compensation for reviewer's service or incentives such as page charge waivers. Respondents (N=9) also indicated a desire for better communication or guidelines on how to review articles. AAS Journals could provide a sample referee report with example language as a resource to demonstrate what is expected of referees. Some respondents (N=3) indicated the reviewing experience could improve by allowing for multiple referees. In particular, this would help for papers that involve multiple types of data or techniques where one referee may not consider themselves expert in everything covered in the paper.

Table 5. Thematic Analysis of ECETF survey Question 11

Theme Description	N	Sample Quote(s)
Provide financial compensation/incentives	12	● Offer page charge waivers for reviewing
Provide guidelines on how to review manuscripts	9	● Clearer communication about how to review manuscripts would be helpful. In particular, it would be helpful if guidance about when to recommend rejection was provided. ● Provide a sample report to give an example of language to share with the authors ● Provide more organized and constructive guidelines. Give a more flexible deadline.
Allow multiple reviewers	3	● I often feel like I'm not qualified to referee an entire paper, because papers now usually involve combining data, science and techniques from different approaches, and I'm typically only an "expert" on some of them, but not all. This means I either feel pressured to learn about the other bits quickly or that I'm not doing a good job. Having multiple referees with limited scope could help without increasing the burden on the community to referee more papers. ● multiple reviewers who can have a discussion about the paper under review
Other Responses of Note	5	● List number of pages, figures, and tables in addition to the abstract in the review request. I can't usually accept a 3 week timeline for a 45 page article with no figures, but a 15 page paper with a few figures and tables is usually manageable. ● Not ask for more than one review within a short period of time. Also, not ask for more papers to be reviewed than papers submitted by the reviewer that year. ● When requesting to not see the manuscript after revisions are addressed, not be sent the manuscript again. ● Make the review process dual-anonymous ● More modern web interface

4. Chambliss Competition

This block of 2-3 questions, summarized below, was asked only of Early Career Participants. Participants who selected "no" for Question 12 were directed to Question 15, while those who selected "yes" were asked Questions 13 and 14.

Table 6. ECETF survey questions about the Chambliss poster competition

No.	Question Category	Who Asked	Question Text	Answer Text (Display Logic)
12	AAS Chambliss	Early Career	Have you ever participated in the AAS Chambliss competition as a contestant (not a judge)?	yes → Q13 no → Q16
13	AAS Chambliss	Early Career	On a scale of 1 (very negative) to 5 (very positive), how was your experience participating in the AAS Chambliss competition?	1-5 scale
14	AAS Chambliss	Early Career	What's one thing AAS could do that would have improved your Chambliss experience?	free response
15	AAS Chambliss	Early Career	Why haven't you participated in the Chambliss competition?	free response

4.1 Summary and Key Takeaways

47% (N=96) of ECA respondents indicated that they had participated in the AAS Chambliss competition as a contestant. Of these, 33% (N=32) were graduate students, 27% (N=26) were postdocs, 14% (N=13) were research staff/technician, 7% (N=7) were faculty, and 7% (N=7) were other. These results indicate respondents generally had positive experiences of the Chambliss competition.

Survey participants who identified as early career were asked what one thing AAS could do to improve the Chambliss experience. Responses were grouped into four major themes with most themes related to improving the judging experience. Respondents indicated that judges did not identify themselves, judges did not have enough time to interact with them or review their poster, or judges did not provide constructive feedback. Respondents indicated that even if their poster was viewed positively by judges, they still wanted some form of feedback on how they can make it better. Respondents also indicated the AAS could do better at providing guidance on what the judges are looking for and provide more logistical information about the Chambliss competition prior to the meeting which includes when the results will be announced.

Respondents who stated that they had not participated in a Chambliss competition were asked why they had not. The majority indicated that they were eligible to participate but never presented a poster at a AAS meeting. The next most common response was that they were not eligible. A sizable portion responded that they either didn't want to participate or that they were not aware whether they were eligible.

4.2 Data Summary and Analysis

Question 12: Have you ever participated in the AAS Chambliss competition as a contestant (not a judge)?

Of the 204 ECA respondents who indicated either 'yes' or 'no' to question 12, 47% (N=96) respondents indicated 'yes' that they had participated in the AAS Chambliss competition as a contestant.

Question 13: On a scale of 1 (very negative) to 5 (very positive), how was your experience participating in the AAS Chambliss competition?

Most of these respondents (60%) were either graduate students or postdocs, indicating that they recently participated in the Chambliss competition. The vast majority (92%) ranked the Chambliss competition at a value of 3 or higher. The most common ranking was 4, with 36% of respondents. These results indicate respondents generally had positive experiences of the Chambliss competition.
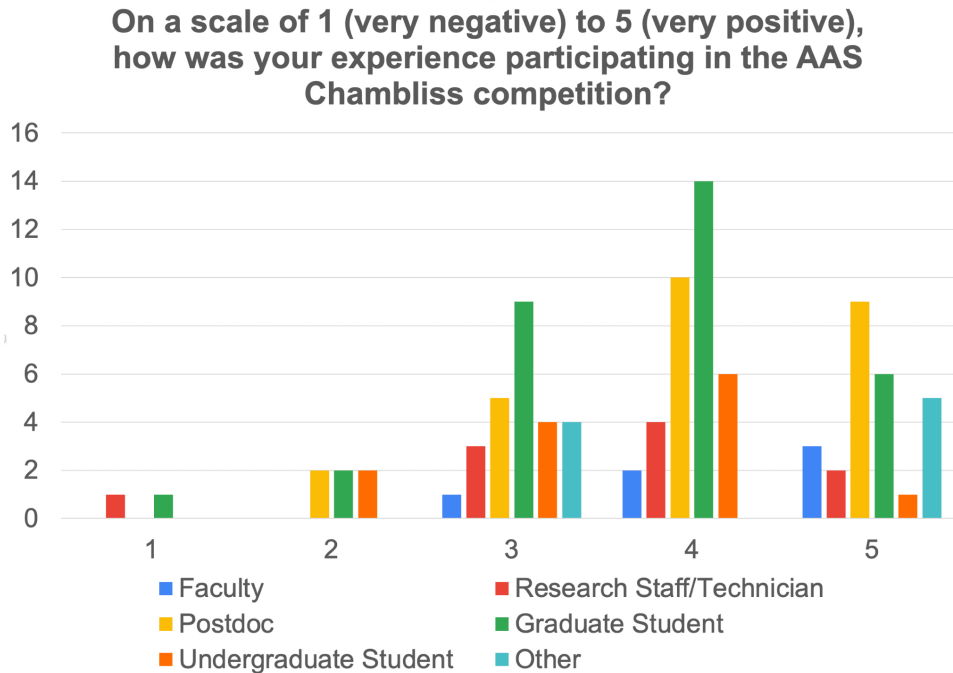

Figure 8: Respondents' rating of their experiences participating in the Chambliss competition from 1 (very negative) to 5 (very positive), organized by career stage.

Question 14: What's one thing AAS could do that would have improved your Chambliss experience?

Among the 47 unique responses, the most common theme (N=15) was to improve the interaction between participant and judge. Respondents indicated that some judges did not have enough time to judge their poster, judges did not identify who they were, and some did not show up at all. Other responses indicated that the number of judges each contestant received was inconsistent and that some judges were unnecessarily harsh.

A group of respondents (N=10) indicated that judges should provide better and mandatory critical feedback so that participants can learn how to improve their posters. One participant mentioned they were disheartened when they received only positive feedback but did not win the competition. Since no critical feedback was provided, they did not know how they could improve their chances for next year.

Another group of respondents (N=10) indicated they wanted more communication from AAS about how they are going to be judged and how long they should talk for when presenting to a judge.

Respondents suggested AAS could provide a grading rubric or link previous examples of posters that won the Chambliss competition.

Respondents (N=8) also indicated that AAS could communicate better with participants before the competition about the Chambliss logistics including: who is eligible, when awards will be announced, and how many judges the participants can expect to visit. They also expressed a desire for a faster turnaround time for Chambliss award announcements.

Table 7. Thematic Analysis of ECETF survey Question 14

Theme Description	N	Sample Quote(s)
Improve participant interaction with judges (e.g., mandate judges identify themselves, make sure they have time to judge each poster, provide a time in advance of when judge will be at poster)	15	• Ask judges to make sure that they have enough time to have a conversation with the poster presenter during the review stage. Too often I've had judges who have to fit in multiple posters into the final half-hour of the day and so they interrupt conversations to insert themselves for a minute or two and then run off. It's very disruptive. • I participated the Chambliss Competition online (remotely), but I couldn't convey all the information properly through slack. as we do in person. If AAS can organize a Zoom meeting for the remote people when judging, It would be remarkable. • I don't think all of my judges actually elected to come speak to me during the poster session, which was disappointing, but I remember being informed that they weren't required to. The student with the poster next to mine ended up winning, and his poster was terrible and was presenting a flashy result from his collaboration (that was later debunked) rather than a personal project. It definitely made me feel like the Chambliss competition wasn't worth participating in. During my PhD, I actually wasn't able to compete at all as my advisor wouldn't pay to send students to AAS unless they were giving a talk, which I think makes the competition less useful as this is probably somewhat common that students are giving talks and not posters. • Perhaps somehow evaluating the harshness of judges in the selection process. My judge was really difficult to communicate with and kept searching for the weak points in my arguments. • Remind the judges that part of the experience is to have a discussion with the students and not just appear to ask a single question that serves as a "weed out" moment in order to cross them off the list. Even if judges have decided earlier in the day who their top poster is, they should treat each student with respect in order to build the confidence of the student. • The judge I had was very rude and condescending and did not accept the answers I gave him, so I would suggest better screening for judges • It seems that the amount of judges each contestant gets is very inconsistent. I think it is important that each contestant receives the same amount of judges, if possible.
Provide better/mandatory critical feedback even if the poster is good. Judges should help all presenters get something positive out of the experience.	10	• I participated in my first Chambliss competition via a poster at the 241st AAS and I never heard back about my presentation. I would have liked to get feedback on how I did. I didn't like that I never heard back except to know that I didn't win, which is totally fine with me that I didn't win -- I would have just liked some feedback. As a result of this, I don't find it likely that I will participate in the Chambliss again for a poster. I'll try Chambliss for a talk and see if the experience is different. • Getting written comments/feedback from judges as to how I could have improved my poster. It was disheartening when I did my best and received positive feedback from judges during discussions, but didn't receive any awards. So obviously my poster could have been improved. It would have been helpful to received written feedback about improvements. • At the time the judges didn't all identify themselves and I didn't get feedback - now there's optional feedback slips and requirement for judges to identify themselves so that seems good.
Provide more guidance on what judges are looking for. Provide examples of past winning posters	10	• provide examples of past winning posters to help contestants design better posters • Give the presenters clear instruction on how long they should talk for. Often they talk for an extended period (>15 minutes), which is not ideal when the judge has multiple posters to visit. • More clarity about the rubric we are being judged on, more timely communication about the results, and, especially, feedback from the judges regardless of the outcome of the competition. I would love to have known more about what the judges liked and didn't like about my poster so I could take that feedback into account in the future.
Provide more Chambliss information prior to the meeting and more	8	• More communication: I was only visited by one judge but I anticipated 3, and I would have liked to receive an email about the winners or had them announced at the end of the meeting. I looked it up months later and realized winners had been announced in March.

Theme Description	N	Sample Quote(s)
information on when results will be announced		● It would have been helpful to have more clear guidelines on when and how the results were going to be released. ● quicker award announcements ● I wasn't sure if I was elegible as an AAS member through SPS. I think I was judged, but I never received feedback and don't know if I was elegible to win.

Question 15 Why haven't you participated in the Chambliss competition?

Respondents who stated that they had not participated in a Chambliss competition were asked why they had not. The majority (N=38) indicated that they were eligible but have never presented a poster at a AAS meeting. The remaining respondents indicated they were not eligible (N=23), they didn't want to (N=20) or they were unsure whether they were eligible or what the Chambliss competition was (N=14). This information demonstrates that if AAS wanted to increase the number of Chambliss competitors, they could provide more incentives to attract respondents who indicated they didn't want to or provide more resources about what Chambliss is to attract respondents who indicated they were unaware if they were eligible or what Chambliss was.

5. AAS Membership

This block of 2-3 questions, summarized below, was asked only of ECA. Participants who selected "no" for Question 16 were directed to Question 19, while those who selected "yes" were asked Questions 17 and 18.

Table 8. ECETF survey questions about AAS membership

No.	Question Category	Who Asked	Question Text	Answer Text (Display Logic)
16	AAS Membership	Early Career	Are you currently a AAS member?	yes → Q17 No → Q19
17	AAS Membership	Early Career	How important were the following to your decision to become a AAS member?	Discounted registration at AAS meetings The annual AAS journals publication discount Eligibility for the Chambliss competition Being listed in the member directory Feeling connected to my professional community Staying up to date on astronomical news and events Support of AAS advocacy and education efforts Other
18	AAS Membership	Early Career	If you selected another reason for choosing to be a AAS member, what was this reason?	free response
19	AAS Membership	Early Career	Why have you elected not to be a member at this time?	free response

5.1 Summary and Key Takeaways

Although a majority of ECA survey participants indicated that they are currently AAS members, we find that the proportion of members vs. non-members increases with career stage (see Figure 9). In other words, undergraduate and graduate students choose <u>not</u> to be AAS members at higher rates (37 and 17% nonmembers, respectively) than postdocs, research staff/technician, and faculty (15, 11, and 0% nonmembers, respectively). Among ECA AAS members, the most important factors in their decision to join were: (1) discounted AAS meeting registration (a tangible benefit) and (2) feeling connected to their professional community (an intangible benefit), benefits that were ranked "Very important" or "important" by ~80% and ~65% of participants, respectively (see also Figure 10). Discounts on AAS Journal publications, support for AAS advocacy/education efforts, and receiving timely information about astronomical news and events were ranked roughly evenly in importance, with approximately 50% of survey participants ranking them "Very important" or "important" to their decision to join. Being listed in the membership directory and eligibility for the Chambliss competition received the most "Not at all Important" rankings (~53% and 69%, respectively), however the Chambliss responses varied strongly by career stage, being ranked as "very important" by 50% of undergraduate participants.

5.2 Data Summary and Analysis

Question 16: Are you currently an AAS member?

Of the 263 ECA who answered this question, 219 (83%) indicated that they are currently a AAS member, and 44 (17%) indicated that they are not. These responses are disaggregated by career stage in Figure 9
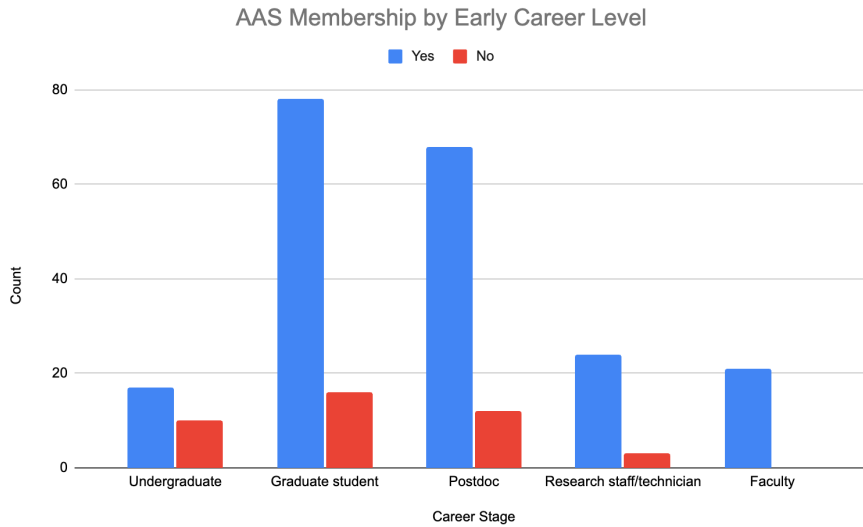
Figure 9: AAS Membership statistics for ECA survey participants, disaggregated by career level.

Question 17: *How important were the following to your decision to become an AAS member?*
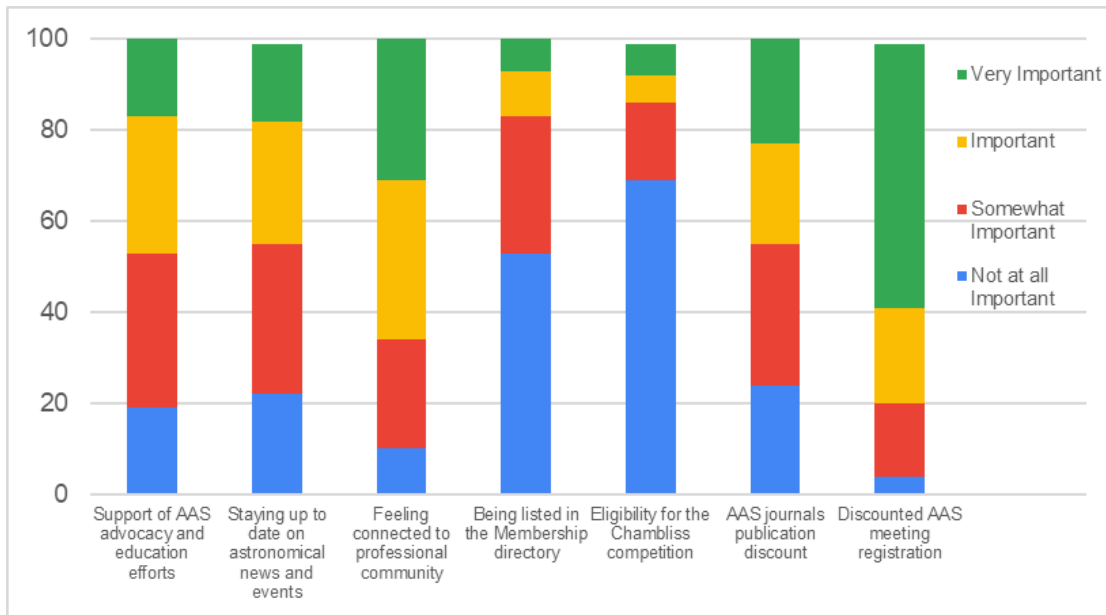

Figure 10: Summary of the proportions of ECA AAS members ranking various AAS membership benefits at different levels of importance to their decision to become a member.

When reviewing responses based on career stage (see Figure 11), we note that undergraduate members had the highest percentage of respondents indicating that discounted AAS meeting registration was the most important factor when deciding to join the Society (~69%), followed by postdocs (~66%). More than half of the postdoc respondents felt that the AAS journals publication discount was either very important or important in their decision to join, moreover postdocs had the smallest percentage indicating that this discount played no role in their decision to become an AAS member.

Figure 11: ECA AAS Members' rankings of the importance of each of the listed membership benefits, disaggregated by career stage. Colors are the same as in Figure 10. Green = "Very important", Yellow = "Important", Red = "Somewhat important", Blue = "Not at all important".

Eligibility for the Chambliss Astronomy Achievement Student Awards is limited to undergraduate (including those who are SPS affiliates) and graduate student members of the AAS, and the eligibility

requirement is a motivating factor for joining the Society. Nearly 70% of the undergraduate survey respondents ranked Chambliss eligibility as either a very important or important factor in their decision to join.

We asked survey takers if feeling connected to their professional community is a significant part of their decision to become AAS members. This factor was either very important or important for ~60 to 70% of survey respondents across career stages.

A large proportion of each career stage assigned AAS Membership Directory listings, an option available to all AAS members, as not at all an important factor in the decision to join. Staying up to date on astronomical news and events and support of AAS advocacy and education efforts were not viewed as strong motivators to join.

Question 18: If you selected another reason for choosing to be a AAS member, what was this reason?

This question was answered by 32 survey respondents, primarily postdocs (38%) and graduate students (34%).

Table 9. Thematic Analysis of ECETF survey Question 18

Theme Description	N	Sample Quote(s)
To register for and attend meetings	10	● Being able to present regularly at AAS meetings
To be part of the astronomical sciences community	9	● The feeling that membership meant that I was (would soon be) a proper astronomer. ● AAS membership is an indicator of being part of the professional astronomy community.
Encouraged by mentors to join and/or membership fee paid by institution	9	● The professor of my first astronomy class convinced my university physics department to cover registration costs for members of the class, so that we could get involved with the professional community. It was very helpful, and I highly recommend it for other universities.
Other Responses of Note		● I think the astronomy community leads the way in DEIA and equity efforts in STEM, and I want to continue to support this organization.

6. AAS Meetings

Questions 20 and 21 were asked of all survey participants who indicated that they identified as an astronomer or astrophysicist. The precise question text and/or answer choices varied slightly between the questions shown to Early Career and Non-Early Career participants, as indicated in the table below.

Table 10. ECETF survey questions about AAS meetings

No.	Question Category /Who Asked	Question Text	Answer Text (Display Logic)
20	AAS Meetings /All Astronomers	How frequently have you encountered the following at AAS meetings? **bold and italicized questions** were only asked of <u>early career participants</u>	- Received adequate support for finding meeting room locations ***Received adequate information about available travel awards (e.g. Rodger Doxsey Travel Prize, childcare grants, other support from AAS) before the submission deadline*** ***Received adequate information about Chambliss competition eligibility, procedure, and/or guidelines*** - Been unable to attend a talk you wanted to see because of a scheduling conflict (e.g. you were already in a session on a similar topic) - Attended a session where the standard allotted talk time was not sufficient to comprehend the work being presented - Prepared a talk for a meeting and felt that you weren't able to fully explain a result or provide adequate background due to time constraints - Chosen not to attend a conference event or session because you weren't sure if it was intended for you - Utilized virtual viewing/discussion options while at a AAS conference in-person - Encountered difficulty navigating the online abstract search functions to find when and where someone was presenting - Attended a conference session or event with the goal of networking or building community (e.g. the undergraduate reception, graduate and REU fair) - Attended a conference session or event hosted by the SGMA, WGAD, CSMA, or CSWA - Been recruited or interviewed for a job at a meeting (note: not a grad school interview) - Networked/made new professional connections by visiting booths in the exhibit hall ***Been encouraged (e.g. by an advisor, received an advertisement) to attend a splinter session or workshop for professional development purposes***
21	AAS Meetings /All Astronomers	<u>Early Career participants</u> were asked: How useful would the following possible AAS services be to improving your experience at the meeting? <u>Non-Early Career participants</u> were asked: In your opinion, how useful would the following possible AAS services be to improving **<u>the experience of early career attendees</u>** at the meeting?	- An online meeting planner that identifies talks/posters with presenter-provided topic keywords such as "beginner-accessible", "planet formation", or "professional development" - An online schedule-builder for the meeting - An abstract search function by presenting author - An informational session on how to navigate your first AAS meeting - An onsite mentorship program for first time attendees in which you and 1-2 other early career AAS members were paired with a more senior member - A virtual grad or postdoc fair in August or September prior to application deadlines - An early career networking reception - A facilitated discussion on a topic of interest to you - An option to have a digital version of your AAS poster linked to the ADS abstract entry - A networking space for early career researchers in the exhibit hall - A virtual workshop on how to write a good AAS abstract

6.1 Summary and Key Takeaways

Early Career Summary:

The two things that ECA reported encountering most frequently at AAS meetings were: 1) receiving adequate support for finding meeting room locations (49 %), and 2) attending a conference session or event with the goal of networking or community building (43%). In addition, the vast majority of ECA reported either "sometimes" or "frequently" experiencing a scheduling conflict during a AAS meeting (>90%). A majority of early career participants indicated that they have never been interviewed or recruited for a job at a meeting (>80%), and 56% indicated that they have never attended a conference event or session hosted by an affinity group (e.g., SGMA, WGAD, CSMA, CSWA). In terms of how useful possible AAS services would be to improving the early career experience at AAS meetings, an online schedule-builder and an abstract search function by presenting author had the highest percentage of ECA indicate that they would be "very useful" (72% and 68%, respectively), followed by an early-career networking reception and an option to have a digital version of one's AAS poster linked to their ADS abstract entry (both ~55%). Few early-career respondents said that these potential services would not be useful at all (<16%)

Non-Early Career Summary:

Of non-ECA respondents, the two things that they encountered most frequently at AAS meetings were: 1) receiving adequate support for finding meeting room locations (67%) and 2) inability to attend a talk they wanted to see because of a scheduling conflict (e.g., already in a session on a similar topic, 42%). A significant number of non-ECA said that they never utilize the virtual viewing/discussion options while attending a AAS conference in-person (56%) and that they have never been recruited or interviewed for a job at a meeting (48%). Of all the potential services, non-early career respondents said that having an option to have a digital version of someone's AAS poster linked to their ADS abstract entry would be the most useful for improving the experience of early career attendees (45%), followed by an abstract search function by presenting authors (34%). Few non-early career respondents said that these potential services would not be useful at all (<16%).
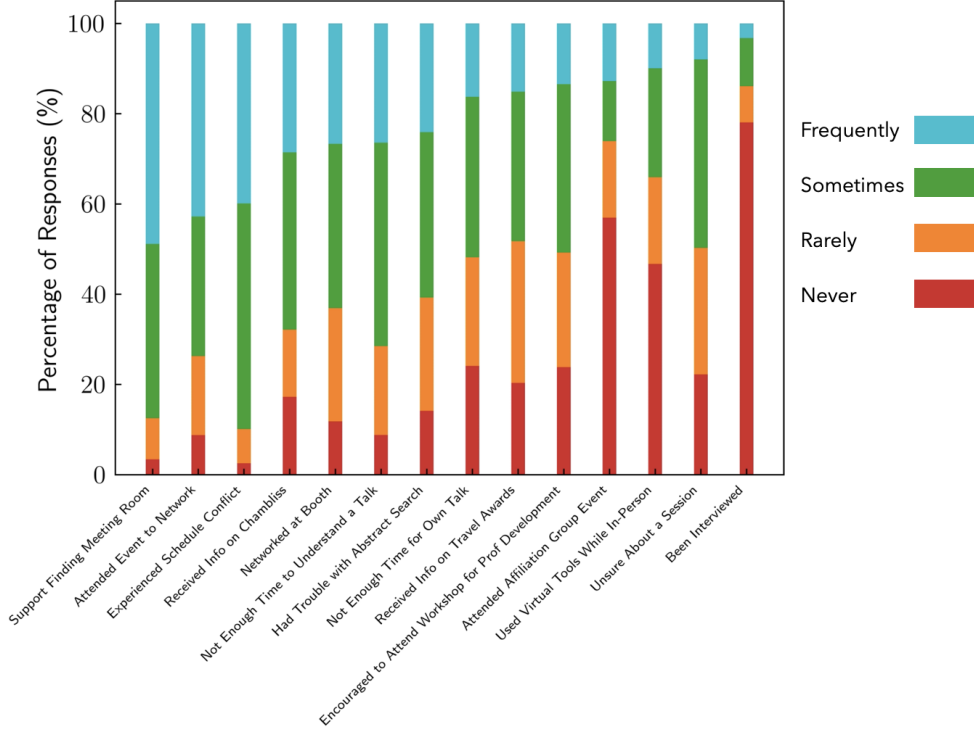
6.2 Data Summary and Analysis

Question 20: How frequently have you encountered the following at AAS meetings?

See Figure 12

Early Career Responses:

How frequently have you encountered the following at a AAS meeting?

Non-Early Career Responses:

How frequently have you encountered the following at a AAS meeting?
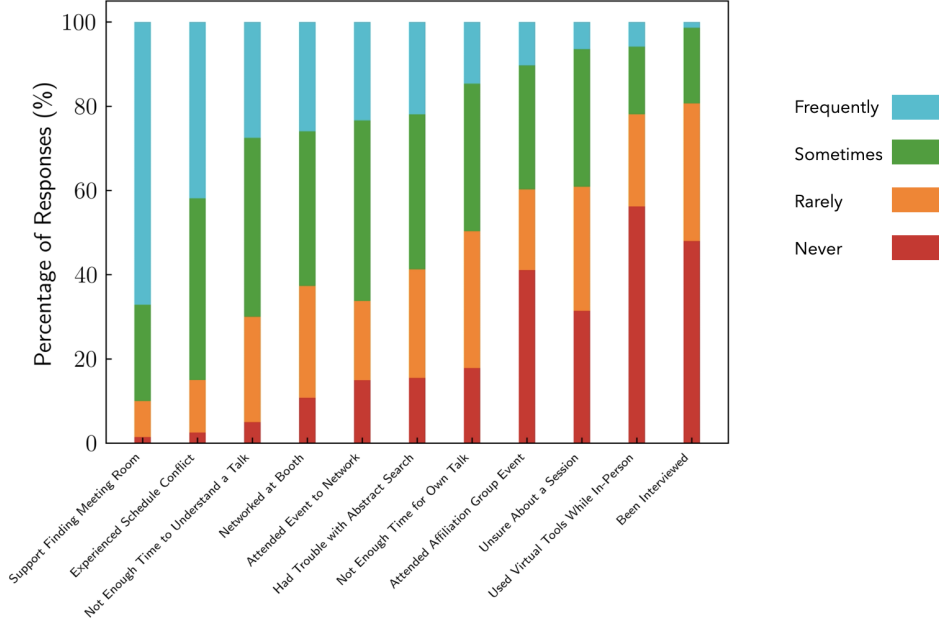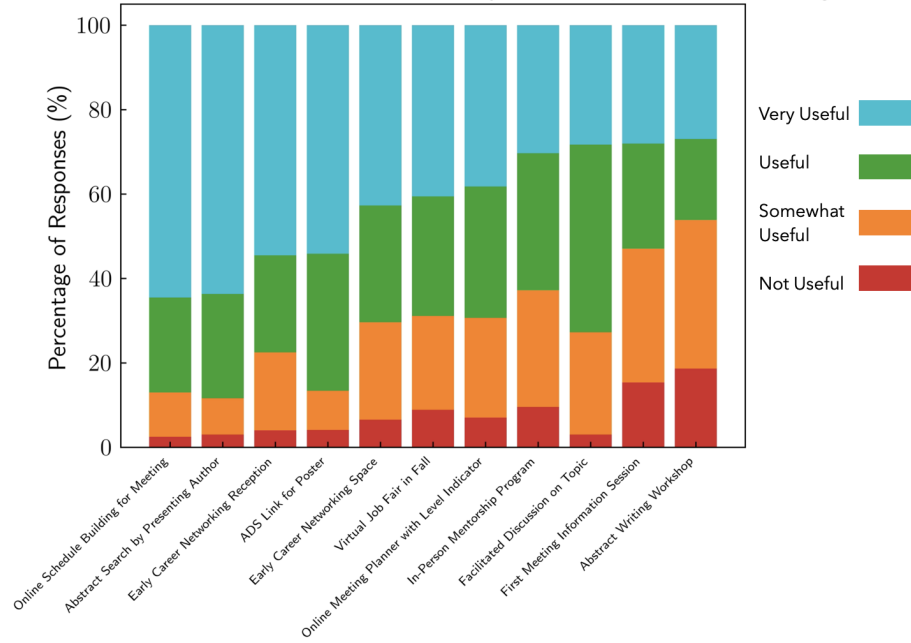

Figure 12: Summary of responses to Question 20 by ECA (top) and non-ECA (bottom)

Question 21: In your opinion, how useful would the following possible AAS services be to improving the experience of early career attendees at the meeting?

Early Career Responses:
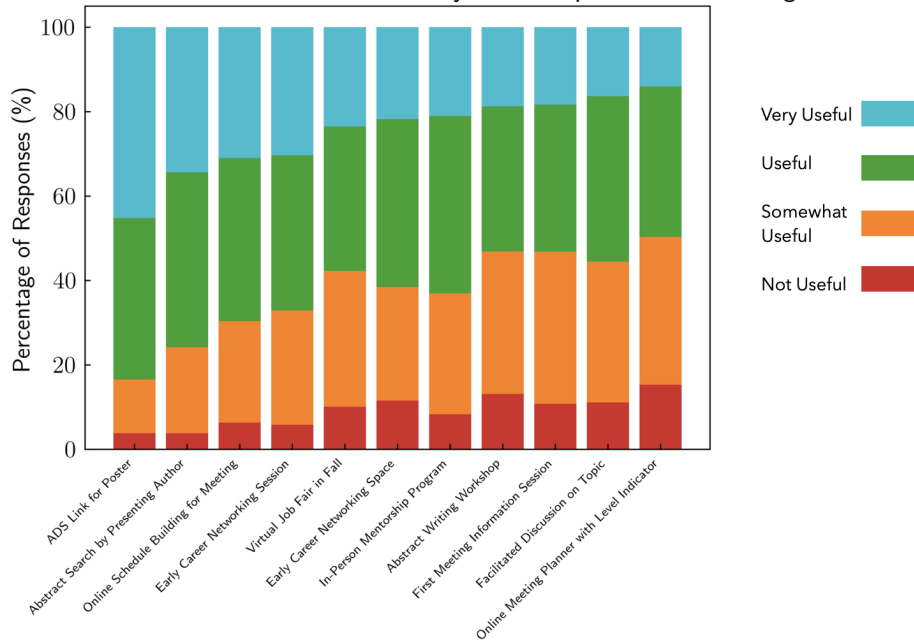

Non-Early Career Responses:

Figure 13: Summary of responses to Question 21 by ECA (top) and non-ECA (bottom).

7. ECETF Committee Ideas

Questions 22-25 were asked of all survey participants who indicated that they identified as an astronomer or astrophysicist.

Table 11. ECETF survey questions collecting opinions about ideas generated by the ECETF

No.	Question Category	Who Asked	Question Text	Answer Text (Display Logic)
22	ECETF Committee Ideas	All Astronomers	One idea our committee had is to allow AAS presenters to choose EITHER an 8min contributed talk where the discussion/Q&A takes place online (e.g., slack) immediately after the talk/session OR a talk under the current system (5min talk, followed by a 3min oral Q&A). *As a contributed talk presenter, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement:* I would prefer to give an 8min talk with an online only discussion/Q&A instead of the current AAS contributed talk style (5min + 3min Q&A)	1-5 scale
23	ECETF Committee Ideas	All Astronomers	*As an audience member, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement:* I would prefer to attend 8min talks with no synchronous Q&A over the current AAS contributed talk style (5min + 3min Q&A)	1-5 scale
24	ECETF Committee Ideas	All Astronomers	*As a meeting attendee, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement:* I would prefer that AAS continue to offer a hybrid (virtual + in person) meeting option	1-5 scale
25	ECETF Committee Ideas	All Astronomers	*As a poster presenter, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement:* I would choose to have a digital version of my AAS poster linked from its ADS abstract entry if this service were available	1-5 scale

7.1 Summary and Key Takeaways

There was no strong consensus on giving or attending longer (8min) talks at AAS meetings, though opinions were somewhat skewed toward the standard AAS talk format (5min + 3min for questions). At the same time, our committee heard from many ECA that AAS contributed talks are difficult for ECA to access because presenters often skimp on background in order to fit their talks into the 5 minutes allotted.

Regarding maintaining a hybrid meeting option, opinions were also divided, though with more weight in the extremes (1 and 5 on a 5 point scale), particularly among non-ECA. Overall, opinions were skewed toward maintaining a hybrid meeting, particularly among ECA.

Preferences expressed by both early career and non-ECA for adding an option to link their iPosters from the AAS conference abstract entries on ADS was strongly preferred by both ECA and non-ECA.
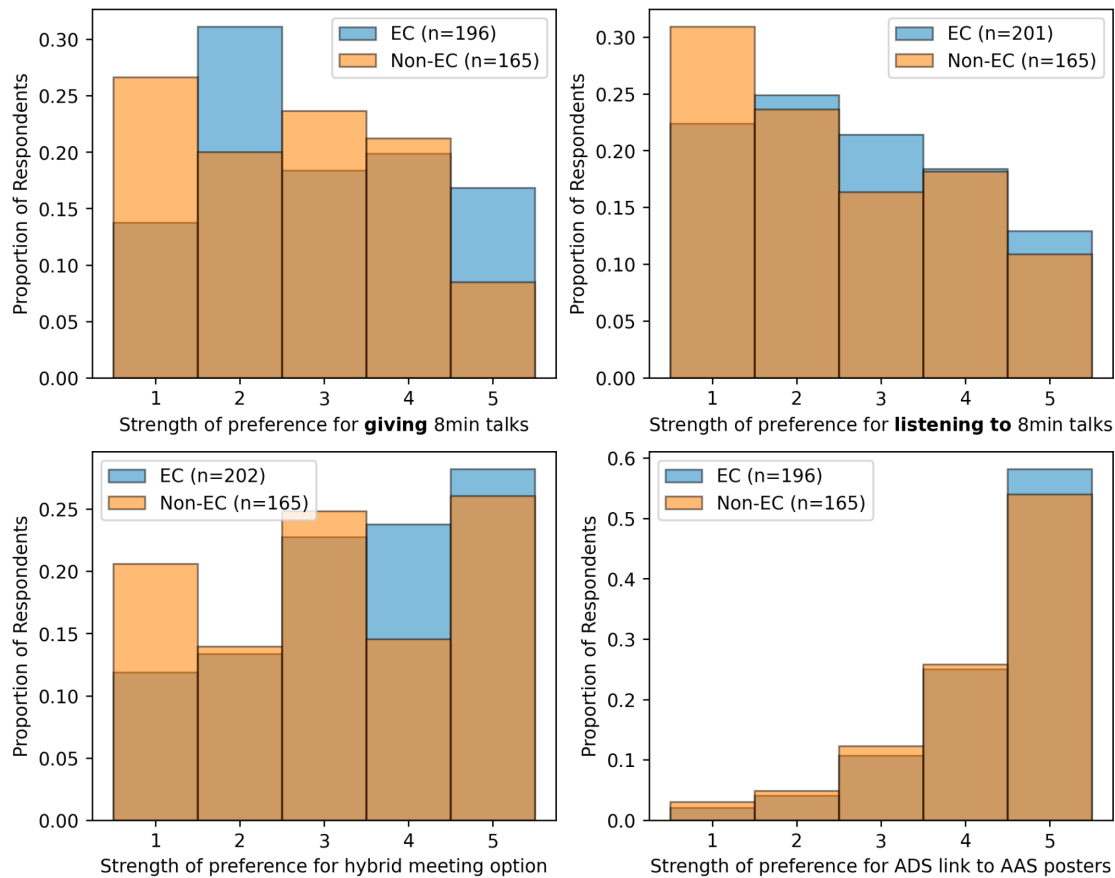
7.2 Data Summary and Analysis

Figure 14. Summary of responses to questions 22-25, all of which asked participants to rank ECETF-generated ideas on a 5 point scale, with 5 indicating the strongest possible preference for the suggestion. These questions were asked of both ECA (blue) and non-ECA (orange).

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*Question 22: As a contributed talk presenter, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement: I would prefer to **<u>give</u>** an 8min talk with an online only discussion/Q&A instead of the current AAS contributed talk style (5min + 3min Q&A)*

In general, there was a slight preference among both early- and non-ECA for the current talk format (5min talks + 3min for questions), with ECA feeling somewhat more positively toward giving longer talks than non-ECA.

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*Question 23: As an audience member, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement: I would prefer to **<u>attend</u>** 8min talks with no synchronous Q&A over the current AAS contributed talk style (5min + 3min Q&A)*

As attendees rather than presenters, both ECA and non-ECA exhibited a stronger preference toward the current AAS talk format, though here too the strength of this preference was more pronounced among non-ECA

Question 24: As a meeting attendee, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement: I would prefer that AAS continue to offer a hybrid (virtual + in person) meeting option

A quarter of both early career and non-ECA indicated the strongest possible preference (5 on a 5 point scale) for hybrid meetings. On the other end of the scale, 20% of non-ECA expressed the strongest preference (1 on a 5 point scale) for non-hybrid meetings versus only 12% of ECA. If we consider a response of 3 to indicate neutrality on this question (20-25% of respondents in both categories), ECA exhibit roughly a two to one preference for hybrid meetings, while non-ECA are approximately evenly divided in their preferences.

Question 25: As a poster presenter, on a scale of 1 (strongly disagree) to 5 (strongly agree), rate your level of agreement with the following statement: I would choose to have a digital version of my AAS poster linked from its ADS abstract entry if this service were available

Among the ECETF-generated ideas that we surveyed participants about, this suggestion met with the most enthusiasm among both ECA and non-ECA participants, with more than 50% of respondents in both categories indicating the strongest level of preference for this service (a value of 5). .

8. Survey Participant Ideas

Questions 26-27 were asked of all survey participants who indicated that they identified as an astronomer or astrophysicist. Question 28 was asked only of Non-Early Career participants, and Question 29 was asked only of Non-Astronomers.

Table 12. ECETF survey free response opinion questions

No.	Question Category	Who Asked	Question Text	Answer Text (Display Logic)
26	Participant Ideas	All Astronomers	In your opinion, if there was one benefit or service that the AAS could provide that is vital to the career development of early career astronomers, what would it be and why?	free response
27	Participant Ideas	All Astronomers	Please use the space below to provide any additional comments, feedback, or ideas to our committee about how AAS could best serve early career astronomers.	free response
28	Participant Ideas	Non-Early Career	*Non-Early Career participants only:* Knowing what you know now, what is one AAS service that you wish you'd known about, had available, or engaged with earlier in your career?	free response
29	Participant Ideas	Non-Astronomers	*Non-Astronomers only:* What is one thing that the AAS could do to better serve you?	free response

8.1 Summary and Key Takeaways

Survey participants who identified as astronomers were asked to name one benefit or service that the AAS could provide that is vital to the career development of ECA. Respondents identified access to career information (career decision guides, data), career development events (job fairs, seminars for aspiring grad students and postdocs), and job register enhancements as the most vital benefits/services that the Society could provide. Additional AAS networking events were also identified as vital to career development, followed by professional development training related to teaching, mentoring, budgeting, grant writing. Other common response themes include removing structural barriers and increasing a sense of belonging and expanded mentoring programs.

8.2 Data Summary and Analysis

Question 26: In your opinion, if there was one benefit or service that the AAS could provide that is vital to the career development of early career astronomers, what would it be and why?

We received 256 write-in replies to question 26, with most respondents from five career stages: faculty (28%); graduate students (20%); postdoc (17%); research staff/technician (17%); undergraduate (5%). More early career respondents submitted comments (57%) than those who are not early career (43%). Table 13 provides a thematic breakdown of responses, and Figure 15 shows the proportions of ECA and non-ECA respondents in each of the thematic categories.

Table 13. Thematic Analysis of ECETF survey Question 26

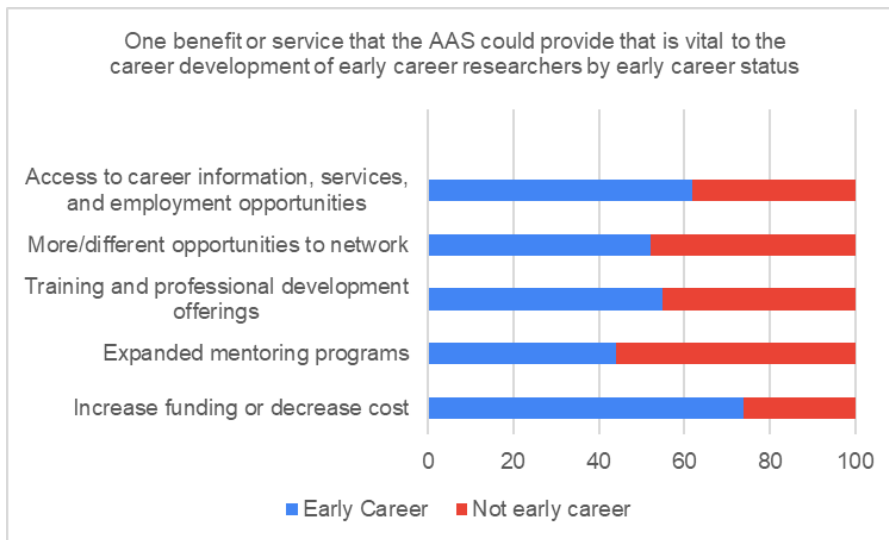| Theme Description	N	Sample Quote(s)
Access to career information, services, and employment opportunities	97	- A general discussion every now and then about the reality of the job situation. ECRs is a very unstable career stage and such discussions lead by experts in AAS can help us make informed decisions for long term career options. - Job applications were the absolute worst part of my early-career experience - so emotionally draining and time consuming. Something like a funded retreat in August to craft job applications and develop a list of jobs to apply to, plus job application support groups or something like that, could be valuable. - Job fair at AAS! You offered one at the winter meeting the year I was finishing my PhD and I found my current job through networking at it. I would LOVE to recruit at a job fair, if one were available. - Reception with potential employers. - Perhaps job application/interview prep by reading over documents and practicing questions. - Seminars for entering grad school and postdoc, to help undergrads and other astronomers attend schools and tips to make you a better candidate - VIRTUAL GRAD SCHOOL FAIR BEFORE APPLICATION DEADLINES!!! - A clear, honest guide for early career scientists for how to decide whether to remain in academia with real examples from current/former members. - Collect good data and publish statistics regarding the career outcomes of early career astronomers (APS already does something similar). It will only become more important for students to know how unlikely it is to be hired long-term as the number of PhDs continues to grow while long-term and tenured positions become more rare. - Guides for grad school, postbac, summer research programs, just anything that can help early career people get more involved with the astrophysics profession. - Highlighting pathways to securing stable jobs in astronomy considering the slew of perpetual postdocs today. - More detailed statistics on jobs and salaries for different years from PhD completion, for all career paths. - A better understanding of the job market and of job prospects. - Aggregate more astro jobs, seek them out and not just passively host them, at all in training levels. - Encouraging better practices for postdoc and faculty hiring. Adding transparency to when you have been rejected and when a job is no longer available (even keeping old job ads on the job registry and requiring people to say when the job is filled). - I would really appreciate more entry-level jobs on the AAS job registry. I'm currently job searching, so I check the registry frequently, and there aren't many openings that don't require a PhD. I know that this is in part the nature of astronomy as a field, but still--I feel like I'm in a Catch-22 where most jobs require a PhD and most PhD programs want you to have job experience. - I'm not sure if this already exists, but if there could be some form of live-updated list of job openings for early career astronomers, that would be helpful. I feel like early-career astronomers feel pigeon-holed into staying in academia, mostly because these are the only jobs we see on a daily basis. If I weren't in a graduate program, I wouldn't really know where to start looking for a job other than at NASA.
More/different opportunities to network	75	- Blocks of time where there are no sessions or workshops dedicated entirely to networking. Not a specific meeting room, but just an empty hour to network. Maybe this already exists but I am not aware of it. - Grad school networking opportunities - Networking events, especially for others in the same field of research - More networking opportunities with the aerospace industry to facilitate the relationship between astronomers and the aerospace industry. - Opportunities for more networking, both with other early career astronomers and one-on-one with more senior astronomers in similar research areas.
Provide training/professional development	60	- Allow early career to review articles. It is an immersive experience that helps developing one's skills. - Help early career researcher get their work published. Not every advisor actively publishes, therefore the hurdle to publishing is extremely high to figure out on your own. - More support for faculty at primarily undergraduate serving institutions (e.g., conducting research at these institutions, how to build networks of collaborators at similar institutions, funding opportunities). - More training in mentorship for senior faculty/researchers - Professional development training courses, e.g. mentoring, teaching, grant management, budgets, etc. - Training on the skills that are the most important for advancing along the academic career path: efficient paper writing, grant writing, time management (balancing the many aspects of a tenure-track job), mentoring students, project management, etc - SOME ADVICE AND PRACTICE ABOUT TEACHING! It is a scandal that some faculty candidates have never taught a course.

Figure 15: Visual depiction of the proportions of ECA vs. non-ECA respondents whose write-in responses to question 26 were categorized under each theme.

Question 27: Please use the space below to provide any additional comments, feedback, or ideas to our committee about how AAS could best serve early career astronomers.

Table 14. Thematic Analysis of ECETF survey Question 27

Theme Description	N	Sample Quote(s)
Changes to or comments about conferences	44	• Don't schedule dissertation talks on the last day of the conference. No one attends them, which is pretty detrimental to early career scientists. • Many early career astronomers do not have extra funding - making sure to give honorariums where possible for their work, waiving registration fees for volunteers, and keeping a hybrid attendance model so that travel budge(t)s do not prevent attendance will expand the amount of early career astronomers able to participate in AAS conferences. • Additionally, early career astronomers will be helped more substantially by DEIA efforts (ie, pronouns on badges, all gender bathrooms, quiet rooms, seating in public spaces for those who can't stand for long periods, live captioning, people with mobility aids being able to access the stage, etc. etc. etc.). These efforts help everyone, but a larger percentage of early career astronomers will benefit from them because these young individuals with marginalized identities have not yet left due to burnout, bias, and lack of support. By incorporating DEIA efforts in our meetings, we can help make astronomy a career they can succeed in, rather than a field that drives them away. • Newfangled conference schedules are great - but it turns out not so useful if there are internet connectivity issues, etc. It's always nice to just have an offline simple PDF schedule that's manually searchable. Or a way to export a block schedule + speakers / titles (in the comments?) to an iCal file.
Careers	15	• Please provide career assistance for the majority of us who will not be able to stay in astronomy due to the high number of PhDs awarded per year, and the low number of faculty and permanent positions available each year. Simple supply and demand and we all can't be astronomers, so help us make the transition. • The lack of support for preparing faculty for the teaching part of their job puts the AAS near the bottom of professional societies. With so many non-science-major college students getting their college science experience through astronomy, this is a tremendously wasted opportunity.

Advocacy for early career astronomers	10	• As I said above, being on the job market is terrifying and the number of applications you send out and never hear from is incredibly discouraging. If AAS could encourage universities and professors to send rejections in a timely manner (if you don't make the long list, you can be sent a rejection letter early) and announce when a job is filled would make it much easier.
Other Responses of Note		• Most professional societies are struggling to find how best to help early-career professionals. Look at what, for example, SPIE and AIAA are doing. Some of the same things that this questionnaire asked about. • The AAS International Travel Grant is a great program that I recently utilized, but it's very poorly publicized (I consider myself lucky to have found out about it, and most people I spoke to had never heard of it).

Question 28: Knowing what you know now, what is one AAS service that you wish you'd known about, had available, or engaged with earlier in your career?

Table 15. Thematic Analysis of ECETF survey Question 28

Theme Description	N	Sample Quote(s)
Career development services, events, and resources	36	• Career consultations • Graduate school fair • Virtual career-focused trainings • Summer research/internship opportunities for undergrads • CV/resume development help • Professional development workshops. Job center. Information about jobs in industry.
Opportunities to network and/or mentor	19	• Mentoring with someone from another institution • Meeting people with similar interests. • Volunteering on a committee is a great way to build one's professional network and better understand how "the system" works.
Other Responses of Note		• Support for childcare • I wish that I had known more about SGMA and CSWA - both that they often have events at the AAS and more about the work they were doing.

Question 29: What is one thing that the AAS could do to better serve you?

Table 16. Thematic Analysis of ECETF survey Question 29

Theme Description	N	Sample Quote(s)
Sense of belonging	7	• Acknowledge that not everyone in the AAS ecosystem has a PhD. There are discussions about people falling out of the "pipeline". Some of them are in the AAS and support the science without having the PhD. • Have more interfaces with both the tech and applied mathematics communities through multi-organizational relationships and strive for more software/tech-related corporate inputs within the exhibition hall area. Personally, I would love to see some of the larger tech companies have a vested interest in this community (similar to that of AGU), software-related workshops, and an emphasis on open-source science and data support. • Provide more bridging between the professional astronomy community and the professional astronomy education/outreach/comms community! We have a lot to learn from each other.