

Creating Space Generation Advisory Council (SGAC) Forums to Engage Young Professionals and Graduate Students into AAS for Future Space Science Policy

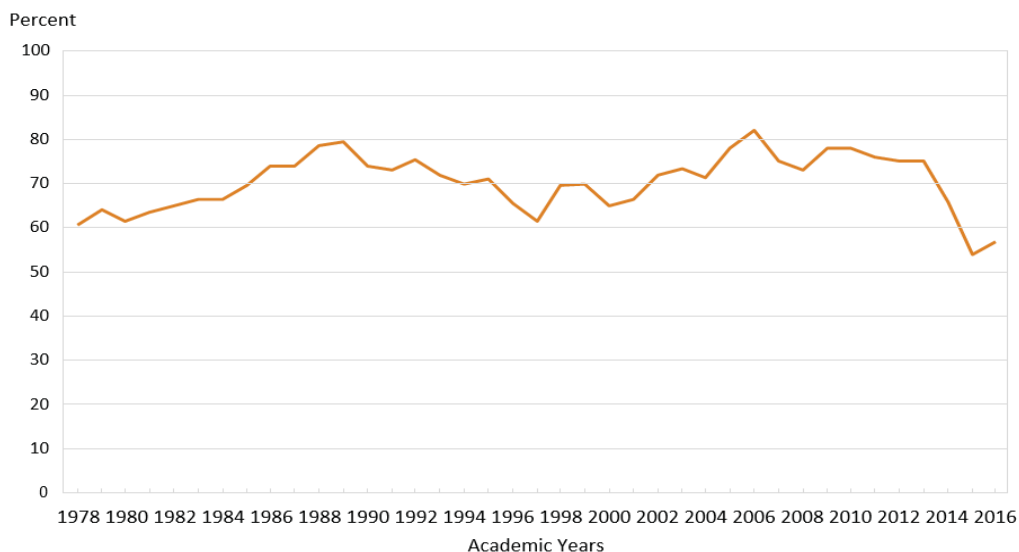
An Astro2020 Decadal Survey *State of the Profession Consideration*
White Paper

Respectfully submitted by the National Points of Contact (NPOC)
for the United States of the
Space Generation Advisory Council (SGAC)
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Overview: Recent decadal studies, committee meetings and town halls have confirmed the need to include more early career inputs and opportunities in the astrophysics community. More astronomy and astrophysics PhDs are being produced than academic positions are available. The result of these two issues creates a lack of involvement in policy for graduate students and their future research and further lacks their networking outside of the academic industry. We explore the trends of employment for the astronomy community, stigmas associated with these employment opportunities, limited graduate student and early career scientist involvement in decadal surveys, and the mutually beneficial involvement of Space Generation Advisory Council (SGAC) to space science in the United States. We conclude with recommendations for commitments of resources by the U.S. astronomical community to forums run by SGAC and annually receive results from these forums at Space Studies Boards meetings.

Availability of Positions within Academia:



Data presented are 2-year averages and are limited to PhDs who earned their degrees from a US university and remained in the US.

AIP | Statistics

aip.org/statistics

Figure 1: Postdoctoral Acceptance Rates for New Astronomy PhDs, Classes of 1978 through 2016 according to the American Institute of Physics

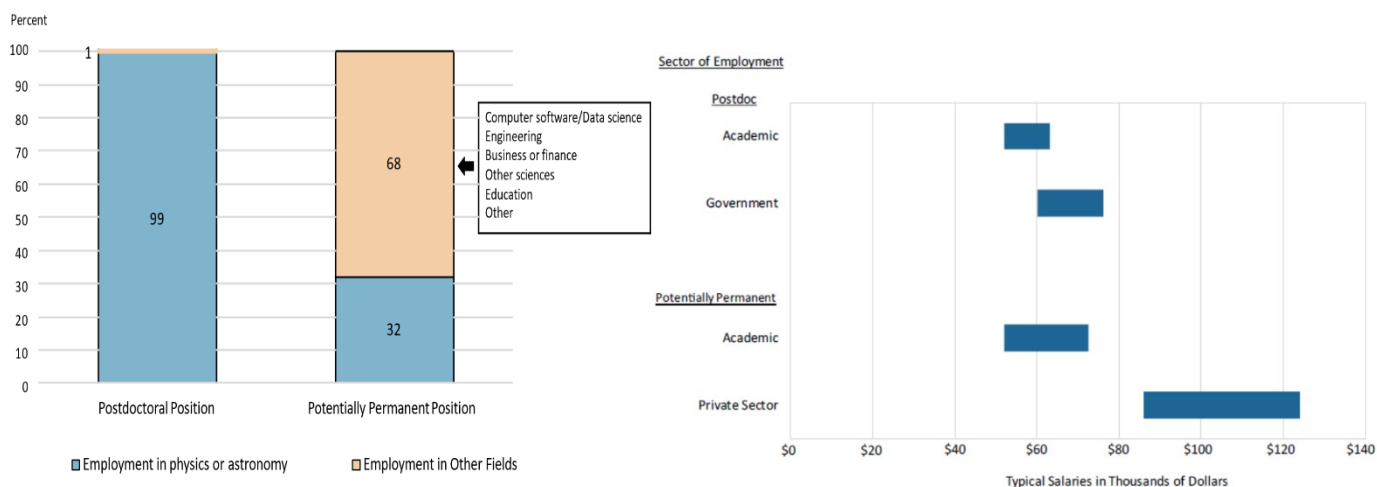


Figure 2: Employment Field of Astronomy PhDs One Year After Degree Classes of 2015, 2015 & 2016 Combined (left) and Starting Salaries of Astronomy PhDs, Classes of 2014, 2015 and 2016 combined (Right) (Courtesy Rachel Ivie: AIP Statistical Research Center)

With the increasing number of PhD's awarded to candidates and limiting number of postdoctoral positions available (Figure 1), recent graduates are struggling to find a position within academia. Federal funding for astronomy has not increased to accommodate the record-breaking 336 doctorates awarded in 2017.¹ The State of the Profession White Paper *Astronomy-Driven Careers in the 2020's* examines the job availability for new PhDs and mentions that more positions are being offered outside of the US rather than increasing funding for academic and postdoctoral positions within the US. Meanwhile, science management, engineering and technical staff positions have increased over the past decade and will provide a higher salary and a more long-term career path for new PhDs. A positive move for the next decade is to encourage PhD candidates to network and explore career paths outside of academia rather than continue the stigma that it is not a viable career path. The Space Studies Boards have mentioned this need explicitly. Connecting with groups that are already responsible for networking young professionals (students and professionals under the age of 35) within the space industry will be a simplistic way to open graduate students to these opportunities and people.

New Opportunities: Graduate students' training throughout their PhD candidacy doesn't include preparation for any career other than continuing into academia. With the continuing decreasing availability of positions for the mass of graduates, training and exposure to multiple, unique prospects is vital for the next decade students. According to Gaff, J. *The Disconnect between Graduate Education and Faculty Realities*, studies have shown that there is a large gap between the work conducted by PhD alumni and the work they conducted in their doctoral programs sometimes within academia and almost always outside of it.

¹ National Center for Science and Engineering Statistics (NCSES), <https://nces.nsf.gov/pubs/nsf19301/data> (Table 13). AIP statistics are lower because NCSES numbers include astronomy PhDs from physics departments.

The 2010 Decadal Survey stated that “Although training in astronomy for astronomers is valuable, in practice at least 20 percent of astronomers leave the profession for other careers following the Ph.D., the postdoctoral, and even the faculty/research position level.” Data trends over the past decade lead to the conclusion that this number may have increased. Resources for the next decade will need to overcome these gaps are to expose students to workshops and events that they normally would not attend under typical grant funding. American Astronomical Society and National Academy of Sciences has already created some of these unique experiences with workshops at AAS conferences and the *Early Career Astronomer and Astrophysicist Focus Session: The Decadal Survey* exposed students and early career scientists to the decadal survey process. With this encouragement for students to contribute in the white paper/decadal survey process, they will have to work beyond their marginalized training as well as collaborate and contribute in a positive setting.

SGAC and AAS Event: SGAC is a non-governmental organization and professional network which aims to bring the views of students and young space professionals (defined as early career professionals/scientists under the age of 35) to the United Nations (UN), space industry, academia and other organizations. SGAC's primary work is in advancing space policy development, representing the world's young adults in space policy to the United Nations Office for Outer Space Affairs (UNOOSA) and other international organizations. SGAC continues to present perspectives of university students and young professionals to the UN through its Observer Status with the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). SGAC has a large USA presence, about 30% students, with almost all students' focus on either engineering, law or business².

SGAC has accepted the need to expand to the space academic community to connect with astrophysicists. Currently, a scholarship program sends SGAC graduate students to Space Science Week for the SSB's Early Career Program. As a result, students have expressed the desire for more interaction between space science and SGAC; ideally to influence space science policy as an early career scientist.

SGAC accomplishes influencing the US's space industry at an annual event, Fusion Forum. This forum, held in conjunction with the Space Symposium, is a two-day, high-intensity, fast-paced professional development and networking event focused on the international and US space industry with students and young professionals from around the world and various facets of the space sector including science, engineering, law/policy, business/commerce, medicine, media, military, and government. Through discussion tracks, expert panels, keynote presentations, and interactive activities, these students will “fuse” their perspectives. The findings from these events are presented to the United Nations as the perspective of the young professionals and students.

Our strategy is to bring this type of event, on a shorter time scale, to AAS meetings with a focus on workforce development and various decadal survey topics with the facilitation of the SSB and funding agencies. Interesting, unique, and new feedback essential for the decadal will come from students and young scientists from the field in specialized focus groups.

² Space Generation Advisory Council (SGAC) mission statement, <https://spacegeneration.org/about>

Giving a Voice to Graduate Students and Early Career Scientists:

This event will provide the collaboration between graduate students at different stages of their career and backgrounds with early career scientists that would not typically occur. With moderation from people with experience in the decadal surveys, young professionals will provide intriguing feedback on the workforce that will help improve conditions for their upcoming careers in the next decade. For the survey in the upcoming years, students that have a stake in that branch of science will also help direct where they want the most resources committed. Collaborating in an environment with small focus groups led by experts in these topics will be the distinctive factor for students to be able to make these decisions and feel confident presenting them. The event will always be followed by networking with these moderators and other members of the space industry. By having focus groups prior, students and early career scientists will have a better understanding of the professions that are able to make these decisions and ask questions better suited towards their interests in a career.

Since this event will be run yearly, results the focus groups that discuss workforce development issues should be presented at the SSB's Early Career Program by the chosen SGAC representatives. The results of the decadal focused topics will be written in the form of a white paper as well as presented to the board of interest during Space Science Week.

Ultimately, connecting graduate students with SGAC will access them to a vast network in the international space community. Not only will they be introduced to US based space science professionals and SGAC members, but they will then be able to attend future SGAC run events to be exposed to engineering, law, business and other facets within the space industry. SGAC in turn will be able to expose their members to more space science when discussing the future and policy regarding future large space-based missions to members of congress and funding agencies. Accomplishing this mutual relationship will be a task that SGAC members are excited to take on and that graduate students will benefit from the most.

Recommendations for Commitments of Resources:

With the lack of exposure outside of the academic community for space science, SGAC wants to facilitate a relationship between industry, science, students and early career scientists. One of the quickest and most productive ways to accomplish this is by an annual forum held at AAS conferences. Resources should be committed towards:

- Providing members of steering committees, funding agencies, space studies boards, industry, and additional workplace professionals to moderate these forums. Obtaining feedback directly during this event will be the most beneficial to the board. Additionally, hearing students' and early career scientists' concerns with the workplace or future funding of research as they prepare to graduate and enter the field is the best way to ensure positive working dynamics for future scientists.
- Funding agencies should provide additional grant resources to be spent exclusively sending students to this event. Professors with the incentive to build their graduate student's abilities and skills beyond research should be rewarded. Once a student attends this event they will then be

qualified to receive scholarships for future SGAC events which should furthermore be encouraged by a research advisor.

- Funding agencies should also provide sponsorship for this event. Since this forum will provide feedback on how funding agencies should allocate resources for a better workplace and more beneficial research opportunities for early career scientists, they should be willing to fund the event that allows these students to feel comfortable enough to share their opinions.
- The SSB has explicitly stated the need for more graduate student input and career options post-graduation. To allow students the opportunity to act on this statement, the SSB should be willing to hear results of this forum every year during Space Science Week by an SGAC representative. By encouraging this partnership with SGAC, the SSB is in turn encouraging a network for graduate students to be exposed to the entire space industry and give them a voice in the next decade of their career. By working with moderators, only the most valuable information will be passed along and should be taken under consideration by the board for ultimately the next decadal survey.