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## A Ten-year Analysis of ASTRO Junior Faculty Career Development Awards

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### Abstract

**Purpose:** Between 2000 and 2010, ASTRO awarded 22 Junior Faculty Career Development Awards (JFA) totaling \$4.4 million. This study aimed to evaluate the impact of these awards on the grantees' career development including current position, publications and subsequent independent grant funding.

**Methods:** Each awardee was requested via email and telephone to provide updated curriculum vitae and National Institutes of Health (NIH) Biosketches, as well as information regarding current position of employment. 21 of the 22 JFA recipients complied. Reported grant funding was extracted from each candidate's CV and the amounts of NIH grants obtained were confirmed via NIH REPORTER. Reported publications were confirmed via PubMed.

**Results:** All of the respondents to this survey (21 of 21) have remained in academic positions. Subsequent aggregate grant funding totaled more than \$25 million (range: \$0 – \$4.1 million) 5.9 times the initial investment. NIH grant funding totaled almost \$15 million, three times the initial investment. Awardees have published an average of 34.6 publications (range: 0 – 123) for an overall rate of 4.5 papers/year (range: 1 – 11).

**Conclusions:** ASTRO Junior Faculty Awards over the past decade have been strongly associated with grantees remaining in academic positions, success in attracting private and NIH grants, and publication productivity. In an era of dwindling federal research funding the support enabled by the ASTRO JFA may be especially helpful to support the research careers of promising junior faculty members.

### SUMMARY

Over the past decade, ASTRO has awarded over 20 Junior Faculty Career Development Awards totaling over \$4 million. In a survey of past award winners, 21 of 22 recipients replied and provided information regarding current position, publications, and subsequent independent grant funding. This programs has been quite successful with all contacted recipients remaining in

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Conflict of Interest Notification

Both authors are members of the ASTRO Research Evaluation Committee. Neither author has received an ASTRO Junior Faculty Career Development Award.

academic medicine, subsequent grants totaled 5.9 times the original investment corresponding to over \$26 million in direct costs, and an average of nearly 5 publications per year per grant recipient.

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## INTRODUCTION

Since its founding, in 1958, the American Society for Radiation Oncology (ASTRO) has sought to promote excellence in patient care, provide opportunities for educational and professional development, promote research, and disseminate research results. The ASTRO Junior Faculty Award (JFA) was established to stimulate interest in radiation research early in one's academic career development by giving young faculty investigators the protected time and resources needed to focus on radiation oncology research central to the missions of ASTRO.

To assist these individuals as they transition from residency training to junior faculty positions, over the last decade ASTRO has awarded 22 Junior Faculty Awards (JFA). These two-year awards are designed to assist the awardee in their transition from residency to faculty and help establish an independent research career in an academic institution. Junior faculty in the first three years of their initial faculty appointment are eligible to submit research proposals which are then evaluated by the Research Evaluation Committee of ASTRO's Research Council for merit and feasibility. The number of awards and dollar amount of each award are determined by the ASTRO Executive Board each year.

The effect of the JFA on the careers and research productivity of awarded candidates however has not been assessed. We therefore sought to determine the current status of each candidate, including current position, success in obtaining subsequent independent grant funding, and publication record in order to assess the effectiveness of the JFA program.

## METHODS

Prior awardees were contacted via email and asked to provide a current curriculum vita (CV), National Institutes of Health (NIH) biosketch, and encouraged to provide comments regarding the impact of the award upon their career. If no response was received from initial email contact, subsequent emails were sent or individual phone calls made to each awardee.

Data regarding current position, grants, and publications was abstracted from submitted CV and biosketch. Grant amounts were confirmed through NIH RePORTER (Research Portfolio Online Reporting Tool) and publicly available private foundation websites. Only direct funds were included, defined as the total grant funding provided to the awardee, who was verified to be the PI and/or Co-PI, and which did not include indirect funds or overhead provided to the awardee's home institution. Publications were verified via PubMed and segregated into first or last author publications vs. total publications. The publication analysis included references that could be verified via PubMed online searches of the English language literature, and thus included peer-reviewed papers as well as editorials and review articles but not abstracts.. All publications arising after the start date of the grant were included.

## RESULTS

Between 2000 and 2010, twenty-two individuals received ASTRO JFAs (two additional recipients were named in 2011 and 2012). Detailed responses were obtained from 21 of 22 awardees. Only one recipient did not respond despite repeated email and direct telephone calls. Therefore, grant and publication data was available for almost all JFA recipients.

The number of grants awarded and the amount of each grant varied by year (Figure 1). A total of \$4.4 million has been awarded through this mechanism. At the time of award receipt, awardees were members of 13 different institutions. Two institutions had 4 awardees each.

At the time of this survey, all who responded to our inquiries (21 of 21) have remained in academic positions. Current positions range from Instructor to Professor. Two individuals have been named Chairperson of a Radiation Oncology Department.

ASTRO JFA recipients have been awarded almost \$15 million (range \$0 to \$3 million, mean \$600,000) in NIH grants (R01, K08, R21, P01; direct funds only). The amount of NIH grants is 3.4 times the initial ASTRO JFA investment. Awardees have also been successful in obtaining funding from a wide range of private foundations and other governmental sources, resulting in a total (i.e., non-NIH and NIH) grant funding successfully acquired of more than \$26 million (range \$0 to \$4.1 million, mean \$850,000). The amount of combined NIH and non-NIH grants is 5.9 times the initial ASTRO JFA investment. As would be expected, awardees from the first five years of the decade (2000–2005) have received more funding than those from the latter years (Figure 2). One measure of success for career development grants is the rate at which awardees transition to an NIH R-series awards (such as an R21 or R01 grant). Of the group of applicants who received their award prior to 2008, 10 of 16 recipients (62.5%, exact 95% confidence interval 35% to 85%) have received R01 or R21 grants.

The ASTRO JFA recipients have published an aggregate of over 700 publications. The median number of publications per recipient is 34.6 (range 1 to 123). Of these, 224 are as either first or last author. These results represented a publication rate of 4.5 manuscripts per year (range: 1 – 11).

We also examined the success of recipients who received their awards before 2005. In this group, the average number of publications was 56 (range: 34 to 123) and the average number of grants obtained was 13 (range: 4 to 18).

Awardees also provided comments regarding the value of the ASTRO JFA grant for their career. The overall tenor of the comments was that the award allowed the recipient to pursue work they may not have been able to otherwise and that the award was instrumental in their current and future success. Selected comments are shown (Figure 3).

## DISCUSSION

Junior faculty members represent the future of Radiation Oncology. Tasked with teaching residents, conducting translational research, and caring for patients, junior faculty represent

the engine that drives many academic practices. The energy, hunger, and drive that junior faculty bring arguably renews and reinvigorates the field. Nurturing the success of junior faculty therefore represents an investment in the future. Towards these ultimate goals, the ASTRO Junior Faculty Award appeared to be effective in nurturing and establishing the academic careers of recipients. All awardees who replied to our requests (21 of 22) remained in an academic position. Most were successful in obtaining independent grant funding, from not only National Institutes of Health but also from foundation and institutional sources.

An impressive metric generated by this analysis is the large amount of subsequent NIH and non-NIH grants received, totaling 5.9 times the initial ASTRO JFA investment. Given the relatively short lifetime of this award with the initial winners only 11 years removed from award receipt, this number will certainly grow in the coming years. In addition, the JFA to NIH R-type grant (e.g. RO-1) success rate of 62.5% is nearly 50% greater than that of typical NIH K awardees after 5 years (1), and is similar to that observed in career development grants provided by other specialty societies (2–4). It is also important to note that not all promising junior faculty are eligible for this award. Those who pursue post-residency training via a dedicated post-doctoral research fellowship and successfully obtain institutional or individual career development grants from the NIH or other private sources are not eligible. And, unlike in other professional societies, at this time, no ASTRO funded grants are available for those beyond their first three years of faculty appointment.

Launching an academic career in Radiation Oncology as a physician scientist is perhaps more challenging today than ever before. The financial strains placed upon our departments and medical centers by changes in reimbursement and payer mix have diminished the internal funds available to help support the substantial start-up costs (approaching the amount of an R01/year for 3–5 years (5)) required to support these positions. In an era of dwindling federal research funding and increasing competition from alternative treatment modalities, our Society has taken on part of the responsibility of supporting promising junior faculty members who are pursuing novel, exciting, and potentially practice-defining research (discussed in (6)). For the past decade, the ASTRO JFA appears to have been successful in that mission.

Challenges do exist on the horizon. We currently face a pending bottleneck with 22% of residents matching into Radiation Oncology having obtained a Ph.D. (7), and 5–10% of residents participating in the Holman Pathway (personal communication May 2011, American Board of Radiology). Many of these individuals approach the field with the hope of becoming the prototypical physician scientist they see populating other cancer specialties: spending 80% of their time pursuing important, fundamental research questions, and 20% of their time providing outstanding clinical care (8, 9). To continue attracting the best and brightest, we must be able to provide convincing evidence that we are able and willing to support this type of career. The ASTRO JFA is an important mechanism to help support these individuals.

Compared to other medical specialties, incoming Radiation Oncology residents rank in the top five in average national board exam scores and are first in both average research publications and average research presentations (7). Those who have been involved in

resident education recognize that this continues a trend seen for the last 10–15 years. This means that some of the best and brightest medical school graduates are choosing careers in Radiation Oncology. The influx of highly talented, motivated, and exceptionally well-trained MDs and MD/PhDs into our field has us well positioned to address the challenges facing us as a specialty (10, 11). However, we must be able to provide opportunities to our most promising researchers. They must be given the protected time to pursue, develop, obtaining funding for, and publish their work, and to drive the innovation and discovery that will ultimately improve the care of cancer patients.

There are several limitations to our analysis. First, due to institutional variation in the indirect rates associated with NIH grants, we used direct funds to calculate the return on investment (had indirect funds been used, the NIH total would have been approximately 50% or higher, resulting in a greater total ROI). Finally, at least 3 individuals received over \$500,000 dollars in external funding from a non-NIH source; while not included in the calculation of the JFA to R-grant conversion success rate, inclusion of these grants would have pushed the rate of “independent funding” success to over 80%. To minimize bias in ascribing publications to the JFA, we included all publications arising after the grant date. This approach, while being inclusive, likely overestimates the true number of publications arising after the grant date as some articles were likely in the submission process at the time of award. In addition, data regarding unsuccessful applicants for a JFA or a comparison group of those who started their junior faculty careers over the same time period were not available to serve as control groups. It is possible that JFA recipients would have performed successfully regardless of ASTRO funding. These applicants are highly motivated physician scientists who would have likely found other sources of funding. JFA recipients heralded from only 13 institutions, and 8 of the recipients came from 2 academic institutions. However, none of these factors should decrease the positive impact of the ASTRO JFA as indicated by the comments shared by award recipients (Figure 3).

## CONCLUSION

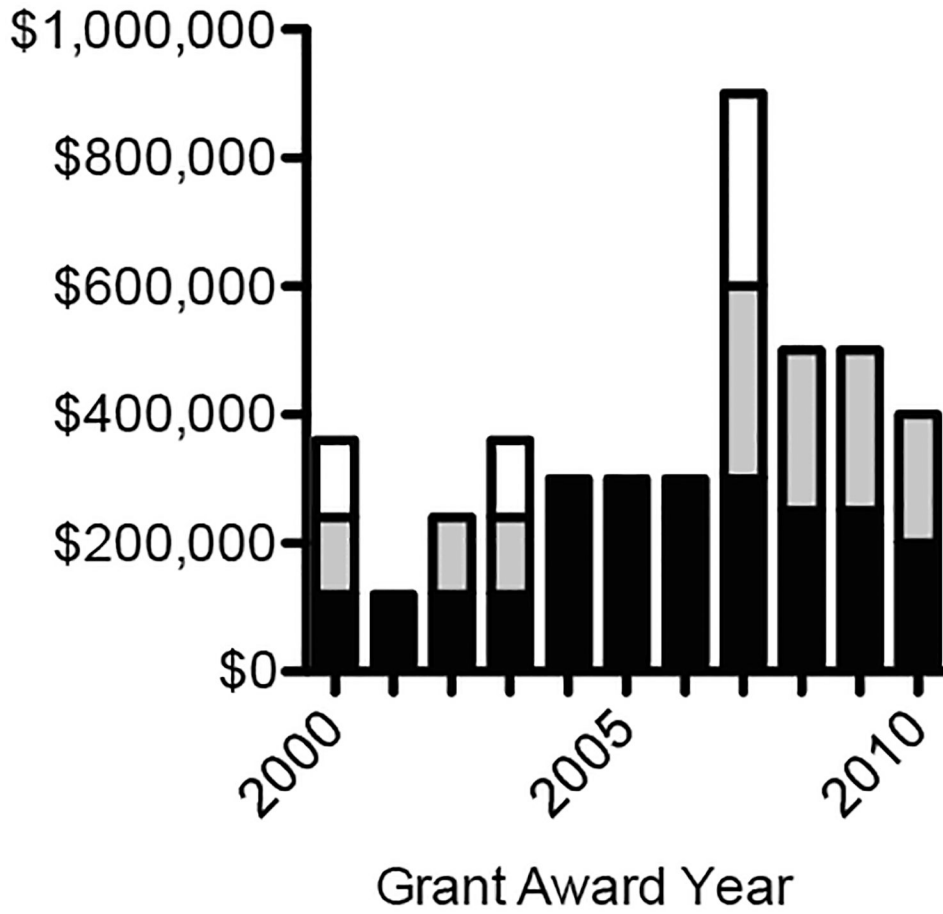
For over a decade, the ASTRO JFA has been awarded to some of the best and brightest junior faculty our field has to offer. Competition for these awards will continue to grow given the high quality residents now entering their initial junior faculty positions. In an era of dwindling federal research funding and increasing competition from alternative treatment modalities the ability of our society to support promising junior faculty members is critical. Based on a number of metrics this award has been a phenomenal success with subsequent total grant funding exceeding 5.9 times the initial investment. These awards provide a powerful opportunity for ASTRO to support the future leaders of our field by helping to propel their careers forward.

## ACKNOWLEDGEMENTS

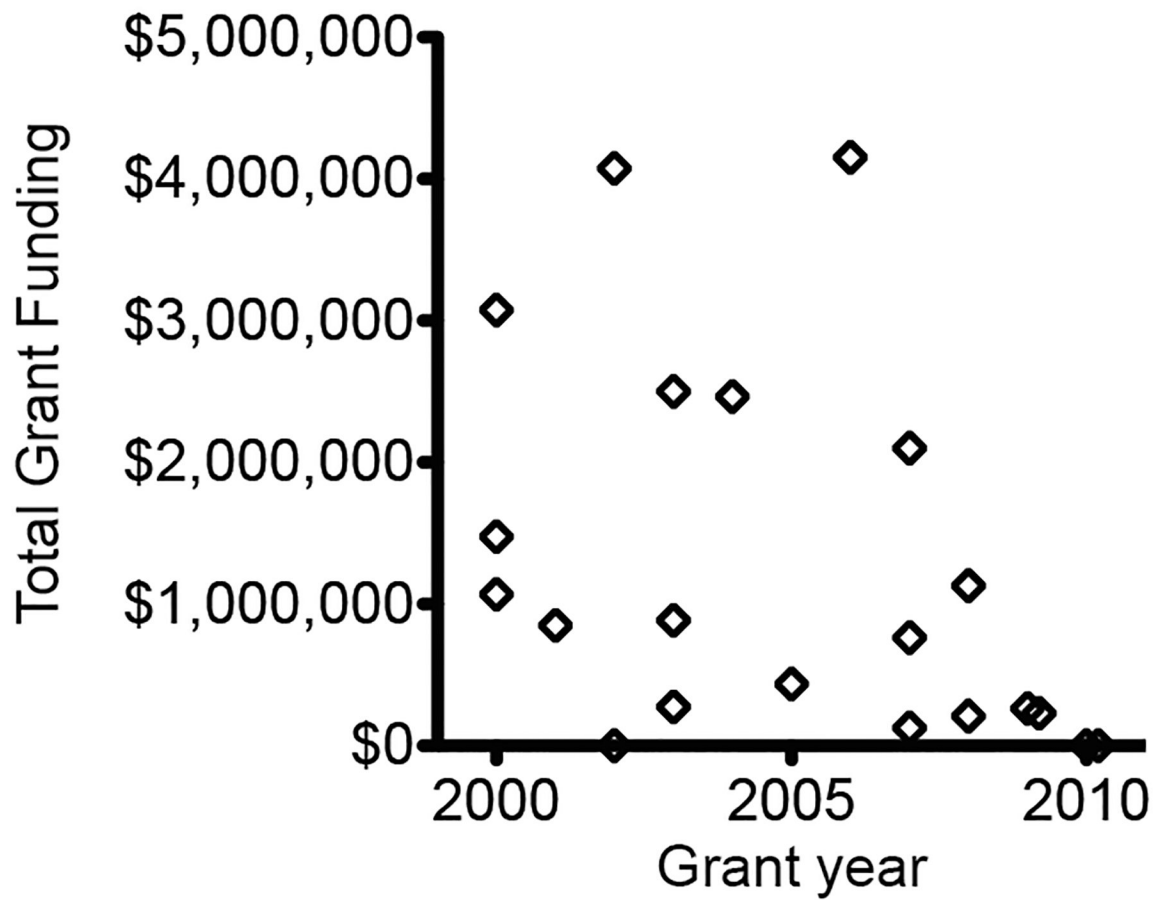
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**Figure 1.** Total ASTRO Junior Faculty Grant Award amount and the number of grants per year. The Y-axis shows the total amount in dollars awarded for each specific year. Each distinct color bar represents an individual grant award. For example, three grants that together totaled \$900,000 were awarded in 2007, while a single grant for \$300,000 was awarded in the years 2004–2006.



**Figure 2.** Subsequent grant funding for ASTRO JFA recipients (n=21). Total grants accumulated ((in dollars; direct costs only) Y-axis) by year that the ASTRO JFA was awarded (X-axis).



- “The ASTRO award was a huge boost to the research side of my career development. It provided support during a point of my career when funding was difficult to get from any external sources.”
- “The ASTRO grant was the first major grant that I received. It help me to launch my career in biomarker studies. It allowed me to hire a research assistant and pursue my own studies in order to publish and generate preliminary data for larger funding from the NIH and other foundations. It definitely has had a strong positive impact on advancing my academic career.”
- “Without this award, I would not have been able to pursue a career in laboratory-based radiation oncology research. It is this type of funding that is absolutely critical to foster the careers of young scientists, especially in a stringent and at times capricious federal funding climate. The funding provided by ASTRO enables the generation of preliminary data to fuel a productive independent scientific career. The award that I received was on a level that compared very favorably with other national cancer research foundations, and was adequate to supplement the initial two years of my faculty career. It is my fervent hope that this type of funding will continue, and perhaps expand. I feel that the fruits of these endeavors are certain to be reaped by both the practicing members of our profession, and by our patients who deserve the best cancer treatments possible.”
- “I could go on and on about how instrumental this award has been for my career and building my lab. Bottom-line, our specialty NEEDS this award to help foster ... radiation oncology physician-scientists, during the most difficult parts of our career. This is self-serving for me to say this, but if we are to survive as a specialty we need physician-scientists who can take radiotherapy to higher and higher levels so that we convincingly demonstrate this modality as a better option for the betterment of our patients. To come to this goal, we need to develop radiation oncology physician-scientists who are competitive with the other medical/surgical physician-scientists.”
- “It was very helpful to have that funding early in my career - it helped me get additional funding.”
- “The ASTRO Junior Faculty Award has been extremely helpful to my early career development. It has provided full funding for a technician, whose assistance has been critical to my research progress. By providing salary coverage for me, it has also helped to alleviate clinical pressures and ensure protected research time. It is a generous award, without which my first year out of residency would have been surely more challenging. It has been key to my development into an independent investigator.”
- “The ASTRO grant has allowed me to hire the personnel needed to conduct the proposed experiments, and two manuscripts are in preparation. I expect in the next year to make further headway in this proposal and to apply for additional funding through NIH R21 or K08 awards. It has been a tremendous honor to have received the ASTRO Junior Faculty Award. “
- “ASTRO Junior Faculty Award was a fine opportunity. It did provide me with the resources I needed to get several key studies/presentations/publications in (my field of research). Furthermore, securing the ASTRO funding was a great learning opportunity for me. It helped me on numerous other grant submissions and continues to help me to this day.”
- “I am extremely appreciative of ASTRO's funding. (It has led to) 8 published papers with several more in preparation. The data is so rich that several other team members will be writing papers from the dataset collected with the funding provided by ASTRO. ASTRO's funding resulted in preliminary data (used to support two subsequent) NIH grants, an R01 and a P01. It is possible that these grants would have been funded without ASTRO's involvement, although I believe it was due to the preliminary data generated through the ASTRO funding that helped secure this funding.”

**Figure 3.**  
Selected comments from prior JFA recipients.