

# Committee on Employment

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## The Evolution of the Astronomy Job Market

From 1982 to 1992, federal funding for astronomy research increased by more than 80%, fueled primarily by NASA funds related to the Hubble Space Telescope. Trailing this trend by several years, the annual production of new Ph.D. astronomers more than doubled. Meanwhile, the total number of jobs advertised in the AAS *Job Register* remained fairly constant. Responsible undergraduate programs began to lecture incoming astronomy majors about this imbalance in the job market, comparing the statistical odds of a long-term career in astronomy to the chances of becoming a professional athlete. The faculty in some graduate programs started to debate the idea of limiting the number of incoming students (“birth control”), and they made efforts to track and publicize the long-term career progress of their Ph.D. recipients.

It was in this atmosphere that Thronson (1991, PASP, 103, 90) devised a model to describe the surplus production of new astronomers. He observed that overproduction appears to be built into the system, making the mathematical formulation of the problem similar to that of industrial pollution – an unintended side effect of the process. We are now in a position to evaluate Thronson’s predictions. He made 20 year projections of several models for the production of astronomers over time. His definition of the “astronomer surplus” was the annual ratio of new astronomy Ph.D. recipients tabulated by the American Institute of Physics (AIP) relative to new tenure-track faculty positions advertised in the AAS *Job Register*, which he calculated to be around 2.5 in 1991.

Regardless of the absolute level of overproduction, Thronson’s most realistic models included the competing effects of increased research funding (which leads to growth in the surplus), and retirement (which briefly absorbs some of the surplus). These models predicted a gradual decline in the astronomer surplus over about 10 years, followed by continued overproduction: “*A momentary abundance of jobs will be subsequently compensated for by training of new graduate students by a new cohort of young professors*”. Indeed, the anticipated impact of increased research funding on Ph.D. production was recently quantified in Figure 2 of a poster I presented at the summer meeting in Honolulu. Furthermore, the slowly evolving ratio of faculty positions to new Ph.D. recipients in Figure 4 of that poster showed exactly the

predicted behavior – peaking in 2001, and gradually declining in more recent years (you can view the poster at [www.hao.ucar.edu/~travis/docs/AAS210poster.pdf](http://www.hao.ucar.edu/~travis/docs/AAS210poster.pdf)).

Despite the accuracy of Thronson’s predictions, a broader definition of sustainability may now be necessary, since the character of the astronomy job market appears to have shifted in the meantime. Astronomy research is increasingly moving towards automation and large collaborations where service positions are becoming more important. This cultural shift might be reflected in the surge of new research and support positions between 1997 and 2002, which may have absorbed some of the astronomer surplus generated during the more competitive conditions of the early 1990’s. More recently,

as the new cadre of young faculty have attempted to recruit a dwindling supply of graduate students, some may have turned to postdocs to maintain their research productivity. This could be responsible for the unprecedented expansion of postdoctoral jobs after 1999. But as startup funds are depleted and external research funding stays relatively constant, these

“holding pattern” positions could evaporate. The most recent data show the first signs of this possible slowdown.

The most important aspect of the ongoing cultural shift in the astronomy job market is the persistent gap between expectations and reality. When first year graduate students are surveyed by the AIP, fully 87% of those in astronomy departments say they would like to end up in an academic position, while only 8% express a desire to work in a national lab or research position. By contrast, the most recent data suggest that less than 50% will ultimately obtain academic positions – and probably fewer, since the turnover at universities appears to be episodic. Graduate programs in astronomy should prepare their students for this reality.

*The AAS Committee on Employment is organizing a special session at the winter meeting in Austin, “What Does It Take to Land a Job Anyway?”, currently scheduled for January 10. We would also like to invite members to submit abstracts for a related poster session about the astronomy job market and career issues, where the conversations can continue. Please check out our website ([www.aas.org/career/](http://www.aas.org/career/)) for additional resources and contact information for the committee members.*