Department of Astronomy
Plans and Proposal for Improving the Graduate Experience and Recruitment

Introduction

The Department of Astronomy has recently embarked on a number of programs to improve the experience of our graduate students with the goals of attracting, retaining, and training highly qualified young scientists to the PhD degree. Our efforts have concentrated on four areas: an overhaul of the coursework in the program to match current emphases within astronomy and astrophysics; increasing TA and RA stipends with Departmental and grant funds; improving the physical state of graduate student areas; and improving our recruiting to attract a somewhat larger number of highly qualified students. With the exception of further major global stipend increases, the Department plans to carry the bulk of the expenses for progress in the first three of these topics; here we request funding support focused on graduate recruiting.

The possibility of increased funding for departmental recruitment activities comes at a very opportune time for the Astronomy Department. Last year we were very successful in recruitment, attracting nine talented new students to the department (as compared to a typical 3-5 students per year). We are aiming for a class of 7-9 this year, and hope to sustain classes of this size without lowering our standards in subsequent years. Our applicant pool has always been large, so it is a matter of attracting the better students from the pool, rather than increasing the size of the pool itself. Our goals of increasing both quality and quantity of desirable acceptances put significant additional pressures on departmental resources. To attract more of the best students, we need higher stipends and a number of small supplementary fellowships (signing bonuses) to offset the high cost of living in the Washington D.C. area. We need to increase the personal contact with our top candidates by bringing more of them to visit the department in a large group with targeted recruitment functions. And finally, we need to modernize our computer resources so that they both attract the best students, and keep them happy and productive during their first few years in the Astronomy Department. Our plans in these three areas are described below.

Stipends and Signing Bonuses

A major hurdle we face in competing for the best students with peer institutions is in the financial bottom line. Though the amount of support we provide is reasonable, it does not always compare favorably to other institutions in the eyes of potential students. The department has recently taken its own initiative to improve this situation, increasing student stipends out of its own funds. This goes some ways towards addressing this issue, but further progress is necessary.

We plan to further enhance our ability to recruit students in this respect. Towards this end, we note that technical text books have become very expensive. We also wish to send the message that we take our students seriously as scholars and that we wish to help them explore the field early in their careers. Hence we propose to establish a book grant of $500 per student to be awarded to students during their first two years. For eight students per incoming class for each of the first two years when course work is intensive, this would require

$8,000. We see this as an excellent way of providing important materials while enhancing the effective bottom line for students who would otherwise have to purchase text or other technical books out of their after-tax income.

Additionally, we request support for two supplementary stipends of $2,000 each (a total of $4,000). These would be special fellowships offered in addition to nominal RA/TA support. The goal is to provide additional up-front incentives targeted at the very best potential students. Having this money under direct department means that we can instantly retarget the fellowship to another qualified candidate if the first student chooses another institution. Independently, the department also provides Wentzel Fellowships ($2,000/year) which can be used as further targeted incentives. This can be seen as Departmental matching to fellowships from other sources.

The department will make further contributions to improve the quality of life for our students from our own funds. For stipends, in addition to the Department's recent $1500 increase, we plan a modest raise of $250 per student. We are also gradually but noticeably upgrading furniture and the appearance of the graduate student areas.

Visits

One of the most important recruitment tools is direct personal contact. We propose to bring a group of potential students to visit the department at a critical juncture in the decision making process. We aim to bring the students to Maryland as a group to promote interaction between them as potential colleagues. This was extremely successful last year, and we plan to do it as often as funds permit. The visit would include group interactions at departmental functions and small (a few on one) meetings with individuals professors working in the areas of specific interest to individual students. Additionally, we plan to have the candidates attend a small research seminar in which a few selected current graduate students discuss their research. This approach puts a human face on the process, and gives the candidates a real flavor for the intellectual life of the department. Social opportunities also play an important role for many students in deciding where to pursue graduate work. We therefore plan to time the visit to include a weekend day, and provide guides from among the current graduate students so that the candidates can explore the Washington, DC metropolitan area, become familiar with the cultural advantages of College Park, and bond with one another and our current students. We ran a scaled down exploratory version of this last year, and it was very successful. We believe that a higher level of human contact will a powerful boost to our recruitment efforts.

We therefore request support to bring a dozen candidate students to visit the department. We plan to pay all expenses, travel and lodging for two to three days. At an average of $700 per student, this would amount to $8,400.

Computers

One of the largest problems facing the Astronomy Department is the rapid improvement in computer technology; this has a very strong effect on the admissions process as the best incoming graduate students are very computer savvy. Incoming students probably feel more confident about judging computing equipment than anything else in a brief first visit, so appearance as well as capability is important in recruiting. They realize that much of their 6 years of graduate school will be spent working with computers, and they strongly prefer to

be driving 2000 Porsches than 1990 Chevys. One of our most important recruitment tactics in recent years has been to point to the strength of our computer network and the machines within individual research groups. (In general, the Departmental philosophy on general computing is to invest in mid- to high-end machines in common rooms, rather than many simple machines on graduate student desks. This certainly promotes interaction between students, and we believe this is also cost effective.) Unfortunately, our historical general departmental computing strengths have weakened considerably over the past few years for two reasons:

1) Our current purchase rate of 1 new machine/year is not keeping up with improvements in computer technology.

2) Additional pressures on our network have been brought to bear by the increasing size of our incoming graduate class.

The results of the department's upgrade policy is that we currently have 14 machines (Sun workstations) in the common areas accessible to first and second year graduate students. Of these 3 are relatively modern (about 2 years old), 3 are usable (about 2-3 times slower) and the remaining 8 are horribly antiquated (5-15 times slower).

Prospective students hear about our computer resources from our faculty, and from current graduate students during recruitment visits. Our current students have become increasingly critical of the machines available to them and point to computer resources as one of their top priorities, second only to increased stipends.

The department makes a strong contribution to our computer network. We employ two full-time computer people, who are continually working to improve and upgrade our system, both software and hardware. In addition, the department covers costs to repair machines in the common areas, and funds the purchase of peripheral such as high quality color printers, and 1 modern workstation per year.

Buying at the cutting edge of technology is expensive. This year's model costs $10,000, while last year's costs only $4,000. Since the useful lifetime of a computer in our department is 4-5 years, it is most cost effective to buy last years model. We propose to use $12,000 in new funds to purchase three new $4,000 workstations per year. Added to the department's substantial contribution, this will enable us to replace all eight of our antiquated machines over the next two years and reduce the average age of our computers to a number that we can speak proudly of.

These additional computers will drastically improve the quality of departmental resources available to first and second year graduate student, and significantly enhance one of the main factors that prospective graduate students consider when they are evaluating different Astronomy Departments.

Measures of Success

Our goals are quite straightforward: to attract and retain more of the best students in our future applicant pools. To quantify this, our target is to:

- Increase our class size to 7-9 students per year without changing our admissions standards.
- Identify applicants and create an environment that will retain at least 80% of the students in the program through the PhD degree (MS degrees in Astronomy are of little practical use; this is not a target area). We can do little about students who decide for a change of field once they arrive, but improving the graduate student environment and providing increased support will help ease some of the losses we experience, particularly with nontraditional students.

Budget Summary

Item	Request	Departmental Contribution
Book Grant	\$8,000	
Supplemental Stipends	\$4,000	\$2,000 (Wentzel)
Recruiting visit	\$8,400	
Computing	\$12,000	\$4,000 + staff
Improving Offices		\$2,000
Stipend Increase		\$8,000 (\$250 TA increases) (+ RA increases)
Total	\$32,400	\$16,000 + staff + RA incr.

Summary

The Astronomy Department is committed to simultaneously increasing the size and the quality of our incoming graduate class. The initiatives described here complement ongoing departmental efforts and will greatly strengthen our ability to attract the best and the brightest students to the University of Maryland.