

# Expansion of the Undergraduate Astronomy Program

First Order Draft

## Introduction

We are working on a multi-pronged plan to enhance the level of enrollment, the *quality* of enrollment, and the graduation rate in the astronomy undergraduate program. This is only a first order draft and many of our ideas may evolve as we get feedback and suggestions. In a nutshell, the five steps of the program are

- (S1) *Teacher training and integration of astronomy in the high school physics curriculum*
- (S2) *Follow-up EPO and recruitment activities targeting good high school students*
- (S3) *UT astronomy summer symposium for the top high school students*
- (S4) *Establishment of astronomy scholarships for first year undergraduates*
- (S5) *Promote retention and progress of enrolled astronomy majors*

Details of each step follow below in the next section.

## Details of Plan

- (S1) *Teacher training and integration of astronomy in the high school physics curriculum*

Experience suggests that 1 hour visits/talks to high schools do not help much in recruitment unless there is already an awareness of what astronomy is about. This awareness also helps to get the *right* students enrolled, namely those with relevant quantitative skills (e.g., math, calculus, physics). Therefore, the first step is the integration of astronomy, *an application of physics*, into the science curriculum of the top high schools in Texas. We will work toward this via

- (a) The development of astronomy activities that high schools teacher can use in their science physics and chemistry classes. It should be noted that many of the astronomy activities needed for our effort are *already being developed or have already been set up*, by the Mc Donald Observatory Outreach division, as part of the EPO programs of individual astronomy faculty members. We now need to synergize a set of activities that is representative of the research expertise at the UT astronomy department, namely the Galaxy Evolution, Interstellar Medium, Planetary systems, Stars, and Theory.

An example of one faculty's EPO website that focuses on some galaxy activities is shown at <http://www.as.utexas.edu/~sj/epo1/epo.html>.

This website could be easily used as a template for a *wider department-based effort* by enlarging the set of activities shown to encompass those by other faculty members on Galaxies Interstellar Medium, Planetary systems, Stars, and Theory.

- (b) Targeted incentive-based training workshops for these teachers. Teacher from the best high schools have numerous options for training workshops and we are evaluating the best strategies to attract them to the astronomy workshops. To this intent, we plan to send out a survey to high schools with previous connections to Mc Donald and to AP Physics teachers.

**(S2)** *Follow-up EPO and recruitment activities targeting good high school students*

- a) We plan follow-up video conferences (and 1-2 talks/semester) where astronomy faculty members and their undergraduate students call into high school classrooms where the teachers have carried out astronomy activities. The video-conference would give UT faculty the opportunity to answer questions from high school students, and to tell them about the UT astronomy program, scholarships, fellowships, and career options in astronomy.
- b) We will establish a website entitled "What are astronomy undergraduates doing at UT?", with written and video interviews of current astronomy undergraduates, so that they directly share their experience with their high school peers. This type of communication between same age groups is often very effective. A draft website is at <http://www.as.utexas.edu/~sj/epo1/epo.html>

**(S3)** *UT astronomy summer symposium for the top high school students*

We envision a one-week UT summer symposium that would target senior high school students who are planning to apply to college in the following year. Top high school students with an interest in astronomy and physics would be encouraged to apply, with supporting letters attesting to their excellent academic record from their teachers or high school principal. The 20 best applicants would be selected. Financial help can be provided based on need. The summer symposium would introduce the students to UT campus life, the UT astronomy program, the Astronomy Student Association (ASA), and give them the chance to work with a hands-on astronomy project.

**(S4)** *Establishment of astronomy scholarships for first year undergraduates*

The UT astronomy department plans to set up two first-year scholarships in order to attract good high school students into the astronomy program. The scholarship would award \$1000 to the astronomy student in the first year, and would continue until the 4th year, as long as he/she is enrolled in the astronomy program and maintains a high academic standard.

**(S5)** *Promote retention and progress of enrolled astronomy majors*

- a) Research involvement: We will encourage enrolled astronomy majors to better fulfill their academic and research potential. To this effect, we are encouraging our astronomy majors to get involved in astronomy research already in the first or second year. We plan to establish three new research prizes of \$500 each, which will be awarded to the three students who carry out the three best research projects in each academic year.
- b) Mentoring program: We will expand the mentoring program between graduates and undergraduates. Talk to Marty Bitner and Stephanie Crouch.
- c) Summer internships at firms like IBM?
- d) An increased range of courses.

## **Contacts and Acknowledgments**

The current plan to enhance and expand the astronomy undergraduate program stems from the efforts, time and suggestions of many people, including Prof. Shardha Jogee (undergraduate astronomy advisor), Prof. Don Winget (astronomy department chair), Stephanie Crouch (student coordinator), Sandi Preston (Assistant Director of EPO at Mc Donald Observatory), Prof. Greg

Shields (undergraduate astronomy honors advisor), educators Dr Mary Kay Hemenway and Brad Armosky, and high school (LBJ) teacher Chris Cotter. In the future, other members of the astronomy department are expected and welcome to join, particularly, in the UT astronomy summer symposium for the top high school students.

If you have any comments and suggestions, please email Professor Shardha Jogee (undergraduate astronomy advisor) at [j@astro.as.utexas.edu](mailto:j@astro.as.utexas.edu).