

# Astronomy Education Review

Volume 1, Oct 2001 - Jan 2002

Issue 1

## A Graduate Seminar on Astronomical Citizenship at Indiana University

by **Catherine A. Pilachowski**

Indiana University Bloomington

**Richard H. Durisen**

Indiana University Bloomington

Posted: 08/22/02

The Astronomy Education Review, Issue 1, Volume 1:88-91, 2002

© 2002, Catherine Pilachowski. Copyright assigned to the Association of Universities for Research in Astronomy, Inc.

### Abstract

A series of graduate seminars on the activities of professional astronomers in the astronomical community was held at Indiana University during the spring 2002 semester. The seminars covered such topics as the role of professional societies, scholarly publishing, teaching, public outreach, the NSF and NASA, and the federal research budget. The goal of the series was first to inform our students about the many aspects of being a professional astronomer that are not covered in their normal coursework, and second, to foster in our students an appreciation of the value of service to the community.

## 1. INTRODUCTION

During the spring 2002 semester, graduate students and faculty in the Astronomy Department at Indiana University participated in a graduate seminar on astronomical citizenship. The goals of the seminar were twofold. Graduate studies usually focus on the content of astronomy and on research, but young professionals also need to learn much about the culture of the astronomical community and the activities of professional astronomers that extend beyond research. This knowledge is usually transferred informally and acquired by experience over many years, often with substantial gaps in students' knowledge. We wanted to help our students learn more about aspects of being an astronomer that will help them succeed in their careers. At the same time, the alumni of Indiana University's graduate program in astronomy have accumulated a strong record of service to the astronomical community. We wanted to foster in our current students a sense of responsibility for service to the community and an appreciation of the value of that service.

## 2. COURSE ORGANIZATION

The Astronomy Department usually offers a graduate seminar in the spring semester on some topic of astronomy research of mutual interest to the professor and students taking the course. Students and faculty in the department prepare and present weekly seminars on aspects of the selected topic. Pre-doctoral students, typically in their first, second, or third year of graduate studies, enroll for the seminar, which is also attended by the more advanced students and some faculty. For the spring 2002 semester, we decided to experiment with a seminar not on research, but on aspects of professional life.

At the beginning of the semester, a list of possible seminar topics was presented to the students. This list is included below. Students were encouraged to select for presentation particular topics that interested them. The course instructors also selected topics for presentation, and additional outside experts in several areas were invited to visit our campus to present both departmental colloquia and citizenship seminars. We wanted to show the students the variety of opportunities for service that are available to professional astronomers, and also to show that service is an important component in the careers of successful and active research scientists. We found that our invited speakers were pleased to be asked to address the students on topics related to astronomical citizenship and led us in some very interesting and worthwhile discussions of aspects of professional careers.

**Table 1.** Suggested topics for seminars on astronomical citizenship

- National Science Foundation
- NASA
- National Observatories/Telescope Resources -- NOAO, NRAO, NAIC, IRTF
- National Observatories/Management: AURA/AUI
- Writing Letters of Recommendation/Nomination
- Grant Proposals/Writing and Reviewing
- Professional Societies (AAS, ASP, AAAS, IAU)
- Decadal Surveys/National Academy of Sciences
- Scholarly Publishing/Reviewing Papers
- Telescope Projects (NGST, CELT, etc.)
- NASA Great Observatory Centers -- organization, functions, getting time
- Post-doctoral Fellowships
- Educational Outreach
- Teaching Astronomy 101
- Public Policy/Federal Science Funding
- Survey Projects (SDSS, MACHO, 2MASS...)
- National Virtual Observatory
- Astronomy and Media Relations
- Jobs in Industry
- Jobs in Government

### 3. THE SEMINAR SCHEDULE

The final schedule of selected seminar topics included a wide range of subject matter, including public outreach, scholarly publishing, panel reviews, the federal budget process, and careers in science. Students were also provided with a copy of *Astronomy and Astrophysics in the New Millennium*, the current decadal survey in astronomy.

Seminars by visiting astronomers included presentations by

- Dr. Eileen Friel of the National Science Foundation, on the topic of NSF support of astronomy and opportunities for students;
- Dr. Brian Pickett of Purdue University Calumet, on public outreach and his experience with the ASP's Project Astro;
- Dr. Steven Shore of Indiana University South Bend, on scholarly publishing and the refereeing process for the astronomical literature;
- Dr. Kevin Marvel of the American Astronomical Society, on federal science funding and the federal budget cycle; and
- Dr. Guenter Riegler of NASA, on the role of astronomers in government.

Students presented seminars on a variety of topics as well. Students from China and Greece described the astronomical communities of their respective countries. Other students presented seminars on astronomy and the media, astronomers in industry, and women in astronomy. Two seminar periods were devoted to overviews of large telescope projects underway around the world and to major astronomical survey projects, both presented by students. The Web provides good access to information on which the students could draw. Faculty presented seminars on the American Astronomical Society and on the teaching of Astronomy 101, including a discussion of the goals for astronomy education developed through the Astronomy Education Board of the AAS, and examples of classroom activities.

The course culminated in a "review panel" run by the students to evaluate research proposals written by students enrolled in a concurrent graduate course on stellar interiors. A senior graduate student served as chair of the panel, which awarded grade points to the most successful proposals. A faculty member served as "proctor" for the review process, which also included lead reviewers and written comments for the proposers.

The seminar schedule and links to several of the presentations, including the "proposal review package" used for the seminar, are available at <http://www.astro.indiana.edu/citizenship.html>. The final program represents the mix of interests of faculty, students, and visitors participating in the seminar.

### 4. EVALUATION

The seminar was successful in stimulating good discussion among students and faculty, both during class and outside class, and appears to have raised the level of understanding among students about the broader roles they will have as professionals within the astronomical community. Our seminars were lively, with many students participating to relate their own relevant experiences as young professionals and teachers. Discussions of the lower retention of women in science at all career levels, for example, got students to think about the different experiences of female and male students. A discussion of the refereeing process led to an animated discussion of the roles and responsibilities of authors, co-authors, referees, and editors.

An interactive exercise about teaching introductory astronomy led to discussion of the goals of introductory classes; the list of goals generated by graduate students and faculty in the seminar has considerable overlap with the goals suggested by the Astronomy Education Board of the American Astronomical Society (<http://www.aas.org/education/>). As a result of these seminars, students are more aware of the diverse responsibilities and opportunities that await them as professionals.

Our second goal, to instill a sense of responsibility to contribute to the professional community, was addressed by asking many of our outside speakers also to present departmental colloquia on their scientific research. We attempted to demonstrate by example that successful scientists do serve the community actively, and that service is not inconsistent with a successful research career. Whether we have achieved our second course goal will be known only as our students move forward in their own careers. We are sufficiently optimistic, however, that we expect to present a similar seminar series regularly to introduce future cohorts of students to the concepts of astronomical citizenship.

## **Acknowledgments**

We wish to express our gratitude to our colleagues who visited Indiana University to participate in our graduate seminar on astronomical citizenship. Our invited speakers enlivened and enriched our understanding of public service in astronomy. We also thank an anonymous referee for helping us to clarify several important points about the seminar series.

## **Resources**

Seminar schedule and links to several presentations: <http://www.astro.indiana.edu/~u/citizenship.html>

The Astronomy Education Board of the American Astronomical Society: <http://www.aas.org/education/>

Indiana University Astronomy Department: <http://www.astro.indiana.edu>

Astronomy and Astrophysics in the New Millennium: <http://www.nap.edu/books/0309070317/html/>

ÆR

88 - 91