

**ANNUAL REPORT**  
**2006 - 2007**  
Department of Astronomy

**I. INTRODUCTION**

The past year was another remarkable one for Astronomy at Cornell. The Mars Exploration Rovers as well as the Spitzer and Cassini spacecraft continued to produce amazing results. The Mars Reconnaissance Orbiter (MRO) began the most detailed yet investigation of the Red Planet from orbit. Significant progress was achieved in the Atacama Telescope Project – the Department's number one priority for the next decade. Cornell radio and radar astronomers continued to exploit the ever-expanding capabilities of the Arecibo Observatory. Several new courses were introduced during the past year and significant improvements in the equipment used to teach our senior-level Laboratory course were realized.

The Department congratulates Professor Emeritus **Martin Harwit**, the 2007 winner of the Bruce Gold Medal of the Astronomical Society of the Pacific. Among many other contributions to astronomy, Professor Harwit was recognized for his pioneering efforts in developing infrared astronomy from space.

A very successful symposium on Gravitational Astronomy and Physics was held on June 2, 2007 to honor Professor **Saul Teukolsky** on the occasion of his 60<sup>th</sup> birthday. Professor **Jim Bell** published a beautiful book describing the recent exploration of Mars (Postcards From Mars). This is a great companion volume to "Roving Mars" published by Professor **Steve Squyres** last year.

Assistant Professors **James Lloyd** and **Jean-Luc Margot** were reappointed for additional three year terms which are expected to culminate in tenure reviews. The Chair of the Department, Professor **Joseph Veverka** was appointed the James A. Weeks Professor of Physical Sciences.

During the past year **958** students participated in courses offered by the Department, **5** undergraduates completed their Astronomy Major and **7** graduate students finished their Ph.D. programs. The Department continues to emphasize the participation of undergraduates in its diverse research programs. Approximately **50** undergraduates were involved, including those who took part in summer programs supported by the National Science Foundation's REU (Research Experience for Undergraduates) program, by the New York State Space Grant Consortium, and by NASA space projects such as Spitzer, Cassini, and MER (Mars Exploration Rovers).

The **Cranson W. and Edna B. Shelley Award for Undergraduate Research in Astronomy** was awarded to **Derek Schaeffer**. The graduate award of the same name was won by **Brian Kent**. **Sabrina Stierwalt** was awarded the **Eleanor Norton York Prize in Astronomy**.

With generous help from the Friends of Astronomy, the Department continued to improve its facilities for undergraduate teaching. A gift from the **Josephine Lawrence Hopkins Foundation** is making it possible to upgrade the data gathering and data reduction hardware used for the Radio Astronomy portion of Astronomy 410 – our laboratory course for seniors in experimental (i.e. observational) astronomy. A gift from Mr. **Edwin Hewitt** supported a field trip to study Mars analogs in Arizona as part of Astronomy 577 (Planetary Surface Processes) taught by Professor **Jim Bell**. Judging from student evaluations the field trip was a resounding success. Later this year the Department is hoping to announce an endowment which will support the presentation of an annual award to the best Teaching Assistant in the Department. Clearly the Friends of Astronomy continue to play a major role in helping us improve the education of our undergraduate and graduate students.

Major progress was made during 2006-2007 on the Atacama Telescope Project, also known as CCAT (Cornell/Caltech Atacama Telescope). The plan calls for building a 25-meter remotely controlled submillimeter telescope at a high altitude site in the Atacama Desert of Chile. A "memorandum of understanding" or MOU has been signed by five major groups to cooperate on this project. In addition to Cornell and Caltech these include the University of Colorado, the Universities of British Columbia and Waterloo representing a consortium of Canadian astronomers and, the United Kingdom Astronomy Technology Centre (Edinburgh) on behalf of astronomers in the United Kingdom. The first meeting of the Oversight Board will take place at the University of Waterloo on July 18-19, 2007. Professor **Joseph Veverka** and Vice Provost for Research, Professor **Joseph Burns** will represent Cornell. The overall project is under the direction of Professor **Riccardo Giovanelli** with assistance from Mr. **Tom Sebring** as Project Manager. The Department's participation in the Project has been made possible by support from the College of Arts and Sciences, the Cornell central administration, and by gifts from Mr. **Fred Young**, a member of our Friends of Astronomy and an enthusiastic supporter of astronomy.

During the past year some of the critical space shortage facing the Department was alleviated by major renovations in the basement and ground floor of the Space Sciences Building. When completed in July 2007 these renovations will provide much needed office space for our growing population of graduate students. Since many of these students serve as Teaching Assistants it is essential that they be provided with office space to be able to advise undergraduates during office hours.

During the 2006-07 there were approximately **99** individuals associated with the Department (not counting NAIC staff at the Arecibo Observatory in Puerto Rico). They included **29** faculty, **39** research associates, and **31** graduate students. Significant research achievements during the past year are described in the reports of individual faculty members in the main body of this report.

The Department's research was supported by **165** grants and contracts and sub-contracts totaling **\$19.0M**. An additional **\$12.8M** supported operations of the Arecibo Observatory. Most research funds for the Department come from NASA, with a significant contribution from NSF. Operations at Arecibo are supported by NSF.

Members of the Department, their students and associates published some **350** papers during the past year, in addition to presenting numerous colloquia and public lectures.

The Department's Colloquium Series, organized by Professors **Rachel Bean** and **James Lloyd** consisted of **31** colloquia including three "named" colloquium endowed by our Friends of Astronomy. These were:

**The Charles & Barbara Burger Special Colloquium** given by **Steve Beckwith** from Space Telescope Science Institute: "The First Galaxies".

**The Josephine Lawrence Hopkins Foundation Colloquium** was given by **Yanqin Wu** from the University of Toronto: "Small Moons Around Pluto-Charon and The Primordial Kuiper Belt".

**The Maryanne Shelley Jessup MacConochie Colloquium** was given by **Guy Consolmagno** from Fordham University: "A Faster, Cheaper, Better Way of Classifying Meteorites – and Asteroids".

**The Salpeter Lecturer** for 2006-2007 was **Jonathan Lunine** of the University of Arizona. He presented two lectures: "The Past, Present and Future of Methane of Titan" and "Origin of Earth's Water From New Dynamical Simulations".

On June 30, 2007 Professor **Joseph Veverka** will be stepping down as Chair of the Astronomy Department after an eight year tenure. The new Chair of the Astronomy Department will be Professor **Ira Wasserman**.

## II. DEPARTMENTAL NEEDS

The Department's most pressing short-term needs are:

- 1) An urgent need exists to increase the number of Teaching Assistants allocated to Astronomy. We continue to limit enrollment and turn away eager students in some of our most popular courses due to insufficient TA support.
- 2) The Department needs a yearly allocation of \$10K to \$20K to keep teaching and laboratory facilities up to date.
- 3) Detailed plans need to be developed for phasing-out and replacing the Fuyates Observatory. The cost of a comprehensive study is estimated at \$50K.

The Department's most pressing long-term need is adequate physical space. The need to provide the Department with additional space was one of the key items emphasized by the Report of the 2004 Visiting Committee. While Physics and Chemistry will benefit from the new building being constructed next to Clark Hall, no help for Astronomy is in sight. Based on the history of the Department it can be anticipated that the activities of the Department will continue to grow and expand into new areas. More space to house these activities will be needed in the coming decade.