

**Rutgers, The State University of New Jersey Department of Physics and Astronomy**  
*136 Frelinghuysen Road, Piscataway, New Jersey 08854*

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This report is for September 2003 to August 2004.

## 1. PERSONNEL

The members of the astrophysics group were:

Faculty: P. Côté, L. Ferrarese, J. P. Hughes, A. Kossowsky, T. A. Matilsky, C. Pryor, J. A. Sellwood, T. B. Williams, and H. S. Zepf. D. Merritt left for a position at the Rochester Institute of Technology. C. Keeton arrived to take up a faculty position from September 2004.

Research faculty: C. L. Joseph.

Research associate and adjunct lecturer: S. Piatek.

Postdoctoral fellows: Eric Barnes, Sandor Molnar, Eric Peng, and Dalia Chakrabarty. Parviz Ghavamian left for a position at The Johns Hopkins University.

Current graduate students: Arthur Congdon, Matthew Francis, Monica Hasegan, Jens Hube, Vincent Jacobs, Miguel Preto, Naseem Rangwala, Ricardo Sanchez, Neelima Sehgal, Juntai Shen, Bonita De Swardt, Jianxiang Wang, and Jessica Warren. Bingrong Xie graduated and moved to Harvard, Arend Sluis graduated moved to a postdoctoral position at UMass, Andrés Jordán graduated and became an ESO Fellow.

## 2. FACILITIES

Rutgers University is a 10% partner in the SALT (Southern African Large Telescope) consortium, a group of countries and universities which have built an 11-meter optical telescope with a design resembling the Hobby-Eberly Telescope at McDonald Observatory. Operations will begin in early 2005. Astronomers at Rutgers are helping to build the prime focus imaging spectrograph.

Hughes is a member of the Astro-E2 International Science Working Group and the Constellation-X Facility Science Team. Joseph is involved in the development of optical and ultraviolet astronomical detectors mostly for use in space. Williams is assembling a new Imaging Fabry-Perot Spectrophotometer for use on the telescopes at CTIO, which will be made available to the entire US astronomical community through an agreement between Rutgers and CTIO. Both the Department and the University have made strong commitments to high-performance computing and Sellwood maintains his own Beowulf cluster of high-performance PCs.

A computer controlled 20-inch optical telescope on the roof of the Physics and Astronomy building is used for undergraduate and graduate training. It is equipped with a CCD camera and fiber-fed CCD spectrograph. A small radio telescope is also used for teaching purposes.

## 3. RESEARCH PROGRAMS

Research currently underway at Rutgers encompasses both observational and theoretical programs over a broad range of astronomy: galactic dynamics, galaxy formation and dark matter, galaxy clusters, the extragalactic distance scale, supermassive black holes, dwarf galaxies, globular clusters, CMB and early universe theory, supernovae, the interstellar medium, high velocity clouds, chemical and stellar evolution of galaxies, gravitation, and gravitational lensing. Major areas of expertise include ultraviolet and optical instrumentation, X-ray astronomy, and  $N$ -body simulations.

Observational work is both ground-based, at SALT and the National Observatories, and space-based, using mainly the Hubble Space Telescope and X-ray satellites.

A continuously-updated list of preprints by members of the group is maintained at the group website.

## 4. GRADUATE PROGRAM

The Graduate Program has separate Physics and Astronomy options with differing course and examination requirements. The graduate curriculum in astronomy offers an introductory course plus separate advanced courses covering the major areas of astronomy. See our Department web site for further information: <http://www.physics.rutgers.edu/>

Students taking the astronomy option are expected to do research with one of the above-listed faculty members, but research opportunities relating to the interests of other members of the Department, e.g. the early universe, also exist within the physics option.

## 5. UNDERGRADUATE PROGRAM

The Department now offers two undergraduate majors. The BS in Astrophysics is suitable preparation for graduate study in astronomy; it has a strong physics and math content, but includes several courses in astronomy, observing lab courses, and an (optional) senior-year research project. The Physics Major has a number of separate options.

## 6. FURTHER INFORMATION

Further details relating to academics and facilities, and full descriptions of specific research activities at Rutgers can be found on the group's web page: <http://www.physics.rutgers.edu/ast/group-ast.html>

J. A. Sellwood