☆ STAR DUST

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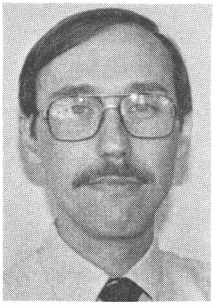
PERRY, TURNROSE TO DESCRIBE ST, IUE, SOFTWARE

DR. PERRY



DR. TURNROSE

Drs. Peter M. Perry and Barry E. Turnrose, Astronomy Department of Computer Sciences Corporation, will discuss CSC's work with the Space Telescope (ST) and the international Ultraviolet Explorer (IUE).

The ST, to be Shuttle-launched in 1985, will be controlled from the ST Science Institute in Baltimore. Data generated by the five initial instruments and fine-guidance systems will be reduced at the Institute by a sophisticated Science Data Analysis Software system (SDAS). The Institute and the SDAS will be discussed.

The IUE has provided an extremely important tool for hundreds of investigators. The operation will be discussed and one application, UV emission-line mapping of the Orion Nebula will be described.

Dr. Perry received his B.S. in physics from the City University of New York in 1964, his M.S. in physics from Adelphi University in 1970, and his Ph.D. in astrophysics from the University of Pennsylvania in 1974. At CSC he was first involved in design and development of the image processing system for the IUE, and is now Manager of the Astronomy Department. He is Principal Investigator on an IUE research project. He is a member of the American Astronomical Society, the Astronomical Society of the Pacific, and Sigma Xi.

Dr. Turnrose received his B.A. in physics from Wesleyan University in 1969 and his Ph.D. in astronomy from California Institute of Technology in 1976. At Johnson Space Center he did absolute spectrophotometry in galaxy stellar population synthesis and multicolor electrographic surface photometry of galaxies. At CSC he was first Resident Astronomer for IUE image processing and is now Manager of the Space Observatory Systems Section. He is a member of the American Astronomical Society and Sigma Xi.

JUNE CALENDAR -- *The public is welcome.*

Tuesday, June 1, 8, 15, 22, 29, 7:30 PM -- Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Friday, June 4, 11, 18, 25, 7:30 PM -- Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.

Friday, June 4, 11, 18, 25, 9:00 PM -- NCA 14-inch telescope open nights with Jim Trexler, 5600 Ottawa Street, Oxon Hill, MD. Call Jim at 839-3490.

Saturday, June 5, 6:15 PM -- Dinner with the speakers at the Thai Room II, 527 13th Street, NW. Reservations unnecessary.

Saturday, June 5, 8:15 PM -- NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Drs. Perry and Turnrose speak.

Saturday, June 26, 9:00 PM -- *Exploring the Sky*, presented jointly by NCA and National Park Service. Glover Road south of Military Road, NW, near Rock Creek Nature Center. Planetarium if cloudy. Bob McCracken, 229-8321.

MAY LECTURE

The May meeting of National Capital Astronomers was addressed by Dr. Kenneth Seidelmann, Director of the Nautical Almanac Office of the U.S. Naval Observatory. He discussed more than a decade of observations of Saturn's satellites and rings. Thus not only the spectacular results of recent Voyager encounters were discussed, but also ground-based observations including a series made at the Flagstaff station of the Naval Observatory. These latter, although much less publicized, were quite as important as the Voyager data. Seidelmann also discussed the computational and theoretical results at length.

The complexities of both satellite orbits and of rings were largely unexpected. Uncertainties and disagreements remain in theory, regarding both explanations and predictions. The Naval Observatory has made fruitful use of classical numerical prediction using extensive integrations of orbits. These have revealed much about the behavior of the unexpected co-orbital pairs of satellites.

The Flagstaff work used the 61-inch astrometric reflector with a 500 x 500-element charge-coupled device. This array will be replaced this year with one of 800 x 800 elements. Faint detail and satellites are favored by masks in the focal plane which cover the planet's disk, the unwanted bright parts of the rings, and even the brighter satellites, whose locations have been predicted. Computer processing of the images has been done (at Goddard) as a further aid in the interpretation of the data.

The E ring is confirmed, and found to extend out to Rhea. Its maximum optical density (curve fitting is used here) is near Enceladus. There appears to be only a little bunching around the leading and trailing Lagrangian points of satellites' orbits.

Times when Saturn's rings are viewed edge-on and are dim or invisible favor observations of the satellites. However, the Naval Observatory and others have by no means confined their work to these brief periods. A pair of satellites just beyond the A ring are observable from Earth only when the rings are edge-on. These and a few others occur in pairs occupying nearly identical orbits which they seem to exchange upon each encounter. The satellite occupying the slightly smaller, faster orbit, upon overtaking the outer, slower one, is accelerated by their mutual gravitation. The additional energy thus acquired seems to propel the inner satellite into the outer orbit, while the concomitant retardation of the outer satellite drops it into the lower orbit. Thus, actual passage never occurs; the satellites continue in the exchanged orbits. Relative to either satellite, the apparent path of the other is horseshoe-shaped.

Existing detailed theory of such encounters is uncertain and inadequate. Some workers say such satellite pairs would collide in time — or are very new. However, extensive numerical integrations of the orbits show that they are dominated by mutual interactions when the satellites meet; there is no apparent tendence to collide. They are independent of each other at all other times. Although each encounter is different in detail and location, the overall orbits remain unchanged except as to which satellite occupies each.

The dynamics of the rings and of the satellites are being studied both by extended, detailed integrations and by searches for broad dynamical laws, especially of stability. Observational tests are few; there are only scattered observations of the less bright satellites and very few sequences over long periods. Many observations do not fit any present models. All of the Voyager observations occurred during the brief interval of proximity to the system.

Paradoxically, at some points there are too many data! it has not been practicable to reduce all of the CCD data.

Dr. Seidelmann concluded with the statement that the Saturn system is a superb laboratory of celestial mechanics. jbl

NCA ELECTS OFFICERS

President:	Robert H. McCracken	Trustee: Daniel G. Lewis (4-year term)
Vice President:	Joan Bixby Dunham	
Secretary:	Stanley G. Cawelti	Trustee: Wolfgang A. Schubert (Three remaining years of McCracken's unexpired term)
Treasurer:	Ruth S. Freitag	
Sergeant at arms:	Geoffrey Chester	

NCA WELCOMES NEW MEMBERS

Michael Cody and Family
PO Box 32065
Washington, DC 20007

Eric J. Finkelstein
1741 Kilburne Place, NW
Washington, DC 20010

Lt. Brian A. Diantonio, USN
3030 Southern Elm Court
Fairfax, VA 22031

NCA-14 RELOCATED ON PROJECT; STILL AVAILABLE ON OPEN NIGHTS

Custody of the NCA C-14 telescope has been transferred from Bob Bolster to James Trexler at Forest Heights, MD, where it will continue to be available for members' use on open nights listed in the calendar. Call Jim at 839-3490.

During the next several months the telescope will be used on a program to record precisely the time and position of lunar transits by artificial satellites. The required short exposures will be made by concurrent photon amplification. These observations will be made within about 500 miles of Washington, and only during periods near full moon; they will not interfere with the usual open night use by members.

Data from the program is expected to be of general interest as well as having specific government interest.

The C-14 is proving to be a versatile instrument, having a fairly large aperture relative to its transportability. Bob McCracken's C-14 has been used on expeditions as far as Canada, and for a few recent weeks was used by Goddard Space Flight Center for collimation of the Zeiss 1-meter telescope to be flown on the Aries project on 18 June.

ASTRONOMY DAY OPEN HOUSE ATTRACTS 4,600 VISITORS

The 1 May Astronomy Day open house at the U.S. Naval Observatory entertained 4,600 guests between 10:00 AM and 4:00 PM on a warm, partly cloudy Saturday. The Observatory displayed the 26-inch Clark, the 6-inch transit circle, the 24-inch reflector, and sunspots with the 12-inch refractor.

NCA displays included a demonstration of mirror making, a videotape of actual lunar occultations made on NCA expeditions, the hydrogen-alpha Sun with a narrowband filter on the 5-inch Clark refractor, and white-light sunspots with the 14-inch telescope.

We thank Jerry Schnall, Charles Reddan, Drs. David and Joan Dunham, Nancy and Paul Hueper, Frank Baffa, Bob Bolster, and Geoffrey Chester for our success. Bob McCracken coordinated NCA's participation.

We thank Dr. Michael A'Hearn and the University of Maryland for the use of their H-alpha solar filter.

Very importantly, we thank the staff of the U.S. Naval Observatory — all of them — not only for their friendly help and characteristic cooperation, but also for the privilege of being invited to participate.

EXCERPTS FROM THE IAU CIRCULARS

1. December -- Jewitt, Danielson, and Terrile, California Institute of Technology, made an unsuccessful search for Comet Halley using a charge-coupled-device camera on the 5.1-m telescope.

2. April 18 — Froeschle and Mangin, CERGA's Calern station, observed a 5.5-s occultation of AGK +17 1309 by (146) Lucina with a photometer on the 1.5-m reflector. Arlot, Richardson, and Thuillot recorded a possible 0.6-s secondary occultation on videotape using an SIT videcon on the 1-m reflector at Meudon.

3. April 22 — Bouchet, Brahic, Perrier, and Sicardy, European Southern Observatory, observed a stellar occultation by Uranus and its rings with the 1-m and 3.6-m telescopes. Occultations by the nine known rings were observed, plus an isolated event 1.5-hour later.

4. April 22 — Visual observers in Florida and Colorada reported an unusually rich display of Lyrid meteors, with 3 to 5 per minute counted at the peak, and 75 per hour during the hour centered on the peak.

U.S. NAVAL OBSERVATORY COLLOQUIA SCHEDULED

On Friday, 11 June, Professor George Contopoulos, Athens, Greece, will speak on "Dynamical Systems with Three or more Degrees of Freedom." On Wednesday, 23 June, Dr. Chr. de Vegt, Hamburger Sternwarte, Bergendorf, Germany, will speak on a topic in astrometry to be announced.

The colloquia are held in room 300, Building 52, at 2:00 PM. NCA members are welcome. Enter the Observatory at the main gate at 34th Street and Massachusetts Avenue, NW, where the guard will require identification and provide directions. For further information call 254-4540.

NCA CLARK REFRACTOR AT NAVAL OBSERVATORY FOR MEMBERS' USE

For many years NCA has enjoyed the privilege of having our 5-inch Alvan Clark refractor housed at the U.S. Naval Observatory where it is available for members' use at any time after a brief checkout on the instrument and rules. If you have not acquired the necessary pass for this privilege, call Larry White 978-9681 to make arrangements.

SAVE ONE OF THOSE SKY AND TELESCOPE RENEWAL NOTICES!

Have you received renewal notices from *Sky and Telescope* reminding you to pay your dues? It is their practice to mail these notices to all members. Just save one of the cards until you receive the renewal form from NCA, and enclose it with your dues to the NCA Secretary. This will facilitate timely renewal of your subscription; no other response to these cards is necessary.

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