# AAS AWARDS A GALAXY OF PRIZES TO SOME OF ITS BRIGHTEST STARS

Early this year the American Astronomical Society announced its 1988 awards. The Henry Norris Russell Lectureship is awarded annually for eminence in astronomical research; it is the highest honor bestowed by AAS. The Dannie Heineman Prize for Astrophysics is awarded jointly by AIP and AAS. Young astronomers who have not attained age 36 in the year of the award are eligible for the Helen B. Warner Prize for Astronomy and the Newton Lacy Pierce Prize for observational astronomical research. Two of the four 1988 award winners presented lectures at the Kansas City AAS meeting in June. At the previous AAS meeting, held at the University of Texas, Austin, in January, all four 1987 award winners presented their lectures.

Gérard Henri de Vaucouleurs (University of Texas, Austin) delivered the 1988 Russell lecture. De Vaucouleurs is widely known for his contributions to extragalactic astronomy. Gérard and Antoinette de Vaucouleurs's *Reference Catalog of Bright Galaxies* is a standard reference work. His classification, a revision of Edwin Hubble's "tuning fork" scheme, categorizes the visual appearances of galaxies: spirals (with or without bars and rings), ellipticals and irregulars. By the mid-1950s de Vaucouleurs, then at Mount Stromlo, Australia, had found evidence for a large-scale structure in the universe that became known as the Local Supercluster; its central region is marked by the Virgo cluster of galaxies. This pioneering work has now led to the realization that superclusters with intervening voids are ubiquitous in the universe.

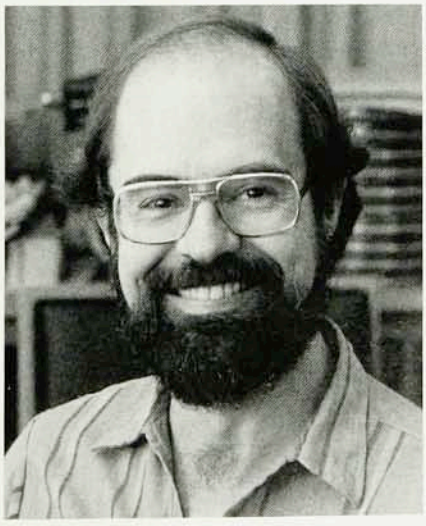
A major problem in observational cosmology is the determination of distances to galaxies and the determination of the Hubble constant $H_0$, which measures the currently observed expansion rate of the universe. De Vaucouleurs has championed a large value for $H_0$, in the range 90–100 km/sec/megaparsec, in opposition to the small value of around 50–55 km/sec/Mpc favored by Allan Sandage and Gustav Tammann. Several factors, including his studies of galactic extinction, supernovae and his evidence for local anisotropies in the motions of galaxies, led de Vaucouleurs to adopt the large value.

De Vaucouleurs has had a truly international career. His degrees in physics, mathematics and astronomy are from the University of Paris (Sorbonne): BSc (1936), LSc (1939), Dr Univ (1949). He earned a DSc (1957) from the Australian National University, Canberra. He then worked at Lowell Observatory and Harvard. Since 1960 he has been at the University of Texas, Austin, and he is now the Jane and Roland Blumberg Centennial Professor there.

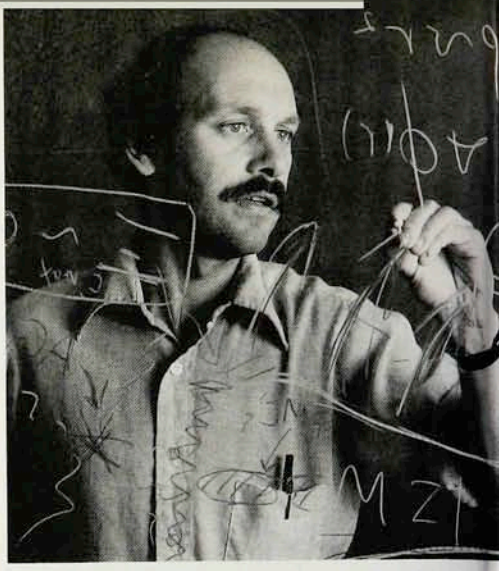
James E. Gunn (Princeton) received the 1988 Heineman Prize. The selection committee cited the "rare combination of skills" in theoretical astrophysics, observational astronomy and instrumental innovations Gunn has shown in his contributions "of breathtaking range to our knowledge of the cosmos." In 1969–70 Gunn worked with Jeremiah Ostriker on the nature, distribution and ages of pulsars, then recently discovered. Gunn's contributions to observational cosmology are perhaps his most widely known. In 1974 Gunn, along with Beatrice M. Tinsley, David N. Schramm and J. Richard Gott, wrote a classic paper that presented evidence for an ever-expanding universe in which the cosmological density parameter $\Omega$ is about 0.1. Since 1972 Gunn has worked with Gott on the infall of intergalactic gas into clusters of galaxies and, more recently, by himself and with Barbara Ryden on gaseous

Gérard de Vaucouleurs

James Gunn



Sallie Baliunas



Mitchell Begelman

infall into galaxies themselves. Gunn finds that gaseous infall plays a major role in shaping both the chemical and the dynamical evolution of spiral galaxies.

Some years before the Lyman-$\alpha$ "forest" of quasar absorption lines was discovered in 1971, Gunn and Bruce Peterson had suggested that intergalactic gas should be detectable as absorption features in quasars at wavelengths shorter than the red-shifted Lyman-$\alpha$ line. In recent years Gunn has been developing charge-coupled devices for imaging wide fields of view. Gunn's "four-shooter," attached to the Palomar Telescope, is used by Gunn, Maarten Schmidt and Donald Schneider to determine how the number of quasars changes with time and to measure the quasar luminosity function. Instruments like the four-shooter allow observations sufficiently far back in time that the evolution of galaxies can be seen directly. Gunn's work with J. Beverly Oke and John Hoessel on finding distant clusters and his work with Alan Dressler on the evolution of galaxies in clusters have significantly advanced observational cosmology.

Gunn received his BA (1961) from Rice University and his PhD (1966) from Caltech. Since 1985 he has been associate director of the Astrophysical Research Consortium's Apache Point Observatory in New Mexico. Gunn is deputy principal investigator for the Wide-Field Planetary Camera on the Hubble Space Telescope. He is now Eugene Higgins Professor of Astronomy at Princeton.

Mitchell Begelman (University of Colorado) is the 1988 recipient of the Warner Prize. His research is in theoretical high-energy astrophysics. He has contributed to the theory of the formation, dynamics and thermodynamics of hot, thick accretion disks

*See your low level picosecond signals as they really are with . . .*

# THE WORLD'S FASTEST OSCILLOSCOPE
## and TDR

### NOW AT A NEW AFFORDABLE PRICE*

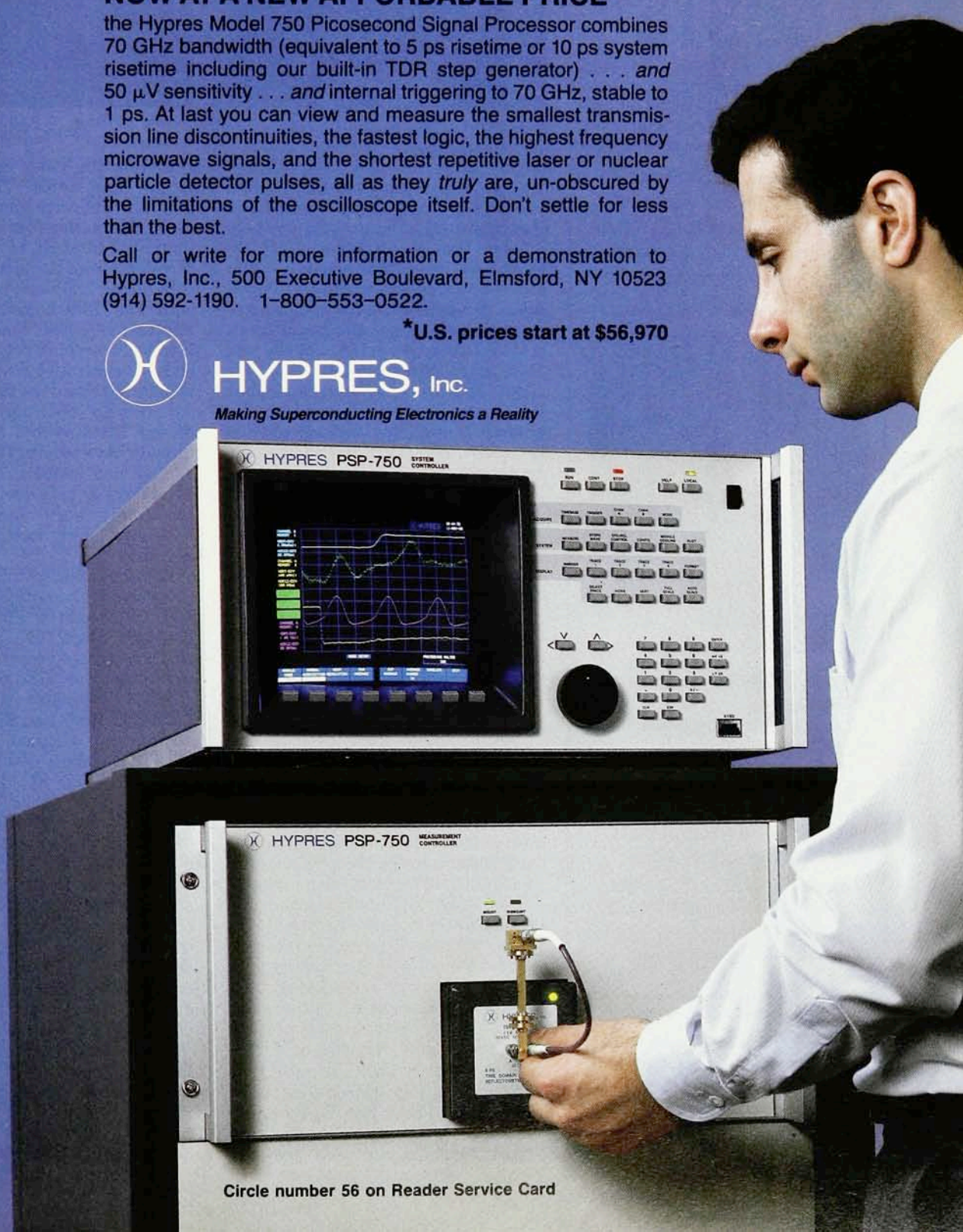
the Hypres Model 750 Picosecond Signal Processor combines 70 GHz bandwidth (equivalent to 5 ps risetime or 10 ps system risetime including our built-in TDR step generator) . . . *and* 50 μV sensitivity . . . *and* internal triggering to 70 GHz, stable to 1 ps. At last you can view and measure the smallest transmission line discontinuities, the fastest logic, the highest frequency microwave signals, and the shortest repetitive laser or nuclear particle detector pulses, all as they *truly* are, un-obscured by the limitations of the oscilloscope itself. Don't settle for less than the best.

Call or write for more information or a demonstration to Hypres, Inc., 500 Executive Boulevard, Elmsford, NY 10523 (914) 592-1190. 1-800-553-0522.

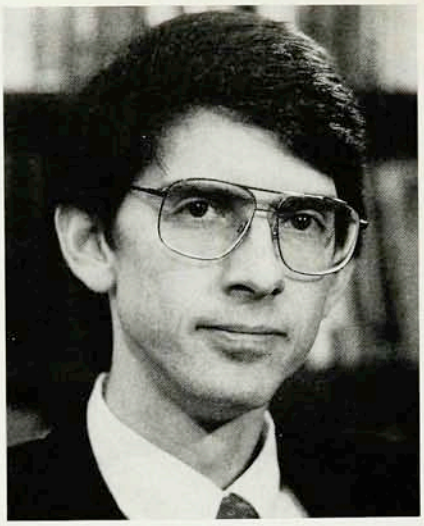
***U.S. prices start at $56,970**

HYPRES, Inc.

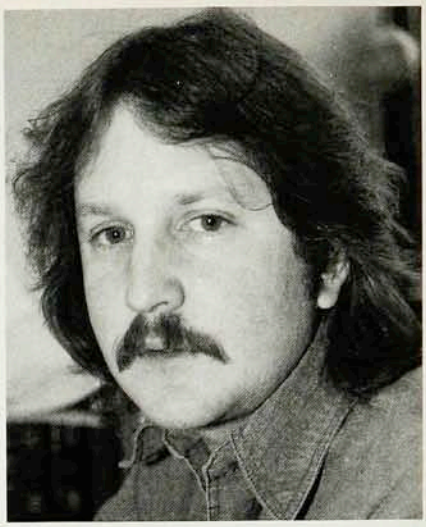
*Making Superconducting Electronics a Reality*




Circle number 56 on Reader Service Card



Jack Wisdom



Donald Winget

surrounding massive black holes. The supermassive-black-hole model can explain active galactic nuclei and the oppositely directed jets (perpendicular to the accretion disk) observed in many extragalactic radio sources, including quasars. Begelman, Roger Blandford and Martin Rees have developed the paradigmatic model for active galactic nuclei (see *Reviews of Modern Physics* **56**, 255, 1984). Begelman has been particularly interested in understanding the environmental impact of active galactic nuclei, especially the effects of x rays from active galactic nuclei on the interstellar medium of the host galaxy. He has contributed to the theory of accretion disk coronae and Compton-heated winds.

Begelman received his AB and AM (both in 1974) from Harvard and his PhD (1978) from the University of Cambridge, UK. In 1982 he joined the department of astrophysical, planetary and atmospheric sciences at the University of Colorado, Boulder, and since 1987 he has been an associate professor. Since 1984 he has also been a fellow at the Joint Institute for Laboratory Astrophysics.

Sallie L. Baliunas (Harvard–Smithsonian Center for Astrophysics) was awarded the 1988 Pierce Prize for contributions to the observational understanding of the outer atmospheres of cool stars. Baliunas has played a pivotal role in maintaining the Mount Wilson 60-inch telescope as a full-time dedicated facility for monitoring chromospheric activity in cool stars. This unique program was started 20 years ago by Olin Wilson and Arthur Vaughan to study analogs of the 22-year sunspot cycle in starspot and magnetic activity cycles of main-sequence and giant stars. Baliunas has developed numerical techniques for extracting rotational and cycle periods from the noisy data yielded by stellar time series. The monitoring program indicates that stellar magnetic fluctuations arise from rotational modulation of magnetic features and from starspot cycles.

Baliunas has observed extensively with the International Ultraviolet Explorer satellite. She has also been involved with pilot programs to develop robot-controlled ground-based photoelectric telescopes that work without human operators. Two sites, Mount Hopkins and Mount Wilson, already have several 10-inch, 15-inch, 20-inch and 30-inch robot telescopes in operation or under construction. Eventually such remote-controlled telescopes may form a worldwide network.

Baliunas has a BS (1974) from Villanova University; she has both an AM (1975) and a PhD (1980) from Harvard. Since 1980 she has held the position of astrophysicist at the Smithsonian Astrophysical Observatory.

Fred L. Whipple is the 1987 Russell Lecturer. He is best known for introducing the so-called dirty-snowball model for comets (see PHYSICS TODAY, July 1987, page 83). David Lambert (University of Texas, Austin) is the winner of the 1987 Heineman Prize (see PHYSICS TODAY, May, page 88).

Jack Wisdom (MIT) received the 1987 Warner Prize for his "remarkable applications of the modern tools of celestial mechanics to problems of the solar system." His establishment that Kirkwood's Gaps in the asteroid belt, between the orbits of Mars and Jupiter, arise from the presence of chaotic zones near resonances with Jupiter solved a century-old problem. He has shown that these chaotic zones provide a dynamical mechanism for transporting meteoritic material to the Earth's vicinity. Wisdom's further work with Stanton J.

Peale and François Mignard has led to the discovery of the first known example of chaotic rotation—that of Saturn's satellite Hyperion. He is a principal collaborator in the MIT digital orrery project, which has carried out direct integrations over hundreds of millions of years of the motion of the outer planets, to try to solve the 300-year-old problem of the dynamical stability of the solar system (*Icarus* **72**, 241, 1987). In very recent work with Gerald J. Sussman, Wisdom has shown that the orbital motion of the planet Pluto is also chaotic.

Wisdom has a BS (1976) from Rice University and a PhD (1981) from Caltech. He is an associate professor in the department of earth, atmospheric and planetary sciences at MIT.

The 1987 Pierce Prize was awarded to Donald E. Winget (University of Texas, Austin) for his "theoretical prediction of a previously unknown class of pulsating helium-atmosphere white dwarfs and the subsequent observational confirmation of the prediction." (See the news story in PHYSICS TODAY, January 1983, page 21.) Probably about 20% of white dwarfs are helium rich; the rest are rich in hydrogen. By investigating the rate of period change in cooling pre-white-dwarf stars, Winget has provided further insight into late stages of stellar evolution. He and his colleagues have demonstrated that the coolest white dwarfs can be used to measure the time of the earliest epoch of star formation in the Galaxy and hence to constrain the age of the universe.

Winget received his BS (1976) from the University of Illinois; both his MA (1978) and his PhD (1982) are from the University of Rochester. He was recently promoted from assistant to associate professor of astronomy at Austin.

The Bruno Rossi Prize is given by the AAS high-energy astrophysics division for "a significant contribution to high-energy astrophysics with particular emphasis on recent original work." June 1987 marked the 25th anniversary of the birth of x-ray astronomy. At the AAS meeting held in Vancouver that month, Michiel van der Klis (European Space Agency, ESTEC, Noordwijk, The Netherlands) received the Rossi Prize for the discovery of quasiperiodic oscillations. In 1984 he discovered intensity-dependent oscillations in the x-ray flux of the binary source GX5–1, located in the Galactic bulge. He was analyzing data from an EXOSAT project that was proposed by Walter H. G. Lewin (MIT) and carried out in collaboration with

Fred Jansen (Space Research Laboratory, Leiden), Jan van Paradijs, E. P. J. van den Heuvel (both of the University of Amsterdam), Joachim E. Trümper and Mirek Sztajno (both of the Max-Planck-Institut für Extraterrestrische Physik, Garching, FRG). Van der Klis received his PhD (1983) from the University of Amsterdam.

At the January 1987 meeting of the AAS in Pasadena, California, three 1986 prize lectures were given. Albert E. Whitford (Lick Observatory), the Russell lecturer, has studied the ages, colors and compositions of old stars in other galaxies and in the bulge at the nucleus of our Galaxy. Simon White (Steward Observatory, University of Arizona), the Warner Prize winner, has contributed to numerical simulations of large-scale structure in the universe, including galaxy collisions, galaxy mergers and the evolution of structure. Hyron Spinrad (University of California, Berkeley) was the Heineman Prize winner. (His work was discussed in PHYSICS TODAY, February 1987, page 123.) Reinhard Genzel (now at the Max-Planck-Institut für Extraterrestrische Physik) received the 1986 Pierce Prize for contributing to the development of submillimeter and far-infrared spectroscopy and for radio observations of molecules. In particular he developed a method for determining the distances to various Galactic sources, such as the Orion Nebula, based on transverse and line-of-sight motions of water-maser spots. He was part of a group that was responsible for a redetermination of the distance to the center of the Milky Way.

—PER H. ANDERSEN

# AGU HONORS ABELSON AND THREE MEDALISTS

The American Geophysical Union in May presented the Waldo E. Smith Medal to Philip H. Abelson (American Association for the Advancement of Science) for his "extraordinary service to geophysics."

In early 1939 Abelson studied the products of uranium fission, and in 1940 he and Edwin M. McMillan discovered element 93, neptunium. He later developed a method for separating uranium isotopes that was used in the Manhattan Project. After the war Abelson initially studied protein synthesis in *E. coli*. In 1953, however, he became director of the Carnegie Institution's geophysics laboratory, where his research interests