RESEARCH ACTIVITY SUMMARIES

NOTE

We encourage every institution listed herein to
periodically review its summary and
provide corrections to Sally Adams
(sadams@noao.edu).

RESEARCH ACTIVITY SUMMARIES

This section lists the institutions that have expressed their intent to participate in the U.S. Gemini Fellowship Program and, in most cases, includes descriptions of their respective research activities. The applicants should be reminded that they need not limit their choice to this list, but may select any U.S. institution where Gemini-related science can successfully be carried out (*cf.* the *Host Institution* section, page 2 in the Announcement of Opportunity).

ARIZONA, UNIVERSITY OF

Steward Observatory, Tucson, AZ 85721

Attention: Peter A. Strittmatter, Director - Steward Observatory

Steward Observatory is the research arm of the Department of Astronomy. Its research program focuses on optical, infrared and submillimeter astronomy, on theoretical astrophysics, and on astronomical instrumentation. The Observatory is also involved in space astronomy research, including HST, ISO and SIRTF; Rodger Thompson is Principal Investigator on the NICMOS instrument for HST. Many of the areas of technology development are relevant to the instruments planned for the Gemini telescopes.

Major areas of current activity include cosmology, the intergalactic medium, quasars and active galactic nuclei, galaxy dynamics, formation and evolution, star formation in galaxies, including starburst galaxies, star formation and the interstellar medium, supernovae, degenerate stars, cataclysmic variables, and brown dwarfs. A number of faculty and graduate students collaborate with NOAO astronomers, and Steward is currently host to a Gemini Fellow.

Among the research facilities available at Steward Observatory are the MMT, 2.3-meter, 1.8-meter (VATT), and 1.5-meter telescopes, the Heinrich Hertz Submillimeter telescope, the Mirror Laboratory, and extensive computing facilities. Gemini Fellows resident at Steward enjoy full access to all Observatory facilities.

ARIZONA STATE UNIVERSITY

Department of Physics and Astronomy, Box 871504, Tempe, AZ 85287-1504

Attention: Professor Rogier A. Windhorst, E-mail: rogier.windhorst@asu.edu

At the ASU Department of Physics and Astronomy, astronomy research is carried out by 9 faculty and about 25 research staff, postdocs and graduate students on the following topics: Solar system objects (Desch, Wyckoff); Stellar structure, evolution, and novae (Starrfield, Stryker); X-ray binaries (Cowley, Schmidtke); Galactic structure and stellar populations (Burstein, Cowley, Schmidtke, Stryker); Star-formation, the ISM and supernova remnants (Aannestad, Desch, Hester, Morse, Scowen); Star-formation in nearby galaxies (Burstein, Hester, Jansen, Morse, Odewahn, Scowen, Windhorst); Radio galaxies (Windhorst) and Quasars (Cowley, Wyckoff); Large-scale motions, dark matter and cosmology (Burstein, Windhorst); and distant galaxies, galaxy formation and evolution (Jansen, Odewahn, Windhorst).

ASU has access to the Steward Observatory telescopes, which includes the 6.5-meter MMT, both 6.5-meter Magellan telescopes, the Steward 90-inch, the 61- and 60-inch telescopes at Catalina, and the 72-inch VATT and SMT telescopes at Mount Graham. ASU is conveniently close to Kitt Peak, Lowell Observatory, and the VLA. For image processing and analysis we have several dozen LINUX workstations available.

The ASU astronomy group has a strong record of getting telescope time on these telescopes, as well as on HST and Chandra. Several ASU faculty are involved in various telescope or instrument teams (e.g., HST WFPC2, WFC3, COS, the JWST, as well as other NASA missions).

BOSTON UNIVERSITY

Department of Astronomy, 725 Commonwealth Avenue, Boston, MA 02215-1401

Attention: W. Jeffrey Hughes, Chairman

Current faculty members who engage in astrophysical research include: T.M. Bania, T. Brainerd, K. Brecher, S. Chakrabarti, D.P. Clemens, J.M. Jackson, K.A. Janes, R.B. Kerr, A.P. Marsher, and M. Mendillo. Research programs at Boston University of particular interest for the Gemini Fellowship Program include:

Evolution of the Galaxy - Studies of the stellar content and chemical evolution of the galaxy, the age of the galactic halo, and the formation of the galactic disk, using photometry, spectroscopy, and deep imaging of open and globular clusters in the Milky Way and nearby galaxies.

Star Formation - Observations of massive star formation in the Milky Way and in starburst galaxies. Studies of the structure, dynamics, and magnetic field configuration of Bok globules, using deep multi-color optical and near-infrared CCD imaging, in conjunction with polarimetric CCD imaging, millimeter-wave spectroscopy of CO, and comparison with co-added IRAS images.

The Interstellar Medium and Galactic Structure - Studies of the composition, excitation, and dynamics of ISM, using both theoretical models and observations of atomic and molecular spectral lines at infrared and radio wavelengths. Probing the AU-scale structure in galactic clouds through variations in molecular absorption lines as a function of the Earth's position in its orbit and solar motion.

Active Galaxies - Observational and theoretical studies of compact, nonthermal emission region in active galaxies and QSOs, with emphasis on jets, variability of flux density and polarization, and studies of non-thermal radiation from active galaxies at all wavelengths.

Galaxy Formation & Large-Scale Structure - Theory of galaxy formation and tests of these theories using observations of high-redshift galaxies and large-scale structure.

Solar System Studies - Extended sodium cloud of Jupiter, exosphere of the Moon, planetary and cometary atmospheres.

General - Ultraviolet spectroscopy of astronomical objects.

CALIFORNIA, UNIVERSITY OF

Department of Astronomy, Berkeley, CA 94720

Attention: Jonathon Arons

The members of the Berkeley Astronomy Department pursue a broad range of interests in Astronomy and Astrophysics.

Observational/experimental work includes study of the atmospheres and ionospheres of comets and the major planets; structure of globular clusters and normal galaxies; active galactic nuclei; pulsar searches, timing and physical characteristics; supernovae; general structure of the interstellar medium; molecular clouds and associated star formations; distribution of galaxies and observational cosmology; development of IR and mm wave imaging and spectroscopic instrumentation.

Theoretical activities are similarly diverse and include physics of star formation; large scale structure; the identity of dark matter; physics of the general interstellar medium, with focus on interstellar shocks; dynamics and appearance of magnetized accretion disks in compact objects (galactic binaries and AGN); physics and evolution of rotation powered and accretion powered pulsars.

Active Space Telescope users on the faculty include Ivan King, Alex Filippenko, James Graham, and Hyron Spinrad.

Departmental Computer facilities include Sun (Unix) and Dec Vax (VMS) servers, and Sun (many) and Microvax (a few) workstations.

The Radio Astronomy Laboratory (housed with the Department) operates the BIMA millimeter array at the Hat Creek Radio Observatory. The Department is a member of the consortium operating the Keck Telescope.

CALIFORNIA, UNIVERSITY OF

Department of Physics and Astronomy, Los Angeles CA 90095-1562

Attention: Michael Jura

Members of the Astronomy and Astrophysics Division are engaged in a wide variety of research programs in observation, theory, and instrumentation. These programs may incorporate observations with the world's largest ground-based telescopes such as the 10-meter Keck telescopes in Hawaii, with orbiting observatories such as the Hubble Space Telescope and Chandra, and with a number of ground-based facilities (e.g., VLA, CTIO, KPNO, and GEMINI). Opportunities to be involved in the construction of state-of-the-art instrumentation are also available. In addition, UCLA operates one of the premier solar observatories at Mt. Wilson and is heavily involved in the space-based solar mission Soho. For more information about research opportunities at UCLA, please see the department Web sites at:http://www.astro.ucla.edu/ and http://www.astro.ucla.edu/research/.

CALIFORNIA INSTITUTE OF TECHNOLOGY

Department of Astronomy, 105-24, Pasadena, CA 91125

Attention: Lynne Hillenbrand (lah@astro.caltech.edu)

The California Insitute of Technology supports a broad research program in Astronomy and Astrophysics. Caltech operates the Palomar Observatory (200-inch, 60-inch, 48-inch, several smaller specialty telescopes, and testbed infrared interferometer), Keck Observatory (two 10-meter telescopes managed jointly by Caltech, UC, and NASA), Owens Valley Radio Observatory (40-meter centimeter dish, millimeter interferometer, and solar array), and Caltech Submillimeter Observatory (10-meter dish). The Jet Propulsion Laboratory (JPL), Infrared Processing and Analysis Center (IPAC), SIRTF Science Center (SSC), and Michelson Science Center (MSC) are all in close proximity to campus. Observational research spans the gamut from first light to large-scale structure to galaxy evolution to globular clusters to star formation to planets, including almost everything in between. Caltech has a distinguished theoretical astrophysics group focussing on compact objects, grav-itational radiation, cosmology, GRB's, and circumstellar disks/planets. Balloon experiments, high-energy instrumentation, particle astrophysics, and gravity waves are active areas within Physics.

Approximately 50 postdocs are working in various branches of astrophysics on the Caltech campus. Inter-disciplinary collaborations are strongly encouraged.

CARNEGIE OBSERVATORIES

Headquarters, 813 Santa Barbara Street, Pasadena, CA 91101-1292

Attention: John Mulchaey, mulchaey@ociw.edu

The Observatories of the Carnegie Institution of Washington is a private endowment-funded research organization whose charter is to pursue excellence in astronomical research. The Observatories operate telescopes on its site on Cerro Las Campanas, Chile. The currently operating telescopes are the 1.0-m Swope and 2.5-m Pont reflectors. In collaboration with the University of Arizona, Harvard University, MIT, and the University of Michigan, Carnegie has finished constructing two 6.5-m telescopes, named Magellan I and II at Las Campanas.

The Observatories offices are located in Santa Barbara Street in Pasadena, California. The research staff and fellows are based there, but they travel to Chile to carry out their observing programs. We maintain excellent computing and library facilities.

There are presently 16 Pasadena-based staff members at the Observatories. At any one time there are typically 6 to 12 post-doctoral fellows and associates. The current staff members and their areas of interest are:

	Alan Dressler	Astronomical instrumentation, large-scale structure, distant clusters
*	Wendy Freedman	Extragalactic distance scale, stellar populations
	Patrick McCarthy	Radio sources, high redshift objects
	Augustus Oemler	Galaxy evolution, galaxy cluster populations
	Eric Persson	Astronomical instrumentation, infra-red astronomy, galaxy evolution
***	George Preston	Galactic structure, metal poor stars

***	Allan Sandage	Extragalactic distance scale, cosmology, stellar populations
**	Steve Shectman	Astronomical instrumentation, large-scale structure
	Ian Thompson	Astronomical instrumentation, stellar populations
***	Rey Weymann	Quasars, quasar absorption line systems
	Luis Ho	Black Holes, star clusters
	Barry Madore	Extragalactic distance scale, galaxies
	Andrew McWilliam	Abundances of the chemical elements in the Milky Way galaxy
	Michael Rauch	QSO absorption lines, galaxy formation
	Francois Schweizer	Merging galaxies, formation of globular clusters
	John Mulchaey	Groups of galaxies, active galaxies, x-ray astronomy

* Director of the Observatories
** Project Scientist, Magellan 6.5-m Telescope
***Emeritus

Post doctoral fellows and associates for 2003/2004:
Mario Hamuy, Jeremy Darling, Michael Gladders, Kurt Adelburger, Marla Geha, Armando Gil De Paz, Daniel Kelson, Jon Fulbright, Stephen Helsdon, Kevin Krisciunas, Joana Thomas-Osip

CASE WESTERN RESERVE UNIVERSITY

Department of Astronomy, 10900 Euclid Avenue, Cleveland, OH 44106-7215

Attention: R. Earle Luck

The primary research instrument of the Warner and Swasey Observatory is the Burrell Schmidt telescope located at Kitt Peak near Tucson, Arizona. The benefits of a Schmidt telescope used in conjunction with a large reflector have been known since the 48-inch Schmidt at Palomar was built to serve the 200-inch. More recently, Schmidt telescopes were built to support the European Southern Observatory and the Anglo-Australian Observatory.

The Burrell Schmidt can efficiently identify astrophysically interesting objects for follow-up observations by large reflectors like the Gemini telescopes. Objective-prism plates covering 5700 square degrees (galactic latitude > +30° and declination > +30°) are currently in hand. These plates were taken for the Case Low-Dispersion Northern Sky Survey. The spectra (covering the range 3300 A to 5350 A) reach a limiting magnitude of about 18. Fifteen lists of objects of interest, such as blue and/or emission-line galaxies, unresolved blue and/or emission-line objects, hot and cool (such as late M and carbon stars) Galactic stars, A- and F- type stars have been published. Approximately half of the plates remain to be scanned. Most of the published objects have not yet been observed at high resolution and signal-to-noise. Thus, the published and the unpublished plate material taken from the Case Low-Dispersion Northern Sky Survey contains much material for follow-up study. This work is directed by Professor Peter Pesch.

The Burrell Schmidt is now used primarily with a 2048^2 CCD, which give a useful field of about one square degree. Photometric and spectroscopic surveys with selected filters are now underway and will identify objects such a metal-poor stars, thick disk stars, and faint emission-line galaxies. Follow-up spectroscopy at high resolution with Gemini would then be possible.

The research efforts of Warner Professor Earle Luck are of direct relevance to Gemini as they are based on high-resolution spectroscopic data obtained with large telescopes in both the Northern and Southern hemispheres. The research encompasses a variety of objects: supergiants, metal-deficient red giants, chemically peculiar stars, and bright giants. The objectives of these analyses are to provide data on galactic and stellar chemical evolution.

Also under study in the Department are the formation and evolution of galaxies by photometric investigation of the spatial distribution, dynamics, and metallicities of old stars (of the halo, thick disk, and bulge) in both the Milky Way and other nearby disk galaxies. This research is directed by Professor Heather Morrison who is also interested in dark matter around galaxies, and the possible relationship between a galaxy's old stellar population and its dark matter.

CENTRAL MICHIGAN UNIVERSITY

Department of Physics, Mount Pleasant, MI 48859

Attention: Stanley Hirschi, Chairman

CHICAGO, UNIVERSITY, OF

Department of Astronomy & Astrophysics, 5640 S. Ellis Avenue, Chicago, IL 60637
Yerkes Observatory, 373 W. Geneva St. Williams Bay, WI 53191 [Kyle Cudworth's address]

Attention: Kyle Cudworth

The University of Chicago has a broad array of programs in astrophysics. In the Department of Astronomy and Astrophysics, approximately 30 faculty members, along with similar numbers of research associates and graduate students, carry out research divided roughly equally between observational and theoretical investigations, in topics ranging from the solar system to interstellar matter, stars, our Galaxy and others, and a strong concentration in cosmology. Several additional groups within other departments also pursue astrophysical research. Chicago is a leader in several current large projects, including the ARC 3.5-m optical telescope, the Sloan Digital Sky Survey, the Center for Cosmological Physics, and the South Pole Telescope.

In addition to the private facilities with which we are involved, astronomers from Chicago also make extensive use of the national observatories and of HST. Various Chicago research groups benefit from very large apertures such as the Gemini telescopes.

Further information is available at: http://astro.uchicago.edu/

CORNELL UNIVERSITY

Department of Astronomy, 610 Space Sciences Building, Ithaca, NY 14853

Attention: Joseph Veverka

Astronomy faculty members at Cornell University are engaged in research covering the general areas of (a) Optical Astronomy, where Cornell scientists use 25 percent of the observing time with the 200-inch Palomar telescope; (b) Infrared Astronomy, where Cornell scientists have played an important role in IRAS, and are

now deeply involved in SIRTF; (c) Planetary Sciences, where since the beginning of the Apollo missions, Cornell scientists have been involved in almost all the planetary space exploration projects including Magellan, Galileo, and now Deep Impact, Mars Exploration Rover, and Cassini; (d) Radio and Radar Astronomy, where the major activities are related with the Cornell operated Arecibo Observatory; and (e) Theoretical Astrophysics, with emphasis on relativistic astrophysics, cosmology, stellar structure, galactic dynamics and other modern subjects.

Cornell astronomers are also planning expansions in the areas of ground-based optical/infrared astronomy and future missions to explore Mars and comets.

DELAWARE, UNIVERSITY OF

Department of Physics and Astronomy, Newark, DE 19716

Attention: James MacDonald

Research in astronomy and astrophysics at the University of Delaware is carried out by faculty members, post-docs and students in the Department of Physics and Astronomy and in the Bartol Research Institute. Current research involves observational and theoretical studies of:

- Brown dwarf stars
- The late stages of stellar evolution (AGB stars, hot subdwarfs, and white dwarfs)
- Rapid variability in flaring stars
- Stellar convection
- Structure and evolution of rotating stars
- Structure and variability in OB star winds and associated X-ray emission
- Disk winds in Be stars, CVs and QSO/AGNs
- Radio studies of compact groups of galaxies
- Cosmic rays

The interferometric capabilities of the Gemini telescopes are expected to be extremely valuable in a number of these areas, particularly in on-going searches for cool companions to subdwarfs and white dwarfs, and in the study of Be stars, structure in OB winds, and convective patterns in giant stars.

FLORIDA INSTITUTE OF TECHNOLOGY

Department of Physics and Space Sciences, 150 West University Blvd., Melbourne, FL 32901

Attention: Laszlo Baksay, Department Head, (baksay@fit.edu)

Using facilities at CTIO, KPNO, and Mauna Kea, we are conducting a study of common proper motion binaries. Our objectives are to define the low-luminosity ends of the white dwarf (WD) cooling track and main sequence, and to derive gravitational redshift masses for WD components.

Theoretical WD luminosity functions are computed with differing input WD evolutionary sequences, assumed ages of the local disk, star formation rates, and scale height inflation of the disk. Results suggest a constant star formation rate over the history of the Galaxy and a disk age in the range 6-13.5 Gyr.

We are also investigating close binary systems in rapid phase of mass transfer. UBVRI light and radial velocity curves are analyzed with the Wilson-Devinney program.

Astronomical instrumentation is another area of emphasis. Current activity includes hyperspectral imaging spectrometry, telescope automation and new data reduction techniques.

Florida Tech is the administrative institution for the Southeastern Association for Research in Astronomy (SARA), which includes East Tennessee State University, University of Georgia, Valdosta State University and Florida International University. The automated SARA 0.9-m telescope at Kitt Peak National Observatory is ideally suited for long-term, simultaneous and/or synoptic imaging, photometry and spectrometry.

GEORGIA STATE UNIVERSITY

Center for High Angular Resolution Astronomy, Dept. of Physics & Astronomy, Atlanta, GA 30303

Attention: H. A. McAlister (hal@chara.gsu.edu)

Research activities at GSU are concentrated in several areas of stellar and extragalactic astronomy. CHARA astronomers have contributed 85% of all the speckle interferometric measurements obtained world-wide of long period binaries (including over 75% of all binaries first resolved interferometrically). The primary undertaking of CHARA is the development of the CHARA Array, a five element, optical/IR interferometer with a maximum baseline of 400 meters. This unique instrument will be built over the next few years at Mount Wilson Observatory in California.

Research is also ongoing on high dispersion optical and UV spectroscopy of massive stars. Current programs include Doppler tomographic reconstruction of the component spectra of massive binaries observed with IUE and time series analysis of line profile variable stars. Similar programs are envisioned for the nearly completed Multiple-Telescope-Telescope, a 1-m equivalent instrument connected through fiber optics to a bench mounted spectrograph and CCD detector. This telescope and a 16-inch telescope with an imaging CCD are located at the GSU Hard Labor Creek Observatory, 50 miles east of Atlanta.

Work in extragalactic astronomy includes the study of optical/UV microvariability in AGNs. Theoretical studies include research on AGNs, jets, accretion disk dynamics, and gravitational lensing.

HARVARD UNIVERSITY

Department of Astronomy, 60 Garden Street MS46, Cambridge, MA 02138-1516

Attention: Department Chair: Prof. Lars Hernquist, lars@cfa.harvard.edu; 617-496-4180
Graduate Coordinator: Jean Collins, jcollins@cfa.harvard.edu; 617-495-3752

The Harvard Department of Astronomy is located at the Harvard- Smithsonian Center for Astrophysics (CfA). The CfA combines the resources and research facilities of the Harvard College Observatory and the Smithsonian Astrophysical Observatory under a single director to pursue studies of those basic physical processes that determine the nature and evolution of the universe. The Harvard College Observatory (HCO),

founded in 1839, is a research institution of the Faculty of Arts and Sciences, Harvard University, and provides facilities and substantial other support for teaching activities of the Department of Astronomy. Today, some 300 Harvard and Smithsonian scientists cooperate in broad programs of astrophysical research that cover the range from atomic and molecular physics through observational cosmology. More information on the Department of Astronomy and CfA can be obtained at: http://cfa-www.harvard.edu/hco/astro/ (Astronomy Department) and http://cfa-www.harvard.edu/ (CfA).

HAWAII, UNIVERSITY OF

Institute for Astronomy, 2680 Woodlawn Dr., Honolulu, HI 96822

Attention: Rolf-Peter Kudritzki, Director - Institute for Astronomy

The Institute for Astronomy (IfA) carries out fundamental research programs in all areas of astronomy, with active groups working in solar, planetary, stellar, galactic, extragalactic astronomy and cosmology. It is responsible for the Astronomy Graduate Program as well as teaching of all undergraduate courses in the College of Natural Sciences. The IfA has a total staff of 203, including 50 faculty, 14 postdoctoral fellows, and 32 graduate students. The IfA research program focuses on optical, infrared and sub-millimeter observations, astronomical instrumentation, and theoretical astrophysics. A more complete description of the Institute and its research programs can be found at <http://www.ifa.hawaii.edu>

In addition to its main facility on the Manoa Campus of the University of Hawaii in Honolulu, the Institute operates the Mees Solar Observatory atop Haleakala on the Island of Maui, and is currently planning the construction of a new IfA-Maui Building in the Maui Research Park. The Institute also operates the Mauna Kea Observatories atop Mauna Kea on the Big Island of Hawaii, and has recently opened the new IfA-Hilo Building in the Hilo Research Park.

On Mauna Kea the IfA operates the UH 0.6-m, and UH 2.2-m optical telescopes, the 3.2-m NASA Infrared Telescope Facility (IRTF), and is a direct partner in the 3.6-m Canada-France-Hawaii telescope (CFHT). In addition, it has guaranteed observing time on the 3.8-m UKIRT infrared telescope, the 8.2-m Subaru and 8-m Gemini telescopes, the twin 10-m Keck Telescopes, the 10-m CSO and 15-m JCMT submillimeter telescopes and the soon-to-be-completed 8-element SMA submillimeter telescope array. On Haleakala the IfA operates the Mees Solar observatory, the NASA LURE Observatory, and receives a share of the observing time on the University of Tokyo 2-m Magnum Telescope and the 3.7-m Advanced Electro-Optical Systems (AEOS) Telescope.

The IfA has a very strong program in astronomical instrumentation. We have built instruments for Gemini, Subaru, CFHT, IRTF, AEOS, and the UH 2.2-m. Our adaptive optics group has built curvature AO systems which have been used on Gemini North, CFHT, IRTF, and the UH 2.2-m. We are currently developing the most ambitious curvature AO system built to date for operation on Gemini South. We are also involved in the instrumentation and techniques for deep circumstellar imaging including the Near Infrared Coronagraphic Imager for Gemini South, CanariCam for the GTC and several other coronagraphic instruments. We have an outstanding detector development group, producing large format CCDs, designing novel orthogonal charge transfer CCDs, and developing infrared arrays for NGST.

Gemini Fellows resident at the Institute for Astronomy will enjoy full access to all Observatory facilities on Mauna Kea and Haleakala.

ILLINOIS, UNIVERSITY OF

Department of Astronomy, 1002 West Green Street, Urbana, IL 61801

Attention: Joseph J. Mohr

Current research programs in optical and near-infrared astronomy at the University of Illinois span the range from stellar to extragalactic astronomy. One area of research centers on galaxy populations within clusters of galaxies as tracers of the evolution of star formation in the universe. In addition, combined optical, near-infrared, X-ray and Sunyaev-Zel'dovich effect cluster surveys are being carried out as a way of studying the dark energy. Other programs focus on quasars and the cosmic microwave background as cosmological tools. An area of particular concentration is the connection between stars and the interstellar medium, with active programs in planetary nebulae, Wolf-Rayet nebulae, bubbles and superbubbles in the ISM and supernova remnants. Active programs also address regions of star formation, interacting binary stars, and galactic structure.

Optical and near-infrared research is complemented by strong research programs in theoretical astrophysics, mm-wave astronomy and X-ray astronomy. Extensive computing facilities are available locally and at the National Center for Supercomputing Applications. These facilities are used not only for theoretical work, but also for data reduction, archiving and data mining for specific, large projects. Research facilities include the Combined Array for Millimeter Wave Astronomy (CARMA), a jointly operated mm-wave interferometer in California that is particularly well suited for studies ranging from star formation to imaging of the cosmic microwave background. The department also jointly operates a 1-m optical reflecting telescope at Mt. Laguna, California. There is an active instrumentation program in laser guided adaptive optics, and there are ongoing programs to develop receivers for polarization studies with CARMA. The department is also collaborating to build a 10-m telescope that will be used to map the cosmic microwave background at arcminute resolution over 10% of the sky visible from the South Pole.

INSTITUTE FOR ADVANCED STUDY

School of Natural Sciences, Bloomberg Hall, Princeton, NJ 08540

Attention: John Bahcall

The Institute has a strong program in astronomy and astrophysics that focuses on recent PhD's and senior sabbatical visitors. Details about this program, including a list of previous IAS postdocs, can be obtained from our Web site: http://www.sns.ias.edu/Main/astro.html. Each year there are about 12 astronomy and astro-physics postdoctoral fellows who come to the Institute for a period of three to five years and who carry out both observational and theoretical programs. The Institute postdoctorals collaborate with each other, with individuals at their home institutions, with colleagues at Princeton University and neighboring universities, and with short-term visitors and colleagues from elsewhere. The postdocs work on whatever topics interest them. We welcome Gemini fellows.

IOWA STATE UNIVERSITY

Department of Physics and Astronomy, Ames, IA 50011

Attention: Steven Kawaler

The seven faculty members at ISU, along with their postdocs, and students, actively investigate astrophysics in several areas:

Theoretical studies by Willson and Bowen include hydrodynamic modeling of atmospheric structure in pulsating stars. These models allow direct exploration of the process of mass loss in evolved stars that is driven by large amplitude pulsations.

Kawaler and Hubble Fellow J.C. Clemens are stellar seismologists. Their theoretical modeling of stars and their pulsations is complemented by observations using a network of ground-based telescopes (the "Whole Earth Telescope"), and space-based instruments.

Appleton and Struck study galaxies, including tidal interactions and wave-driven star formation in interacting systems. Using observation and computer modeling, this work seeks to understand star formation in other galaxies, and by extension, in our own. Lavery studies galaxies in high-redshift clusters, gravitational lensing by distant clusters, and other diagnostics of galaxy evolution.

Lamb and Lewis, study very high energy gamma ray sources using CGRO and ground-based instruments. They are active collaborators in the Whipple Observatory, developing techniques for that atmospheric Cherenkov system.

Related programs involving other departments include radio astronomy and image and data processing techniques. Local facilities include Fick Observatory; a 60 cm telescope with a T1 800x800 wide-field CCD camera.

JOHNS HOPKINS UNIVERSITY, THE

Henry A. Rowland Department of Physics and Astronomy

Attention: Professor Jonathan Bagger (Chair)

Astrophysical research at The Johns Hopkins University (http://pha.jhu.edu) had its beginnings with Rowland. Since his day, its subject matter has broadened to include the entire span of modern work, from the solar system to cosmology. The placement of the Space Telescope Science Institute on the Homewood campus made Baltimore one of the principal foci of world astronomy. Work in the Center for Astrophysical Sciences (CAS) at JHU is now centered in three areas: developing instrumentation for astronomical observations, particularly from space; observational astronomy from the ground and space; and theory.

Two large space astronomy projects are currently active in CAS: The Far Ultraviolet Spectroscopic Explorer (FUSE; http://fuse.pha.jhu.edu), a free-flying satellite, which was launched mid-1999 and is currently returning exciting data concerning the evolution of the Milky Way Galaxy, and the baryonic content of the Universe. The Advanced Camera for Surveys (ACS) was installed on the Hubble Space Telescope during servicing mission 3B, and is providing breath-taking and invaluable images of the Universe (http://adcam.pha.jhu.edu). JHU is also a major participant in the Galex mission, which is undertaking a major UV survey of the universe (http://www.galex.caltech.edu).

Several members of the faculty are active users of ground-based optical observatories and space based X-ray observatories studying such diverse subjects as the large-scale structure of the Universe, active galactic nuclei, galaxy clusters, starbursts, the internal dynamics of galaxies, and stellar populations within our own galaxy.

Hopkins is a member of the Astronomy Research Consortium (ARC) and a participant in its two major activities. First, ARC operates the Sloan Digital Sky Survey (http://www.sdss.jhu.edu), a project to systematically survey the entire northern sky down to very faint levels. This project will catalog 100 million stars and galaxies, and obtain redshifts for 1 million galaxies. Second, JHU owns a share of the ARC 3.5-meter telescope of the Apache Point Observatory in New Mexico (http://www.apo.nmsu.edu).

Theoretical work, by its nature, moves rapidly from topic to topic. Recent studies have included such subjects as the nature of "dark matter" in the universe, galaxy formation, the evolution and structure of active galactic nuclei, gravitational lenses, interstellar masers, star formation, pulsars, and the nature of gamma-ray bursts.

The members of the astrophysics faculty are: Professors Steven Beckwith, Paul Feldman, Holland Ford, Karl Glazebrook, Riccardo Giacconi, Tim Heckman, Richard Henry, Julian Krolik, Warren Moos, David Neufeld, Colin Norman, Alex Szalay, Ethan Vishniac, and Rosemary Wyse; Research Professor Bill Blair; and Adjunct professors Ron Allen, Mark Dickinson, Michael Fall, Henry Ferguson, Michael Hauser, Jerry Kriss, Mario Livio, Bruce Margon, Adam Reiss, Roeland van der Marel, Kim Weaver, and Robert Williams.

KANSAS, UNIVERSITY OF

Department of Physics & Astronomy, Lawrence, KS 66045

Attention: Barbara J. Anthony-Twarog

Well into its second century of scholarship in astronomy and astrophysics, the University of Kansas' astronomy and astrophysics program includes research efforts in stellar and galactic astronomy, space and plasma astrophysics and cosmology. In addition to use of the National Optical Astronomy Observatory, optical astronomers (Shawl, Twarog, and Anthony-Twarog) at KU have developed relationships with the WIYN consortium and Mt. Laguna Observatory for additional facilities access. Cravens and Medvedev anchor the space and plasma astrophysics group, working on topics ranging from planetary ionospheres to accretion onto degenerate stars. Cosmologists Melott, Shandarin, and Feldman model the large-scale structure of the universe and the origin of structure and galaxy clustering.

LOUISIANA STATE UNIVERSITY

Department of Physics and Astronomy, Baton Rouge, LA 70803-4001
Department Chair: Joel Tohline

Attention: Juhan Frank or faculty member in your area of interest (frank@rouge.phys.lsu.edu)

The Department of Physics and Astronomy at LSU offers a PhD Program in Physics with thesis in Astronomy/Astrophysics and an optical concurrent MSc in Computer Sciences. The Department has faculty active in research in Astronomy, Astrophysics, and Space Sciences. A considerable effort is under way in high performance computing, making use of massively parallel computers and related architectures, and

focusing on astrophysical hydrodynamics and radiative transfer. The faculty whose work is related to one or more of the Gemini scientific key programs, and their respective research interests are listed below:

Ganesh Chanmugam is interested in magnetic degenerate stars, cataclysmic variables, LMXBs and pulsars. He is currently involved in a search for QPOs in cataclysmic variables using HST.

John Drilling is making comprehensive studies of very hot sdO stars and hot hydrogen-deficient stars. Work using IUE data and HST is currently underway.

Juhan Frank is working on accretion problems which include the fueling of AGN, the structure of accretion disks in close binaries, the radiation from accretion columns, and the evolution of binaries and binary pulsars.

Arlo Landolt is setting up an extensive network of broad-based Johnson-Kron-Cousins photometric standard stars which are used in the calibration of HST instruments.

Joel Tohline uses multi-dimensional hydrodynamic codes to model binary star formation, the settling of gas disks in galaxies, and gravitational instabilities in accretion disks and tori. His current work focuses on the efficient use of massively parallel computers to study astrophysical problems.

Computing Capabilities: LSU's Concurrent Computing Laboratory houses several high-performance, distributed memory parallel computers including an 8,192-node MasPar 1208B, an 8-node Intel iPSC/860 system, a 64-cell iWarp machine, a 40-node DEC Alpha system on a GIGASwitch network, and also an 8-node, shared memory Silicon Graphics Power Center 4D/380VGX. These machines are accessible as Unix nodes over internet. Access to supercomputing platforms at NSF MetaCenter Facilities is also available.

LOWELL OBSERVATORY

1400 W. Mars Hill Road, Flagstaff, AZ 86001

Attention: Robert L. Millis, Director

Lowell Observatory is a private research institution with a staff of 62, of whom 18 are astronomers at the doctoral level. We operate four research telescopes at our Anderson Mesa dark-sky site, including the 1.8-m Perkins Telescope. Ground soon will be broken for a versatile new 4-m telescope (NGLT) with first light scheduled for December 2007. Lowell is a partner in the Navy Prototype Optical Interferometer (NPOI), also located on Anderson Mesa. Our instrumentation group is currently building HIPO, a high-speed imaging photometer for use on SOFIA.

Current research at Lowell is divided more or less equally between solar system investigations and stellar/galactic/extragalactic studies. Examples of the former include a search for near-Earth asteroids (LONEOS); a reconnaissance of the Kuiper Belt (the Deep Ecliptic Survey); and numerous physical investigations of comets, satellites of the outer planets, Pluto, Charon, Uranus, and Neptune. Among the astrophysical research programs are investigations of activity cycles in late type stars, binaries containing late type or population II stars, very massive stars and their impact on their galactic and intergalactic environments, the stellar content of Local Group galaxies, and the evolution of galaxies.

More information is available at http://www.lowell.edu/.

MARYLAND, UNIVERSITY OF

Department of Astronomy, College Park, MD 20742

Attention: Marvin Leventhal

The department has a major involvement in the Berkeley-Illinois-Maryland Array (BIMA) of millimeter wave telescope in Hat Creek, CA. The Maryland group led by L. Blitz, S. Vogel, and L. Mundy is interested in the physical properties of star forming regions in our own and nearby galaxies, the properties of the interstellar medium and the overall structure of the Milky-Way and external galaxies. The planetary group led by M. A'Hearn is interested in all aspects of observational cometary research. This group was heavily involved in the impact with Jupiter during July 1994.

J. Stone models the hydrodynamics of the interstellar medium and star forming regions including the effects of magnetic and radiation fields using super computer simulations. J. Wang is a high energy theorist specializing in radiative transfer problems. P. Harrington does both calculations and observations of planetary nebulae. R. Bell does both observations and calculations of stellar spectra with a primary interest in the calculation of accurate synthetic stellar spectra. A. Wilson and S. Veilleux are primarily observers of Active Galactic Nuclei employing the entire gamut of observational tools in an attempt to understand the nature of the central engine. V. Trimble has been studying the corona of magnetic white dwarf stars using X-ray (Rosat) and ultraviolet (EUVE) satellite data. M. Leventhal is using both balloon and satellite data to do gamma ray spectroscopy. His particular interest is in the electron/positron annihilation line at 511 keV emanating from the galactic center.

MINNESOTA, UNIVERSITY OF

School of Physics & Astronomy, 116 Church Street, SE, Minneapolis, MN 55455

Attention: Thomas W. Jones

The Department of Astronomy supports a variety of observational and theoretical research programs broadly targeted to studies of the evolution of stars, galaxies and the associated interstellar medium. The department operates 0.75 m and 1.5m telescopes equipped for optical and infrared observations. Faculty and students are regular users of optical, infrared and radio observatories all over the world. The department operates a unique and very fast machine for scanning photographic plates and digitizing image data. The machine was used to produce an all-sky digital catalog of the POSS that is now available for on-line analysis. The department provides a comprehensive collection of computing and data analysis facilities that range from a local network of Sun and SGI machines to the full resources of the Minnesota Supercomputer Institute, which includes several Cray supercomputers.

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
HIGH ALTITUDE OBSERVATORY

P. O. Box 3000, Boulder, CO 80307-3000

Attention: T.E. Holzer

Research at the High Altitude Observatory is focused on understanding the sun and heliosphere and the earth's upper atmosphere, ionosphere, and magnetosphere as an integral physical system. Although there are astrophysical and planetary components in HAO's research program, the principal efforts are directed toward understanding the physical processes underlying the variability of the solar-terrestrial system and the impacts of this variability on the earth's lower atmosphere.

The combined action of convection and rotation in the solar interior generates the solar magnetic field in cycles of approximately 22 years, and it is this magnetic field that leads to the variability of the solar output of radiation, magnetized plasma, and energetic particles on time scales ranging from minutes to millennia, including the most familiar solar activity time scale of approximately 11 years. In the solar interior, the magnetic field alters the outward flow of energy: directly, by transforming fluid energy into magnetic energy and by providing additional modes of energy transport to the outer layers; and, indirectly, by altering the convective and the radiative transport efficiencies. In the solar atmosphere, the magnetic field controls the thermal and dynamical properties of the plasma which, in turn, give rise to the wealth of physical phenomena associated with the variable outputs of the sun. Understanding the physics of these phenomena is both inherently interesting and essential to our desire eventually to have a predictive capability for the variability of solar outputs that have a significant impact on the terrestrial environment.

The sun, of course, is the principal forcing agent of the terrestrial environment. Solar radiation in the visible, infrared, and near-ultraviolet spectral ranges directly impacts the upper atmosphere. The solar magnetized plasma and energetic particle outputs couple through the inner heliosphere and the terrestrial magnetosphere to impact primarily the high-latitude terrestrial upper atmosphere. The variability associated with the short-wavelength radiation, magnetized plasma, and energetic particles is coupled downward into the lower atmospheric layers, just as the variability in the lower atmosphere associated with anthropogenic effects is coupled upward into the upper atmospheric layers. Hence, studies of the anthropogenic effects in the upper atmosphere (where they are frequently much larger than in the lower atmosphere) can provide important information on the magnitude of anthropogenically induced global change at lower levels in the atmosphere, while studies of the downward transport of solar variability effects through the atmosphere provides a basis for understanding the relative importance of solar and anthropogenic variability effects on biospheric global change.

The unusual breadth of the HAO research program (which includes the region from the interior of the sun to the terrestrial atmosphere, as well as related to astrophysical and planetary systems) strains the available resources, but it is necessary for a coherent approach to the study of solar variability and its impact on the terrestrial environment. Fortunately, the unifying theme of solar-terrestrial research produces strongly overlapping interests over all of HAO's research efforts and leads to a healthy of interaction and cooperation.

NATIONAL OPTICAL ASTRONOMY OBSERVATORY

950 N. Cherry Avenue, Tucson, AZ 85719

Attention: Jeremy Mould, Director

Two divisions of NOAO, the Cerro Tololo Inter-American Observatory (CTIO) in Chile and the Kitt Peak National Observatory (KPNO) in Tucson, welcome applicants for Gemini Fellowships. Fellows who work in Tucson will interact with a large number of staff astronomers as well as astronomers from the many other observatories centered here. KPNO staff research emphases include the distance scale, large-scale structure of the universe, massive star formation and the luminosity function, planetary studies, and galaxy formation and evolution. Instrumentation development projects include a multi-object spectrograph, interferometry, and numerous state-of-the-are infrared cameras and spectrographs.

CTIO staff scientific projects that are particularly applicable to Gemini include the study of supernovae and their use in determining the Hubble constant, the structure of quasars and active galaxies, and the distribution of Lyman α clouds. In addition, CTIO supports infrared instrument development and control system development.

Applicants are invited to join any NOAO staff or instrumentation group.

NATIONAL RADIO ASTRONOMY OBSERVATORY

Edgemont Road, Charlottesville, VA 22903 (Director's Office Phone: 434-296-0241, Fax: 434-296-0278)

Attention: Miller Goss

Gemini Fellows at the NRAO in Tucson are encouraged to make use of the 12-Meter Millimeter Wave Telescope on Kitt Peak to obtain data complementary to, or in support of other observations. At the NRAO, Gemini Fellow, at their discretion, may either become involved with an ongoing Observatory research program, or they may develop their own program and receive the support of the Observatory to do so.

Current research at the NRAO in which students, postdoctorals, and staff scientists participate includes observations of regions of nascent star formation and analysis of the gas-phase chemistry that precedes, or perhaps initiates, star formation; studies of pre-planetary nebulae; the physics of circumstellar shells and the effect of stellar winds on the latter stages of stellar evolution; and investigation of the content, distribution, kinematics or molecular gas in late-type galaxies.

The NRAO provides computing facilities, imaging software, and access to the electronics laboratory for Gemini Fellows. The continuing flow of visiting scientists who use the 12-Meter telescope as well as the extensive astronomical community in Tucson all contribute to making the NRAO an environment in which Gemini Fellows can be exceptionally productive.

NEW MEXICO STATE UNIVERSITY

Department of Astronomy, MSC 4500, Box 30001, Las Cruces, NM 88003 (http://astro.nmsu.edu/)

Attention: Rene Walterbos, Department Head

New Mexico State University offers many exciting opportunities for research by Gemini Fellows. Our program covers diverse research interests, from planetary science to cosmology. We have 8 regular faculty, about 25 graduate students and several postdocs and research faculty. NMSU is a partner in the Astrophysical Research Consortium (ARC) with telescope access at the nearby Apache Point Observatory to the ARC 3.5-m optical/IR telescope and the NMSU 1-m telescope. We are also a participant in the Sloan Digital Sky Survey. Other major facilities in the area include Kitt Peak National Observatory near Tucson, the VLA and VLBI radio facilities in Socorro, the National Solar Observatory at Sac Peak, and the Los Alamos and Sandia National Laboratories. Department members are regular users of various space-based observatories and national observatories, including Gemini.

Research interests in the department include planetary atmospheres, cataclysmic variables and binary stars, star clusters, interstellar and intergalactic medium, galaxy formation and evolution, quasar absorption lines, and cosmology.

NORTH CAROLINA, UNIVERSITY OF

Department of Physics & Astronomy, CB#3255 Phillips Hall, Chapel Hill, NC 27599-3255

Attention: Bruce Carney

Observational astrophysics at UNC includes work in stellar evolution (Chris Clemens; Bruce Carney), stellar populations (Bruce Carney; Jim Rose), evolution of galaxies (Gerald Cecil; Jim Rose), high-energy astrophysics (Wayne Christiansen; Dan Reichart; Chuck Evans), and cosmology (Dan Reichart). UNC will have 61 nights per year on the 4.1-meter SOAR Telescope once it comes on line in 2004, and 11 nights a year on the 11-meter Southern African Large Telescope when it comes on line in 2005.

The Physics & Astronomy Department at UNC also includes several other varieties of astrophysics. Theoretical work is done in string theory (Louise Dolan, Paul Frampton), cosmology (Paul Frampton, Laura Mersini), and gravity theory (Chuck Evans). Experimental nuclear astrophysics is done at the Triangle Universities Nuclear Laboratory as well as at other sites (Art Champagne; Christian Iliadis; Hugon Karwowski), with an emphasis on neutrino physics and low-energy reactions of astrophysical interest, in particular with respect to processes involved in the advanced stages of stellar evolution and Big Bang nucleosynthesis.

OHIO STATE UNIVERSITY

Department of Astronomy, 4055 McPherson, 140 W. 18th Avenue, Columbus, OH 43210

Attention: Patrick S. Osmer

The Astronomy Department at Ohio State has active research programs in ultraviolet, optical and infrared observational astronomy, theoretical astrophysics and cosmology, and astronomical instrumentation and

stresses close interaction among all three areas. Observational programs related to the Gemini project include the nature and evolution of galaxies and quasars, the properties of active galactic nuclei, the study of the galactic center, the nature and composition of the interstellar medium, star formation, and stellar abundances and galactic chemical evolution. All of the programs will benefit from the light-gathering power, spatial resolution, and infrared capabilities of the Gemini telescopes. The goals of the instrumentation program in the Department are closely related to Gemini efforts, and OSIRIS, the Ohio State Infrared Imaging Spectrometer, has had extensive use at CTIO by OSU personnel and the general user community.

Gemini Fellows would have opportunities to use all the Department facilities, including its 1/4 share of the MDM Observatory and its 1/6 share of the observing time on the Large Binocular Telescope after it becomes operational.

Ohio State faculty and staff also have many years of experience in working with students and astronomers from the South American Gemini countries. Several of the faculty and staff have worked at CTIO and are bilingual in English and Spanish. The Astronomy Department welcomes visitors and students from South America and will provide a friendly and scientifically stimulating environment for research work.

OKLAHOMA STATE UNIVERSITY

Department of Physics, 145 Physical Science II, Stillwater, OK 74078-3072

Attention: Steve W.S. McKeever

Research in the OSU Physic Department includes programs on protoplanetary disks and on the structure and evolution of supernova remnants. Both observational and theoretical techniques are employed. Gemini observations of northern and southern SNRs would have high sensitivity and resolution, and consequently be of great interest. Gemini Fellows at OSU would also have the opportunity to consult astronomers at the University of Oklahoma who specialize in supernovae.

PENNSYLVANIA STATE UNIVERSITY

Department of Astronomy and Astrophysics, 525 Davey Laboratory, University Park, PA 16802

Attention: Peter Meszaros

The Department of Astronomy and Astrophysics at Penn State University conducts a wide range of research programs in stellar, galactic, and extragalactic astronomy, which span the entire electromagnetic spectrum. Commonly used facilities include the VLA and Arecibo radio telescopes, the NASA Infrared Telescope Facility, the optical telescopes of the Kitt Peak, Cerro Tololo, and McDonald Observatories, the IUE and Hubble Space Telescopes, and the ROSAT and ASCA x-ray satellites. In addition, the faculty at Penn State are actively engaged in the development of astronomical instrumentation, including CCD cameras for x-ray sounding rockets and the Advanced X-ray Astrophysical Facility (AXAF), spectrographs and infrared detectors for groundbased telescopes, and receivers and signal processors for radio telescopes. Currently, Penn State operates the 1.6-m telescope at Black Moshannon Observatory, and is a major partner in the Hobby-Eberly Telescope, a 9-m class optical/infrared instrument now under construction at the McDonald Observatory in West Texas. This unique, Arecibo-line telescope will be optimized for queue-scheduled, fiber-coupled spectroscopy and will be available for the general usage by Penn State astronomers in late 1996.

Active programs in observational astronomy and theoretical astrophysics include the search for extrasolar planets, (distance scale, quasar absorption lines, galaxy evolution, BL Lacs, high-redshift quasars), the study of cataclysmic variables and x-ray binaries, theoretical modeling of gamma-ray bursts, and numerical relativistic dynamics.

PLANETARY SCIENCE INSTITUTE

620 N. Sixth Avenue, Tucson, AZ 85705

Attention: Donald R. Davis

The Planetary Science Institute (PSI) is a non-profit scientific research organization which conducts a variety of basic research programs in planetary science and stellar astrophysics. Established in Tucson, Arizona, in 1972, the Institute has multi-faceted research programs in planetary astronomy, lunar and planetary geology, and planetary geophysics and dynamics and PSI's Astrophysics Group conducts research on cataclysmic variables, CCD observational techniques and instrumentation, multi-wavelength observations, faint object photometry, and extra-solar planet searches.

PSI scientists have participated in NASA spacecraft missions such as Mariner 9, Viking, and Mars Observer, and are presently involved in the Galileo and NEAR missions. They are frequent guest observers on NASA astrophysics satellites such as HST and EUVE and regularly use many of the world's ground-based observatories. Planned research using the Gemini telescopes (see below) includes observations of faint solar-system bodies, high resolution imaging of asteroids, optical and IR spectra of faint cataclysmic variables and photometric time-series observations of faint extragalactic systems.

Staff Members at PSI and their research areas are:

Clark Chapman - Physical studies of small bodies in the solar system, Cratering and impact processes, and Spacecraft imagery of planetary surfaces.

Donald Davis - Asteroid collisional evolution, Planet formation processes, Origin of the moon, and Dynamical studies of planetesimals.

William Hartmann - Cratering studies, Mars, Astronomy education, and Astronomical art.

Steve Howell - Cataclysmic variables, Faint Object 2-D photometry, Multi-Wavelength Studies, CCD instrumentation, Variable Extra-galactic objects, and Extra-Solar planet searches.

Carol Neese - Spectroscopy and photometry of asteroids, Low-resolution spectroscopy, Near-Earth objects, and Archiving asteroid data for the Planetary Data System.

Eileen Ryan - Experimental studies of asteroid impacts, Numerical impact simulations, cratering studies, and Science education via the internet.

Stuart Weidenschilling - Origin of the solar system, Interactions between solid bodies and gas in the early solar nebula, Gravitational scattering, and Planetary accretion.

PRINCETON UNIVERSITY

Department of Astrophysical Sciences, 113 Peyton Hall, Princeton, NJ 08544-1001

Attention: Scott Tremaine (tremaine@astro.princeton.edu)

The Department of Astrophysical Sciences supports research in most branches of astrophysics, both theoretical and observational. The topics range from planets, stars and the interstellar medium, to extragalactic astro-physics—galaxies, clusters, quasars, large-scale structure of the universe, galaxy formation and cosmology. Neta Bahcall, Renyue Cen, J. Richard Gott, and Jeremiah Ostriker conduct phenomenological and numerical studies of large-scale structure and galaxy evolution. Princeton's other faculty include Bruce Draine (theoretical studies of dust and the interstellar medium), Jeremy Goodman (dynamics, galactic structure, accretion disks), James Gunn (observational cosmology and instrumentation), Edward Jenkins (interstellar and intergalactic medium), Gillian Knapp (stars and the interstellar medium), Russell Kulsrud (plasma astro-physics), Bohdan Paczynski (large-scale surveys, gravitational microlensing, gamma-ray bursts), David Spergel (detection of extrasolar planets, theoretical cosmology, the cosmic background radiation), Michael Strauss (observational studies of large-scale structure active galactic nuclei), Scott Tremaine (galactic structure, planetary and stellar dynamics), and Edwin Turner (gravitational lenses, extrasolar planets). The faculty includes five members of the National Academy of Sciences, four winners of the Warner or Pierce Prize, and three winners of the Heinemann Prize. The department offers an exceptionally strong graduate program in astrophysics, with close interactions between grad students and postdocs; nine former Princeton graduate students have been awarded Hubble Fellowships. Information on other fellowships at Princeton is available at http://astro.princeton.edu/.

Princeton University is a partner in ARC, which operates a 3.5-m telescope at Apache Point Observatory and is operating the Sloan Digital Sky Survey, a survey of the northern Galactic hemisphere which will catalog more than 100 million objects and obtain spectra of almost one million objects.

There is also an active program of astrophysics research in the Gravity Group in the Physics Department at Princeton University. The faculty includes Edward Groth, Lyman Page, P.J.E. Peebles, Suzanne Staggs, Paul Steinhardt, and Joseph Taylor. The Institute for Advanced Study, about 2 km from campus, maintains a strong research program in astrophysics and there are many collaborations between these three groups. Together they provide an unsurpassed environment for research in a broad range of topics in astrophysics, particularly those which involve theoretical interpretation.

RICE UNIVERSITY

Department of Space Physics & Astronomy, Houston, TX 77251-1892

Attention: Reginald J. Dufour

Our department consists of 14 regular faculty, 4 research faculty, and 8 associated faculty, for which the unifying research theme is plasmas related to astrophysics and space physics. Among the faculty, seven are primarily interested in astrophysical problems. Observationalists include Reginald J. Dufour (HII regions, planetary nebulae, star-forming galaxies, chemical evolution of galaxies), Patrick M. Hartigan (young stars, circumstellar disks, stellar jets, Fabry-Perot instrumentation), Robert C. Haynes (observational γ-ray astronomy and balloon-borne insturmentation), and C. Robert O'Dell (HII regions, planetary nebulae, proto-planetary objects, comets, space astronomy). Theorists include Edison P. Liang (γ-ray bursters and other

sources, black holes and accretion disk phenomena), F. Curtis Michel (properties and evolution of pulsars, young supernova remnants, dark matter), and Jon Weisheit (atomic processes in plasmas with intense in plasmas with intense magnetic fields and/or high densities, magnetic white dwarfs, globular clusters in the early universe). In this research we have utilized telescopes in both hemispheres, as well as space-borne instruments such as CGRO, COBE, HST, IUE, IRAS, ROSAT, etc. and look forward to the scientific potential of the GEMINI telescopes for future research projects.

SPACE TELESCOPE SCIENCE INSTITUTE
3700 San Martin Drive, Baltimore, MD 21218
Attention: Ron Allen - Head, Research Programs Office

STScI is the scientific and operations center for the Hubble Space Telescope. The research interests of the scientific staff include the solar system, stellar evolution and pulsation, supernovae, interacting binary stars, the interstellar and intergalactic media, galactic structure and evolution, active galactic nuclei and quasars, large-scale structure, and cosmology. The STScI staff are typically awarded about 15 percent of the peer-reviewed observing time with HST. The research also involves observations with many other telescopes (both space-based and ground-based, at all wavelengths) and theoretical studies. The scientific staff of STScI includes: R.Allen, S. Baum, J. Biretta, C. Blades, R. Bohlin, H. Bond, R. Brown, D. Calzetti, L. Danly, M. Donahue, M. Fall, H. Ferguson, H. Ford, A. Fruchter, R. Gilliland, A. Kinney, A. Koratkar, B. Lasker, C. Leitherer, M. Livio, K. Long, S. Lubow, D. Macchetto, P. Madau, M. McGrath, P. Moller, K. Noll, C. Norman, C. O'Dea, N. Panagia, M. Postman, E. Schreier, A. Saha, K. Sahu, M. Shara, D. Soderblom, B. Sparks, P. Stockman, M. Urry, M. Voit, N. Walborn, H. Weaver, R. White, B. Whitmore, and R. Williams. STScI also has a significant number of graduate students, postdoctoral fellows and scientific visitors. Interaction and collaboration between them and the scientific staff are encouraged. STScI is only a short distance from the Physics and Astronomy Department of the Johns Hopkins University, which is also active in astrophysical research.

STANFORD UNIVERSITY
Astronomy Program, Building ERL, Stanford, CA 94305-4055

Attention: Vahe Petrosian

TEXAS, UNIVERSITY OF
Department of Astronomy and McDonald Observatory, Austin, TX 78712

Attention: Dr. David L. Lambert, Chair (chairman@astro.as.utexas.edu)

The Department of Astronomy and McDonald Observatory together have a scientific staff of about 50 Ph.D.'s, including faculty, research scientists, and postdocs. The observatory has a 2.1- and a 2.70-meter telescope, and in cooperation with Pennsylvania State University and three other partners, operates the Hobby-Eberly Telescope, a 9-meter telescope. We also have a cooperative arrangement with California Institute of Technology to use the Caltech Submillimeter Observatory at Mauna Kea Observatory. A wide range of computer services are available within the department and at the Center for High Performance Computing. Research areas include:

Solar System Research: Astrometry, planetary atmospheres, cometary physics and chemistry, and searches for extra-solar system planets.

Stellar Astronomy: Chemical abundances, chemical evolution of the galaxy, binary stars with compact objects, accretion disks, variable white dwarfs, and supernovae.

Star Formation and the Interstellar Medium: Observations of the ISM at infrared, millimeter and submillimeter wavelengths, and associated theory of dynamics, turbulence, and interstellar grains.

Extragalactic Astronomy: Observations and theory of galaxy structure and evolution, quasars, massive black holes, intergalactic medium, extragalactic HII regions, large scale structure, cosmology.

For more details, please see our web site at http://www.as.utexas.edu/.

TEXAS AT EL PASO, UNIVERSITY OF

Department of Physics, 500 W. University, El Paso, TX 79968

Attention: Verne V. Smith (verne@barium.physics.utep.edu)

Astronomy and astrophysics research at UTEP centers on the origins and evolution of the chemical elements in the Universe. Much of this work involves the observation and analysis of high-resolution spectra from stars and interstellar gas, both from ground- and space-based observatories. A sample of current projects includes:

- Chemical evolution in various galactic and extragalactic environments.
- Probing neutrino-induced nucleosynthesis.
- Lithium isotopes and the baryonic density of the Universe.
- Follow-up spectroscopic observations of grid-star candidates for the Space Interferometry Mission.

VIRGINIA, UNIVERSITY OF

Department of Astronomy, P.O. Box 3818, Charlottesville, VA 22903-0818

Attention: Craig L. Sarazin, Chairman

Research areas pursued at the University of Virginia include supernovae, stellar evolution and stellar populations, the interstellar medium, hot gas in galaxies and clusters of galaxies, accretion disks, binary stars, starburst galaxies, active galactic nuclei, large scale structure, computational astrophysics, and astrometry. The Virginia Institute for Theoretical Astronomy funds an active visitor and postdoctoral program. The Department is near the headquarters of the National Radio Astronomy Observatory, which provides close contact with developments in radio astronomy.

WASHINGTON, UNIVERSITY OF

Astronomy Department, PO Box 351580, Seattle, WA 98195-1580

Attention: Bruce Balik, Chair

Our department includes about 15 faculty, 10 postdocs, 15 technical support staff, and 25 graduate students engaged in research covering a broad range of experimental and theoretical astrophysics, instrument development and telescope design. Facilities include a one third share of the Apache Point 3.5 meter telescope in New Mexico and a new building near Portage Bay in central Seattle shared with the UW Physics Department. UW is also a partner in the Sloan Digital Sky Survey (SDSS) and the Large Synoptic Survey Telescope (LSST). For more detail, please see our web site at http://www.astro.washington.edu/.

WISCONSIN, UNIVERSITY OF

Department of Astronomy, 475 North Charter Street, Madison, WI 53706

Attention: Linda Sparke

The University of Wisconsin Department of Astronomy has an extensive array of research programs in observational and theoretical astronomy as well as instrumentation development. Our observational programs employ instruments on satellites, rockets, and a variety of ground-based facilities, including the 3.5-m WIYN telescope at Kitt peak, and span the electromagnetic spectrum from radio to x-rays. Wisconsin is a major partner in the new 11-m SALT telescope. SALT's Prime Focus Imaging Spectrograph (PFIS), built in the Department, will offer unique spectroscopic and polarimetric capabilities in the southern sky from 2005.

Current programs include observational cosmology, galaxy dynamics, extra galactic radio astronomy, stellar populations and galaxy evolution. We study low and high mass star formation, stellar atmospheres and winds, Galactic molecular clouds, the diffuse interstellar and intergalactic medium, magnetic fields, turbulence, plasma astrophysics, and new technologies for detectors, spectroscopes, and polarimetry.

Wisconsin astronomy benefits from close ties to the Physics Department, with research on neutrino astronomy, pulsars/compact objects, cosmic background radiation, solar system objects, and the theory and observations of hot interstellar matter. The IceCube neutrino telescope now under construction at the South Pole involves both departments.

YALE UNIVERSITY

Department of Astronomy, P.O. Box 208101, New Haven, CT 06520-8101

Attention: Sabatino Sofia