

Organized Research Units (ORUs) are academic units the University of California has established to provide a supportive infrastructure for interdisciplinary research complementary to the academic goals of departments of instruction and research. The functions of ORUs are to facilitate research and research collaborations; disseminate research results through research conferences, meetings, and other activities; strengthen graduate and undergraduate education by providing students with training opportunities and access to facilities; seek extramural research funds; and carry out university and public service programs related to ORUs' research expertise. The senior staff of these units are faculty members in related academic departments. Institutes and centers currently in operation at UCSD are described below.

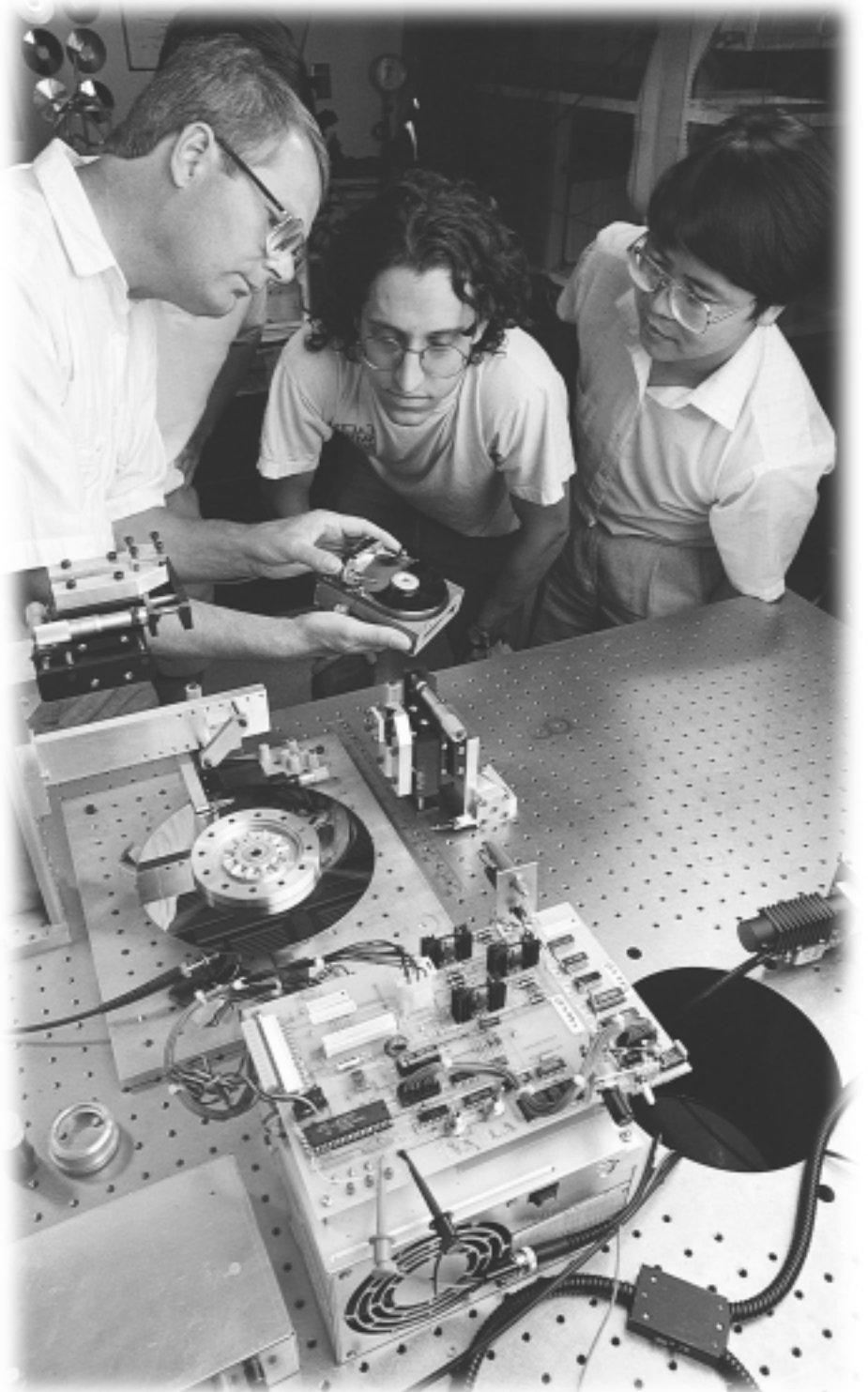
In addition, the university is formally and informally affiliated with various private research organizations such as the Institute of the Americas, The Salk Institute for Biological Studies, Howard Hughes Medical Institute, Ludwig Institute for Cancer Research, and The Burnham Institute.

Universitywide Institutes/ Organized Research Units

California Space Institute (Cal Space) was established in 1979 as a multicampus organized research unit of the University of California (UC). It supports and conducts pure and applied space-related science and technological research and development throughout the UC system. Specific areas of investigation include the following:

Remote Sensing—acquisition, processing, and application of observations by satellites or other remotely automated instruments to study the Earth and its changing environment. The primarily satellite-based investigations study the greenhouse effect, global warming, hydrological cycle, land surface processes, air-sea interactions, radiation, and cloud dynamics.

Climate—interdisciplinary scientific research that applies space observations and numerical modeling techniques to fundamental issues of climate prediction and global change caused by both natural and human forces. CalSpace collaborates with the Climate Research Division and



other divisions at Scripps to study complex geophysical and biochemical interactions and feedbacks that link the components of the climate system, including the atmosphere, oceans, and land surfaces.

Space science and engineering—investigations of both the solar system and universe, and the development of automation and robotic systems for space exploration. Current investigations include the study of comets, asteroids, the solar wind, and cosmic background radiation. Space observations are often conducted with instruments and techniques designed by CalSpace researchers.

Education—promotion of undergraduate and graduate education in the interdisciplinary fields of climate and global change, and space science and engineering. The CalSpace-led state-wide consortium (California Space Grant Consortium) was designated in 1989 as a Space Grant College by NASA's Office of Education. The program expands leadership in the development and application of space resources through research and hands-on space projects, fellowship funding, and educational outreach activities. The California Space Grant Program works with NASA Centers and the aerospace and high technology industries to strengthen its educational objectives.

Institute of Geophysics and Planetary Physics (IGPP) was established in 1960 and named the Cecil H. and Ida M. Green IGPP in 1994. It is a multicampus research unit of the University of California, headquartered at UCSD, with branches at UCLA, UCR, UCSC, as well as Los Alamos and Lawrence Livermore National Laboratories. The present facility includes the Roger and Ellen Revelle Laboratory and the Judith and Walter Munk Laboratory. Present research concentrates on the study of crustal dynamics by measurements of gravity, tilt, displacement, and strain in both continental and oceanic environments; of regional seismicity and linear and nonlinear earthquake and explosion source mechanisms; of the variability of the earth's geomagnetic field and its generation by the geodynamo; of the spherical and aspherical structure of the earth by measurements of free oscillations, surface waves, and travel times; of seafloor tectonics using marine geophysical methods; of linear and nonlinear theoretical and computational fluid dynamics; of the variable mesoscale structure of the oceans and global ocean warming by acoustic tomography; of the

structure of the oceanic crust and lithosphere by seismic and electromagnetic measurements on the ocean bottom and at the ocean's surface through seismic multichannel methods; of seafloor and planetary topography and gravity using satellite methods; of nonlinear dynamics applied to geomorphology; and of tides, waves, turbulence, and circulation in the oceans; of surface change caused by tectonic activity, or climate change using satellite Interferometric Synthetic Aperture Radar (InSAR), as well as airborne and spaceborne laser altimetry. The institute operates a global network of some forty broadband seismometers, the IDA (International Deployment of Accelerometers) Array, with ten of these stations in the former Soviet Union which are telemetered by satellite to the institute; a crustal strain and seismic observatory at the Cecil and Ida Green Pi-on Flat Observatory near Palm Springs; a scientific wireless network in California with SDSC, the High Performance Wireless Research and Education Network (HPWREN); a southern California network of Global Positioning System (GPS) satellite geodetic sites operated by the Scripps Orbit and Permanent Array Center (SOPAC) and the California Spatial Reference Center (CSRC); an acoustic network in the Pacific for measuring ocean temperature variability; a 5m, X-band satellite receiving antenna for satellite remote sensing; a national Ocean Bottom Seismograph Instrument Pool (OBSIP); and telemetered seismic arrays in Kirghizia, and two locations in California. The institute does not grant degrees, but makes its facilities available to graduate students from various departments who have chosen to write their dissertations on geophysical problems. Undergraduate students are involved in independent research projects and as laboratory assistants. Members of the institute staff now hold joint appointments with the Departments of the Scripps Institution of Oceanography, and Applied Mechanics and Engineering Sciences. Support for visiting scholars and grant matching funds is provided through an endowment to the Cecil and Ida Green Foundation for the Earth Sciences.

The University of California **Institute on Global Conflict and Cooperation (IGCC)** was founded in 1983 as a multicampus research unit for the entire University of California (UC) system. IGCC is based at UCSD and serves all ten universities of the University of California and

the UC-managed Lawrence Berkeley, Lawrence Livermore, and Los Alamos National Laboratories. IGCC's mission is to educate the next generation of international problem-solvers and peacemakers through teaching activities, research, and public service. Scholars, researchers, government officials, and journalists from the United States and abroad participate in IGCC projects.

During IGCC's first five years, research focused largely on averting nuclear war through arms control and confidence building measures between the superpowers. Since then, the research program has diversified to encompass several broad areas of inquiry: regional relations, international environmental policy, ethnic and internal conflicts, the proliferation of strategic weapons, and international trade and telecommunications.

IGCC serves as a liaison between the academic and policy communities. IGCC supports research and teaching on the causes of international conflict and opportunities to promote international cooperation through an annual fellowship and grant cycle. IGCC's development office provides additional resources on foundation funding opportunities for UC faculty projects.

In 1997, an IGCC Washington D.C. office was established to further connect scholars with the policy process. The D.C. office administers a graduate internship program in international affairs and the IGCC Dissertation/Foreign Policy Fellow Program. Interns and fellows work with governmental and non-governmental organizations involved in international policy. IGCC Washington also puts on policy seminars to showcase UC faculty research results and provide interaction between professors and policy-makers.

Annually, IGCC's **NEWSWired** provides a concise overview of IGCC's multicampus agenda, research, funding, awards, projects, meetings, workshops, colloquia, news, and publications. IGCC's online **POLICYPacks** serve our core mission of informing policy debate. **IGCCReView** condenses and thematically addresses book-length results of research conducted by senior faculty associated with IGCC.

IGCC receives primary support from the Regents of the University of California and the State of California. Additional funding has been provided by the U.S. Department of Energy, the U.S. Department of State, the U.S. Department of Defense, the U.S. Institute of Peace, the Japan-U.S. Friendship Commission, and Japan's National Institute for Research Advancement

(NIRA). IGCC also receives important foundation support from the Carnegie Corporation of New York, the John D. and Catherine T. MacArthur Foundation, the William and Flora Hewlett Foundation, the Rockefeller Foundation, and the Japan Foundation Center for Global Partnership.

For in-depth information about IGCC and its research programs, including full-text publications, visit IGCCOnline at <http://www-igcc.ucsd.edu>.

The White Mountain Research Station (WMRS) was established as a UC multicampus research unit in 1950 to support high altitude research. The station includes 4 laboratory facilities located over a 3,000m (10,000 vertical ft.) altitude transect, ranging from the floor of the Owens Valley to the highest peak in the White/Inyo Mountains. Located on the western edge of the Great Basin, WMRS also provides access to three major biogeographic regions (Sierra Nevada and White/Inyo montane, Mojave desert and Great Basin desert), and geologically rich and diverse field sites. WMRS has evolved into a major multidisciplinary research and teaching institution in eastern California, and hosts programs in archaeology and anthropology, atmospheric and space sciences, biological and medical sciences, ecology, conservation and natural resource management, geological, hydrological, and earth sciences.

WMRS facilities include: (1) the business office, laboratories, classrooms, dormitories, and dining hall for up to seventy people in Bishop, (2) a newly renovated lodge, cabins, and laboratory at Crooked Creek (3,094m altitude), which accommodates up to fifty people, (3) the Nello Pace Laboratory and Mount Barcroft facilities (3,801m altitude) which accommodate thirty-five people in dormitories, and (4) the 450 square foot Summit Laboratory located on White Mountain peak (4,342m altitude), and is the highest research lab in North America.

The Bishop facilities include a modern biology laboratory, The Deepest Valley Interagency Plant Propagation Center, and a geographic information system (GIS) laboratory that houses the USGS-funded "Eastern Sierra Geospatial Data Clearinghouse." This is used by visiting researchers and local agency scientists, as well as off-site investigators and policy makers via World Wide Web access.

WMRS hosts more than 2,000 users from over 100 institutions per year for research, teaching,



and conferences. Research is most intensive in the summer and involves students supported by WMRS Fellowships, UC faculty supported by WMRS Research Grants, and faculty from other universities around the world. Educational uses include several geology field courses and the UC intercampus supercourse in Environmental Biology with the students in residence for the spring quarter. WMRS hosts the UC Summer Symposium in conservation biology and annual professional society meetings, and offers published proceedings from symposia on the environmental science in the region.

Campuswide Institutes

Established in September 1996, **the AIDS Research Institute (ARI)** originated from the Center for AIDS Research (CFAR), an NIH-funded AIDS research program. The ARI is an organizational umbrella to integrate HIV (human immunodeficiency virus)/AIDS (acquired immune deficiency syndrome) researchers and clinicians on campus by sponsoring seminars and work-

shops, offering developmental grants to new investigators in the area of HIV- and AIDS-related research, and devising new approaches to the prevention, diagnosis, and treatment of AIDS. One of the the missions of the ARI is to become an important community resource for HIV- and AIDS-related clinical programs, innovative therapies, and cutting edge research taking place at UCSD. The AIDS program at UCSD's medical school ranked eighth in the nation and HIV- and AIDS-related grants at the university totaled more than \$24 million in 1999.

Related HIV research and care centers at UCSD include the Center for AIDS Research (CFAR), the UCSD Treatment Center, The Owen Clinic, The HIV Neurobehavioral Research Center (HNRC), The Center for Medicinal Cannabis Research, and the Center for Viral Dynamics at the San Diego VA Healthcare System.

Investigators at UCSD are also recipients of the Adult AIDS Clinical Trials Group (ACTG), the Pediatric AIDS Clinical Trials Group (PACTG), the California Collaborative Clinical Trials Group (CCTG), the California NeuroAIDS Tissue Network

(CNTN), and individual grants totaling more than \$10 million.

The ARI is committed to improving core facilities, as well as offering education, training, and research opportunities. It also serves as a liaison with the public for increased awareness of AIDS transmission, available treatments and clinical trials, as well as counseling programs for affected individuals and their families.

The UCSD Institute of Molecular Medicine (IMM) is a newly approved initiative designed to provide a unique research and training atmosphere for graduate students, Ph.D. students, M.D. fellows, and M.D.-Ph.D. fellows with a scientific focus on molecular medicine in the post-genome era. The Institute of Molecular Medicine was established in June 2000 as an Organized Research Unit at UCSD, and has been designed as a "Center Without Walls" to encourage interactive, interdisciplinary, educational, and research opportunities in the growing field of molecular medicine. The faculty members of this institute are committed to create and maintain a collaborative environment that will ensure the rapid development of novel, biologically targeted therapies to enhance the lives of the patients of tomorrow. The first phase of programs has been established in the areas of cardiovascular and neurological diseases; however, it is anticipated that studies in other complex human diseases will be included as scientific and clinical opportunities are solidified in the new institute. A current National Institutes of Health Training Program and The Leducq Award are joint programs with collaborators at The Salk Institute, which afford students an opportunity to work for periods of time at both institutions, depending upon the technology which is being applied to their particular research project. Research and educational programs include stem cell biology, regeneration, chemical biology, neuroscience, computer modeling, and genomics.

The Institute of Molecular Medicine's goals and objectives are: 1) to expand on the growing vertebrate genomic databases and a variety of genetic based approaches to form a multidisciplinary research program to unravel complex human diseases, including heart and neurological disorders 2) to provide a high technology platform that will be based upon collaborative research efforts between prominent scientists in the fields of bioengineering, neuroscience, chemistry, physiology, biology, and genetics 3) to

provide an international, cross-institutional, interdisciplinary training program in the Molecular Basis of Complex Human Physiology and Diseases, for M.D., M.D./Ph.D., and Ph.D. postdoctoral fellows 4) to develop strategic research collaborations, educational exchange programs, and training alliances with other international institutions and 5) to promote the development of industrial collaborations for specific targeted areas of both scientific and clinical interest.

Seventy-five faculty members from UCSD, Salk, Scripps, Burnham, and internationally-based collaborators, are participating in the Institute of Molecular Medicine. These participants represent a cross-section of the investigators and educators who constitute the scientific and clinical community of leading investigators working and teaching in areas related to molecular, cellular, genetic, and bioengineering approaches to identify pathways that control complex human physiological systems and related diseases. Each year the IMM hosts an international symposium, "Days of Molecular Medicine" which brings world leaders to La Jolla to present state-of-the-art lectures and provides programs which allow students in the IMM to



meet and discuss their projects with the speakers and senior scientists in attendance. This year, the journal *Nature Medicine* has forged a partnership with the IMM to co-sponsor the 2001 symposium and awards and further information can be reviewed online at imm.ucsd.edu. In addition to strengthening the ties in academia, the symposium also provides an opportunity for corporate sponsors to discuss potential collaborations and meet with the next generation of physician-scientists in this ever-changing field. The Institute of Molecular Medicine is based on the vision that a new era in human health and drug discovery lies at the borders between curiosity-driven science and tomorrow's medical therapies.

The Institute for Neural Computation (INC) focuses on research into how nervous systems function through experimental investigation and modeling of neural structures. The institute supports graduate training programs in cognitive neuroscience and computational neurobiology. The recently dedicated Swartz Center for Computational Neuroscience within the institute uses imaging techniques to study brain dynamics. The Machine Perception laboratory in the institute studies human perception and develops similar capabilities for robots. Additional areas of research include motor control systems, learning and memory, and language modeling. There is an active visitors program and an industrial affiliates program with ongoing joint research projects.

The Institute for Nonlinear Science (INLS) promotes interdisciplinary research and graduate education in the development and application of contemporary methods in the study of nonlinear dynamical systems. Using a common mathematical language, faculty and students from disciplines as diverse as physics, mathematics, oceanography, biology and neuroscience, mechanical and electrical engineering, and economics pursue the implications of generic characteristics of nonlinear problems for their subjects. Each year the institute sponsors several long- and short-term senior visitors from the University of California and elsewhere and provides, through funds from external funding agencies, support for approximately ten graduate students to work on Ph.D. dissertations concerned with nonlinear problems. Also associated with INLS are approximately twenty full-time research scientists and postdoctoral researchers.

The core of INLS activities is composed of (1) joint research among faculty and students across disciplinary lines and (2) lecture series and working seminars designed to convey recent research progress and to stimulate new investigations. Through contracts with external agencies the INLS supports experimental, numerical, and theoretical studies of nonlinear dynamics and chaos in neurophysiology, investigations in nonlinear fluid dynamics and pattern formation, studies (jointly with the University of California, Los Angeles and Stanford University) of applications of chaos in communications, as well as in the nonlinear dynamics of granular materials.

INLS has developed joint research programs with universities, research institutes, and commercial companies in areas of common interest. It actively works with colleagues at UCLA, Stanford, Cal Tech, Argonne National Laboratory, ST Microelectronics, Time Domain Inc., and Randle Corporation. These affiliations provide new research horizons and realistic opportunities for technology transfer.

Institute for Pure and Applied Physical Sciences (IPAPS) is an interdisciplinary research unit which brings together faculty and researchers in physics, chemistry, engineering, and Scripps Institution of Oceanography. The institute is concerned with fluids and materials. Specific subjects of research include superconductivity, ferromagnetism, semiconductor heterostructures, solid surfaces, plasma physics, hydromagnetics, turbulence, fluid mechanics, laser physics, and numerical analysis.

Within the IPAPS is the Center for Interface and Materials Science (CIMS), which emphasizes interdisciplinary collaborative research on the properties of surfaces, thin-layered composites, and novel materials, as well as their technological applications. With centralized space and equipment, CIMS brings together faculty and research staff from the Departments of Physics, Applied Mechanics and Engineering Sciences, Chemistry and Biochemistry, Electrical and Computer Engineering, and the Scripps Institution of Oceanography.

The **Sam and Rose Stein Institute for Research on Aging (SIRA)** is an ORU committed to advancing lifelong health and independence through research, education, and patient care. Established in 1983, the unit consists of sixty-eight researchers representing eleven different departments ranging from bioengineering to

family and preventive medicine and from neurosciences to psychiatry. This wide diversity fosters an interdisciplinary approach to solving the problems posed by diseases that increase with age. A majority of the total budget is allocated to research expenditures. SIRA also sponsors "Start-up Grants" to junior-level scientists in order to allow them to lay a foundation of data necessary to compete for national funding and help with career development. In addition, the institute is active in recruiting young students to the field of aging through the "Student Investigator Grant Program." Undergraduate and medical students, who have expressed an interest in age-related research, are teamed with established senior scientists to pursue a project. Healthwise, the free monthly newsletter, informs community members of the latest research discoveries and upcoming events sponsored by SIRA and UCSD. Coupled with the newsletter, a free monthly public lecture series presented by SIRA faculty is also used to inform the public.

The Whitaker Institute of Biomedical Engineering (WIBE). The Institute for Biomedical Engineering was established as an Organized Research Unit in November 1991. In August 1999, the ORU was named the Whitaker Institute of Biomedical Engineering in recognition of the strong support given by the Whitaker Foundation to biomedical engineering at UCSD.

The overall objective of the ORU is to provide an academic research unit for interdisciplinary interactions among faculty and students aimed at promoting and coordinating bioengineering research and education. The goals of the ORU are complementary to the academic goals of departments of instruction and research, with a major emphasis in bridging the various disciplines on campus related to biomedical engineering. The specific aims are: (1) to promote technology and biomedical engineering research at UCSD, (2) to enhance extramural research funding involving multidisciplinary collaborations, (3) to increase the visibility of the bioengineering programs at UCSD, (4) to coordinate bioengineering research at UCSD and neighboring institutions, and (5) to set up a high-technology laboratory for technology transfer to industry and medicine.

Members of the institute include close to 100 faculty and research scientists from the Jacobs School of Engineering, the School of Medicine, other departments on the main campus, and

The Scripps Institution of Oceanography, as well as The Scripps Research Institute, The Salk Institute, and The Burnham Institute.

The main research theme of the institute is integrative biomedical engineering. Under this general theme, principles and methods of engineering and life sciences are applied to elucidate structure-function relationships in normal and pathological states. The focus areas range from genes and molecules to tissues and organs. The research programs in the WIBE integrate the various levels of biological hierarchy and different body systems, as well as quantitative engineering analysis and modern biomedical sciences.

The WIBE has established several core facilities, which have provided research infrastructure for its members and educational facilities for graduate and undergraduate students, as well as postdoctoral fellows. The facilities include the Molecular/Genetic Technology Core (which includes Molecular Biology and DNA microarray), a Cell/Tissue Technology Core (which includes Confocal Microscopy, Cell/Tissue Culture Core, Flow Cytometry, Scanning Cytometry, and Biosensor Technology), and a Computation and Modeling Technology Core.

The research and training activities fostered by the WIBE are related to important medical problems such as heart failure, hypertension, atherosclerosis, pulmonary diseases, shock, inflammation, burns, orthopedic disorders, sports injuries, myopathies, peripheral nerve and brain injuries, age-related blindness, noise injury, cancer, liver disease, and diabetes. The ultimate goal of the interdisciplinary research carried out in the Institute is to improve the methods of prevention, diagnosis, and treatment of diseases. To this end, the WIBE endeavors to enhance the collaboration between basic science and clinical medicine and the cooperation between academia and industry. The WIBE Industrial Advisory Board was formed in 1993. With the help of the Board, an Industrial Affiliates Program was formed to facilitate the participation of biomedical engineering-related companies in WIBE activities. The Program currently has twenty member companies in San Diego and elsewhere. The enhanced academia-industry liaison has helped to facilitate collaborative research, student internship training, and scientific interchange through symposia, seminars, and meetings.

The WIBE received a \$5-million Whitaker Foundation Development Award in September 1993. The award made possible the recruitment of new faculty, increase of graduate student fellowships, enhancement of research cooperation among scientists on campus and in neighboring institutions, facilitation of industrial liaison, and the holding of symposia and workshops. The fostering of interdisciplinary collaborations by WIBE has also led to increased research funding from federal and industrial sources.

The WIBE played an important role in the successful application of the Whitaker Foundation Leadership Award by the Department of Bioengineering. The Leadership Award provides \$18.2 million for the construction of a new bioengineering building (the Powell-Focht Bioengineering Hall), establishment of new core facilities for research and education, and recruitment of new faculty with joint appointments in the School of Medicine and Department of Bioengineering.

The WIBE is leading an effort to establish a University of California system-wide Multicampus Organized Research Unit (MRU) on bioengineering.

Centers

The **UCSD Cancer Center (CC)**, active in the fight against cancer since 1979, is a National Cancer Institute-designated Clinical Cancer Center. The specific goals of the Cancer Center are to enhance the present level of basic research, increase collaborative research, increase the application of basic science to solve clinical problems through translational research, disseminate new knowledge to oncology professionals and scientists in the San Diego community, enable the biomedical industry to transfer new technology to the clinical setting, develop a strong effort in cancer prevention and control, and educate and train undergraduate and postgraduate physicians, and basic scientists. Under the auspices of a Cancer Center Support Grant from the National Cancer Institute, there are seven active program areas within the Cancer Center. These include Cancer Biology, Cancer Genetics, Cancer Prevention and Control, Cancer Pharmacology, Cancer Symptom Control, Translational Oncology, and Viral Malignancy. Shared resources at the Cancer Center include Behavioral Assessment and Counseling,

Biostatistics, Clinical Trials, Data Compilation and Analysis, Digital Imaging, DNA Sequencing, Flow Cytometry, Histology and Immunohistochemistry, Microarray, Molecular Pathology, Nutrition, Radiation Medicine, and Transgenic Mouse.

Research and educational grants support the training of postdoctoral fellows and medical students. The Clinical Trials Office coordinates clinical research trials involving cancer patients at UCSD and is the focal point for a large Oncology Outreach Network which provides state-of-the-art protocol treatment opportunities for patients in a broad geographic area. Patient care activities of the Cancer Center are located in the Combined Oncology Clinic at the Theodore Gildred Facility and in UCSD Medical Center, both located in Hillcrest, and at the Oncology Clinic of the Perlman Ambulatory Care Center and in UCSD Thornton Hospital, both located in La Jolla. Basic research activities of the Cancer Center are carried out at a variety of other locations on or adjacent to the La Jolla campus. Total membership of the Cancer Center exceeds 213 laboratory investigators and clinical physicians from nineteen academic departments. The research funding for Cancer Center members exceeds \$88 million.

The **Center for Astrophysics and Space Sciences (CASS)** is an interdisciplinary research unit established in 1979. The center brings together academic and research staff from the Departments of Physics, Chemistry, and Electrical and Computer Engineering. Research is conducted in the scientific areas of theoretical astrophysics; infrared, optical, and ultraviolet astronomy; solar observational and theoretical studies; X-ray and gamma-ray astrophysics; experimental and theoretical magnetospheric and space plasma physics; radio astronomy and cosmochemistry, including the chemistry of interstellar matter.

CASS provides a jointly shared facility which has office, laboratory, and computer space to enhance the interchange of expertise. Researchers in CASS have access to many University of California observing facilities, including Lick Observatory and the Keck Telescopes, and have contributed experiments to many major NASA space missions including the Hubble Space Telescope and the Rossi X-Ray Timing Explorer. Associated with CASS are included seventeen faculty, about twenty-five Ph.D.-level research staff, twelve graduate stu-

dents, and thirty technical and administrative support personnel.

The center's facilities, faculty, and research staff are available to graduate students in the Departments of Physics, Electrical and Computer Engineering, and Chemistry who have chosen to write their dissertation on subjects of research encompassed by CASS. Graduate and undergraduate courses in astrophysics, astronomy, and space sciences are developed and taught by the academic staff of CASS. The total yearly budget is about \$4 million, mostly from federal funding sources.

The Marlar Foundation provides several enhancements to the academic program, including support of the astrophysics and space science library, and funding for a yearly public lecture given by an eminent astrophysicist.

The overall objective of the **Center for Energy Research (CER)** is to provide an academic research unit for interdisciplinary interactions among UCSD faculty, research staff, and students aimed at promoting and coordinating energy research and education. Approximately sixty-one faculty, staff, and students are affiliated with the CER. The goals of the CER are complementary to academic departments of instruction and research with an emphasis on bridging the various disciplines related to energy research on the campus. Emphasis is currently on combustion and fusion energy research. The CER will also provide a vehicle for developing other dimensions of energy research, including energy policy research. The specific goals of the CER are: (1) to provide an inter-departmental coordinating function for energy research groups and projects at UCSD (2) to enhance the prospects of extramural research funding involving interdepartmental and multi-disciplinary collaborations in energy research (3) to promote the visibility of energy topics in undergraduate and graduate programs at UCSD (4) to provide a mechanism for interacting with other institutions involved in energy research with particular attention to potential industrial partners and (5) to promote the visibility of energy research at UCSD to potential sponsors and funding agencies.

A number of graduate research assistantships are available. Applications for graduate study in any of the disciplines covered by the CER should be directed to the academic department in which graduate study is to be undertaken.

The **Center for Environmental Research and Training (CERT)** coordinates the broad range of

environmental research activities across the university. Departmental participation includes the Departments of Anthropology, Biology, Chemistry and Biochemistry, Economics, School of Engineering, School of Medicine, Scripps Institution of Oceanography, the Center for U.S.-Mexican Studies, and the Graduate School of International Relations and Pacific Studies. This extensive group offers an opportunity to address environmental issues across traditional disciplinary boundaries. This opportunity is particularly crucial for understanding the complex interactive nature of global and regional environmental issues. The CERT also provides an interface for interaction with environmental agencies outside the university, including the environmental technology sector and governmental agencies.

The **Center for Human Development (CHD)** is an interdisciplinary, research-centered unit designed to meet the growing needs for interdisciplinary exchange on issues related to human development. The goal of CHD is to provide a forum for interdisciplinary exchange that creates dialogue between members of diverse disciplines. The Center is organized around five structurally distinct components, but with integrated functions. Each function is designed to serve a specific set of needs and to make unique contributions to the larger enterprise. These components are the following: (1) research support and infrastructure, (2) enrichment of human development's instructional counterparts—the undergraduate Human Development Program and a proposed interdisciplinary graduate program, (3) dissemination activities focused on but not limited to local community needs, (4) public policy analysis, and (5) assessment activities. In addition, the Center serves as a focal point for research, evaluation, and assessment activities associated with the campuswide Center for Research in Educational Equity, Assessment, and Teaching Excellence (CREATE).

The **Center for Human Information Processing (CHIP)** is a center for the study of the neural basis of perceptual and cognitive processes in the brain. It has two missions. The first is theoretical; we hope to understand the neural basis of perception, language, memory, and other mental processes by studying neurological patients as well as normal subjects. Second, we have the practical goal of developing new treatments for neurological and psychiatric disorders. It is composed of four subdivisions, each operating with the common goal of fur-

thering our understanding of human cognitive processes and the neurological bases of these processes. The subdivisions are: Brain and Perception Division, the Cognitive Processes Division, Division of Neuropharmacology and Alternative Medicine, and the Language Processing Division.

CHIP provides facilities for visiting scholars and supports workshops, conferences, and brown-bag discussion groups centering on the theoretical and empirical issues in each of these areas.

The **Laboratory of Comparative Human Cognition (LCHC)** operates under the auspices of CHIP. From its inception at UCSD in 1978, the focus of the LCHC's theoretical and empirical work has been the role of culture in shaping human development and human cognition. Members of the LCHC elaborate on culture as the species-specific medium of human existence, constituted of systems of artifacts and acting as both a constraint on and a tool kit for human action. Research sites focus on adult development, the organization of learning, and connecting theory and practice in community-based activity systems.

Within psychology, the approach adopted by LCHC is variously referred to as cultural-historical psychology, cultural psychology, or a cultural context approach to mind. It treats the mind as a phenomenon distributed among people and their artifacts, including language and social institutions. This approach is closely linked to social science movements referred to as activity theory, constructivism, and distributed cognition, which ground their analyses in people's everyday culturally organized activities.

Current research projects are grouped around five major areas: (1) the creation of experimental educational activities in community settings to promote the development of numerous forms of literacy; (2) investigation of cultural and linguistic factors in cognitive and social development; (3) computer networking and joint activity; (4) intervention studies of work and expertise as collaborative activity; and (5) analyses of discourse and representation. The LCHC published fifteen

volumes of *The Quarterly Newsletter of the Laboratory of Comparative Human Cognition*. It now publishes a journal, *Mind, Culture, and Activity: An International Journal*. The LCHC also coordinates several international electronic discussion conferences which currently includes more than 400 researchers from sixteen coun-

tries. The LCHC conducts a weekly seminar and workshops focused on special topics, including cutting-edge research reports from members of an interdisciplinary, international group of LCHC alumni who visit periodically.

The **Center for Iberian and Latin American Studies (CILAS)** coordinates and promotes Latin American and Iberian research and service activities for faculty and students in all departments at the university. It sponsors multi-disciplinary colloquia, conferences, projects and publications, as well as library expansion. Its most recent major initiative has been a multi-year project on Latin America and the Pacific Rim. The center also hosts visiting scholars, and it awards grants and fellowships each year to promising graduate students.

The **Center for Magnetic Recording Research (CMRR)** is devoted to multidisciplinary research and education in areas of science and engineering that form the foundation for information storage technologies for computer disk and tape drives. Founded in 1983 in partnership with a consortium of industrial sponsors, the center's continuing mission is to advance the state-of-the-art in magnetic disk and tape storage technologies, while producing highly trained graduate students and postdoctoral professionals. Together, the center's faculty and graduates have made major contributions to the remarkable progress that storage systems have achieved in storage capacity, data transfer rate, and cost efficiency over the past two decades.

CMRR supports four endowed professorial chairs, currently in the areas of magnetic materials, recording physics, tribology and mechanics of the head/medium interface, and signal processing and coding. The chaired professors also hold faculty appointments in the Departments of Physics, Electrical and Computer Engineering, and Mechanical and Aerospace Engineering. Graduate student researchers, post-graduate researchers, professional scientists, and visiting scholars representing international academic institutions and industrial laboratories contribute to a research and educational environment that is dynamic and varied.

As part of the center's mission to educate future leaders in the vital information storage industry, the faculty teach specialized classes at the undergraduate and graduate levels that train students in the theoretical methods and experimental techniques underlying advanced magnetic recording technology. In addition, the center contributes to the continuing education

of professionals in the storage industry through regular seminars, research reviews, and focused workshops.

Virtually all major information storage companies are sponsors of CMRR, and they provide substantial research support through their membership fees, focused research grants, and graduate student fellowships. "Real-world" research opportunities are also available to students through academic-year and summer internships with selected sponsors. Additional support has come from private foundations, state, and federal funding agencies, as well as from active participation in joint university-industry programs, such as those coordinated by the National Storage Industry Consortium (NSIC).

Through cooperative research projects and the associated faculty program, the center also fosters interactions with researchers in other campus organizations, including the Department of Chemistry and Biochemistry, the Department of Computer Science and Engineering, the San Diego Supercomputer Center, and the Information Storage Industry Center in the Graduate School of International Relations and Pacific Studies. The interests of these affiliates cover a broad spectrum, including novel materials for data recording, disk-drive failure prediction, computational analysis of the recording process, and the globalization of the magnetic recording industry.

CMRR also supports a world-class Library/Information Center for information storage technology that provides a range of services to sponsors, resident researchers, and students. Services include licensed database searching, patent searching, document retrieval, and expedited access to proprietary technical resources.

The **Center for Molecular Agriculture (CMA)** promotes research and education in plant genetics and plant molecular biology with an eye to the application of that research to the improvement of crops. Crop improvement cannot any longer rely exclusively on traditional plant breeding methods but requires the application of new technologies that include but are not limited to genetics and genomics, informatics, molecular gene isolation, and plant transformation. The CMA brings together researchers from UCSD and the Salk Institute and is a resource for the entire San Diego community. It provides a focal point for interaction with the local and statewide agricultural biotechnology industry. The Center wishes to play an active role in the debate about

the safe cultivation and use of genetically modified crops.

Center for Molecular Genetics (CMG) promotes molecular genetic research and the training of graduate students and postdoctoral fellows in the biological, chemical, and biomedical sciences. The center's research focus integrates basic science, including work on model developmental systems, with clinical applications aimed at understanding the molecular bases of human diseases. The latest techniques of gene isolation, gene manipulation (including control of gene expression), and the genetic transformation of cells and organisms are further developed and applied to major problems in biology and medicine. The center serves as a resource for the entire campus for molecular genetic techniques, materials, and facilities, and it encourages interactions with other ORUs in the biomedical area.

The center also strives to promote interactions between laboratories at UCSD and the biotechnology community and to facilitate the prompt and orderly transfer of new information resulting from innovative research into the private sector. The center reaches out to its supporters in the biotechnology and biopharmaceutical sectors through its industrial affiliates program, Biotechnology Origin. This unique program brings together scientists, business executives, and lawyers from both the for-profit and not-for-profit sectors of the industry to participate in a variety of meetings, conferences, and symposia throughout the year.

The **Center for Research in Biological Structure (CRBS)** is an interdisciplinary research unit focused on learning more about the nature and interrelationship of increasingly complex levels of biological structure, from the atomic and molecular level to the cellular and tissue level. Researchers involved with this center are studying the arrangements of atoms that determine the structures of enzymes, proteins, and the body's vast chemical communications network to the tissues and organs that provide an organism's inner strength and outside support. The center's goals include creating new tools to understand cell functions such as those involved in muscle contraction, cardiovascular networking, and the activities of the central nervous system such as thinking, memory, and emotion. Longer-term goals include providing a structural and computational basis for understanding signal transduction at all levels. A key aspect of this

work will be to provide a state-of-the-art interdisciplinary environment in which biology and medicine merge with chemistry, physics, and computation.

Researchers participating in the center are applying the most sophisticated computer-assisted technologies. These technologies include a high-power electron microscope capable of revealing the three-dimensional structures of living cells and their internal components, state-of-the-art resources for X-ray crystallography and magnetic resonance analysis that define high-resolution structures of simple and complex proteins, and confocal light microscopes that allow researchers to visualize molecules tagged with fluorescent markers as they pass chemical messages to each other. The researchers are also using the powerful computing resources of the San Diego Supercomputer Center (SDSC) to simulate the activity of such systems, analyze the results, and organize and make accessible the growing storehouse of biological information for the benefit of all. These resources include the highest-performance supercomputers, visualization and database technologies, large archival storage systems, and high-speed networks.

Established in 1996, the center involves researchers from a cross section of disciplines across the campus, the UCSD Medical School, the Salk Institute for Biological Studies, and SDSC, including from bioengineering, biology, chemistry, computer science, mathematics, neuroscience, pharmacology, psychiatry, and physics. This group also seeks to forge new interactions with the biotechnology and biocomputing-related companies to effect technology transfer. The interaction among these researchers is expected to produce new perspectives, point out fruitful research topics, lead to the development of new technologies and drugs, and train a new generation of researchers interested in biological structures and how they interact with each other.

The **Center for Research in Computing & the Arts (CRCA)** is an organized research unit of UCSD whose mission is to foster advanced research and production at the crossroads between digital technology and new art forms. Current areas of interest include interactive networked multimedia, virtual reality, computer-spatialized audio, and live performance techniques for computer music and graphics. As the University of California's oldest arts research center, CRCA pursues innovative approaches to the arts, and crosses the boundaries of the

humanities and the sciences. Our faculty research pool represents the computing interests from such diverse departments as music, visual arts, theatre, psychology, computer science, and engineering. Faculty members are creating new models of artistic practice through their liaisons with cultural institutions, high-tech industries, and interdisciplinary collaborations. We host artist researchers from around the world and service the research interests of faculty and graduate students. Our research members produce research results and art experiences that challenge conventional thinking both within the artistic and scientific realms.

CRCA's facility offers a broad array of computing platforms and tools. Research areas allow for in-depth, individualized work in digital audio, digital video, multimedia development, spatialized sound, software development, and high bandwidth curriculum development. The Center presents the outcome of research efforts via exhibitions and performances at international venues, as well as on the Internet, in publications, and events offered in our performance space.

More information about the Center, our researchers, the facility, and the process for engagement, may be found at: <http://www-crca.ucsd.edu>.

Center for Research in Language (CRL). The foci of the center are on language processing,

language learning, language disorders, and simulations of all these aspects of language in artificial systems. Research in the center is interdisciplinary and draws upon the fields of linguistics, psychology, cognitive science, neurosciences, computer science, and communication.

The center's facilities are designed to accommodate laboratory research projects by the faculty and graduate students; facilities include a number of high-performance work stations, a transputer laboratory, extensive equipment for audio recording and analysis, and equipment for psycholinguistic experimentation.

Current research projects include studies of language and cognitive development in children; language impairment in children and adults; word and sentence processing in bilinguals; foreign vocabulary in American Sign Language; development of neurally inspired parallel processing models of speech perception; studies in first language acquisition; cross-linguistic comparisons of the process of language acquisition and aphasia; research on the integration of grammatical analyses and theories; a project to collect large-scale text corpora in electronic form; a study of expectancy generation in sentence processing, and the compilation of an Albanian-English dictionary. The center administers an NIH pre- and postdoctoral training grant, "Language, Communication and Brain." CRL has also entered into several institutional agree-

ments with research institutions in Europe, Asia, and the Americas, providing for the exchange of personnel and support for projects of mutual interest. An ongoing speaker series presents a broad range of experimental approaches to the study of language. The center publishes a monthly electronic newsletter.

The Project in Cognitive and Neural Development is an activity of CRL. Its purpose is to provide a forum for interdisciplinary research on brain and cognition in human children, including research on the neural bases of language and communication. The project brings together faculty and research staff from the UCSD Departments of Cognitive Science, Communication, Linguistics, Neurosciences, Psychology, Psychiatry and Sociology, the San Diego State University Departments of Psychology and Communication Disorders, and the Salk Institute for Biological Studies.

The **Center for U.S.-Mexican Studies (CUSMS)**, established in 1979, is the nation's largest program devoted to the study of Mexico and U.S.-Mexican relations. It supports research in the social sciences and history, graduate student training, publications, and public education activities that address the full range of problems affecting economic and political relations between Mexico and the United States. The center also studies the history, economy, politics, and social structure of Mexico, and aspects of the U.S. economy and U.S. public policy that affect Mexico.



Through its program of researchers-in-residence, the center each year sponsors the research of twenty-five to thirty predoctoral and postdoctoral scholars, who spend three to nine months in residence. Typically, people from Mexico receive over half of these awards, which are made through an open, international competition. Other visiting fellows come from Europe, Canada, Latin America, and East Asia. The center's permanent academic staff also conducts long-term studies of political change in Mexico, the U.S.-Mexico border environment, Mexican migration to the U.S., and social and economic consequences of North American economic integration. The center publishes much of the research conducted under its auspices.

Each summer, the center conducts a six-week seminar in studies of the United States for twenty to twenty-five Latin American social scientists and nonacademic professionals.

The center's interdisciplinary Research Seminar on Mexico and U.S.-Mexican Relations, which meets weekly throughout the academic year, and its research library attract leading researchers from throughout the United States, Mexico, and other countries. In addition, several research workshops on specialized subjects are held each year.

The center has a very active public education program, which includes frequent briefings for journalists, public officials, and community groups.

The **Glycobiology Research and Training Center (GRTC)** seeks to facilitate and enhance glycobiology research and training at UCSD. Current faculty membership includes many UCSD faculty from several departments across the School of Medicine, SIO, and the general campus as well as adjunct faculty at nearby institutions. Affiliate members include interested scientists in the La Jolla area as well as faculty from other UC campuses.

Glycobiology is the study of the structure, biosynthesis, and biology of sugar chains (called oligosaccharides or glycans) that are widely distributed in nature. All cells and many proteins in nature carry a dense and complex array of covalently attached glycans. These are often on the outer surface of cellular and secreted macromolecules, in an optimal position to modulate or mediate events in cell-cell and cell-matrix interactions that are crucial to the development and function of a complex multicellular organisms. They can also mediate interactions between

organisms (e.g., between host and parasite). In addition, simple, rapidly turning-over protein-bound glycans are abundant in the nucleus and cytoplasm, where they appear to serve as regulatory switches. The development of a variety of new technologies for exploring the structures of these glycans has recently opened up this new frontier of molecular biology.

The GRTC seeks to foster interactive research in glycobiology by coordinating the availability of state-of-the-art instrumentation and expertise in the structural analysis of glycans through a Glycotechnology Core Resource, increasing intellectual and collaborative interactions by organizing symposia, joint programs and seminars, coordinating joint applications for extramural support, improving access to relevant informatics, and facilitating the transfer of basic glycobiology research to practical applications. The Center also strongly emphasizes graduate, postgraduate, and medical student education in glycobiology, including contributions by the faculty to core curricula, as well as to elective courses and journal clubs.

The **San Diego Supercomputer Center (SDSC)** is an organized research unit of UCSD focusing on computational science and engineering. Its mission is to advance knowledge through the development and application of high-performance computing technologies. With a staff of 280 scientists, software developers, and research, operations, and user support staff, SDSC is a recognized world leader in bioinformatics, computational chemistry, environmental informatics, data-intensive computing, Internet infrastructure research, and computer security. Researchers around the country also use SDSC resources, including the nation's most powerful academic-use supercomputer, to study problems in various scientific applications areas and investigate new paradigms of computing.

SDSC research activities are typically undertaken jointly with faculty from relevant departments across campus, including computer science and engineering, bioengineering, biochemistry and chemistry, pharmacology, and Scripps Institution of Oceanography.

Information Technology Activities at SDSC focus on data-intensive computing, networking, and computer security.

SDSC's Data-intensive Computing Environments group is a world leader in promoting the ability to publish scientific data by integrating

mass storage systems, distributed data-handling systems, data collections, digital libraries, and data grids. SDSC technology is being used to create scientific data collections, federate digital libraries, and build persistent digital archives. The systems will provide integrated access to data sets and allow remote application of digital library and presentation services on the data collections. In 2000, fifteen data collections aggregating more than twenty terabytes of data were assembled at SDSC. The collections include astronomical images from the 2-Micron All Sky Survey, art images from the Art Museum Image Consortium, Chinese text from the Pacific Rim Digital Library Alliance, and human brain images. The technology is also being used to prototype persistent digital archives for the National Archives and Records Administration. <http://www.sdsc.edu/DICE/>.

Networking: With the goal of promoting a more robust, scalable Internet infrastructure by fostering engineering and technical collaborations among Internet providers, vendors, and users, the Cooperative Association for Internet Data Analysis (CAIDA) works with the community to develop and transfer tools and technologies that provide engineering and other insights relating to the operation and evolution of the Internet infrastructure. CAIDA is collaborating with providers and researchers to refine traffic metrics, foster collaborative research environments, and encourage the development and testing of advanced networking technologies. <http://www.caida.org>.

SDSC's Applied Network Research group is currently conducting two projects of short- to medium-term concern to the Internet. The first, as part of the National Laboratory for Applied Network Research (NLNR), is a network measurement and analysis activity that focuses on performance aspects of the high-performance networking community and owns and operates a vast network analysis infrastructure, including more than 100 dedicated measurement machines throughout the U.S. and abroad. The project continuously makes its data publicly available (<http://moat.nlanr.net/>). The second activity is UCSD's High Performance Wireless Research and Education Network (HPWREN), which is creating, demonstrating, and evaluating a non-commercial, prototype, high-performance, wide-area, wireless network. The NSF-funded network includes backbone nodes at UCSD and

hard-to-reach areas of San Diego County. The HPWREN (<http://hpwren.ucsd.edu/>) will be used for network analysis research and to provide high-speed Internet access to field researchers—from geophysics, astronomy, and ecology—and to rural Indian reservations and schools.

Security: The Pacific Institute for Computer Security (PICS) conducts and publishes research on real-world computer and network security issues, emphasizing solutions to real security problems. This project has produced several CERT advisories and numerous security tools, available via the Web and FTP, to help system administrators analyze and investigate intrusions. <http://security.sdsc.edu>.

Computational Science Activities at SDSC focus on computational biology and bioinformatics, computational chemistry, and environmental informatics and computational ecology. SDSC is particularly strong in biology (see <http://biology.sdsc.edu/>) with the following representative activities:

- The Protein Data Bank is the world's central scientific repository of biological 3-D macromolecular structure data determined experimentally by X-ray crystallography and nuclear magnetic resonance.
- The Biology Workbench is a revolutionary Web-based tool to help biologists search many popular protein and nucleic acid sequence databases.
- The Computational Center for Macromolecular Structure develops and distributes software to analyze the structure of biological molecules.
- The National Biomedical Computation Resource facilitates biomedical research by making advanced computational and visualization capabilities easy to access and use.
- Most recently, SDSC is playing the key bioinformatics role in two new multi-institutional projects, the Alliance for Cell Signaling, led by the University of Texas, Southwestern, and the Joint Center for Structural Genomics, led by The Scripps Research Institute.

SDSC's computational chemistry activities focus on quantum and atmospheric chemistry and building bridges between chemistry and molecular biology.

In environmental informatics and computational ecology, SDSC supports projects such as Biodiversity Insight, which develops software

tools to support research, data analysis, and visualization related to biodiversity issues (<http://biodi.sdsc.edu/>) and the Long-Term Ecological Research Network, by facilitating the use of high-performance computing resources in support of long-term ecological research (<http://www.sdsc.edu/sdsc-lter>).

The SDSC Fellows Program promotes computational science and engineering activities across campus and seeks to strengthen intellectual ties between SDSC staff and campus faculty. Faculty members are encouraged to apply to join this program. For more information, please contact Peter Arzberger, parzberg@sdsc.edu, (858) 822-0935.

Research Experiences for Undergraduates, funded by NSF, provides an opportunity for undergraduates to work on computational science research projects under the guidance of SDSC mentors and their campus advisers. Students can participate in a full-time summer program or a part-time program during the academic year, and they must apply for and be accepted into the program. Stipends are provided. For more information, please contact Ann Redelfs, redelfs@sdsc.edu, (858) 534-5032.

Projects

The goal of the **African and African-American Studies Research Project** is to facilitate faculty, postgraduate, and graduate research in the areas of Africa and African diaspora studies in the social sciences and the humanities, and to foster the comparative, cross-national, and interdisciplinary dimensions of research, with a core group of scholars drawn from several fields in the social sciences and humanities. These research efforts are linked directly to larger local and international community concerns.

The project sponsors visiting scholars, focused research groups, a seminar, and symposia. Faculty from seven university departments are involved. The project oversees the African Studies Minor. The project is also part of the UC Systemwide Consortium of African Studies Programs and the national Association of African Studies Programs. It provides the basis for the establishment of an organized research unit on African and African-American Studies at a later time.

The **Project for Explaining the Origin of Humans** is a broad-based multidisciplinary coalition of individuals in the La Jolla area (from UCSD as well as surrounding institutions) who are interested in defining and explaining the evolutionary origins of humans and in generating testable hypotheses and new agendas for research regarding this matter. Areas of current interest include primate genetics and evolution, paleoanthropology and hominid origins, mammalian and primate neurosciences, primate biology and medicine, the roles of nature and nurture in language and cognition, human and primate society and culture, comparative primate reproductive biology, geographic, environmental and climatic factors in hominid evolution, as well as general theories for explaining humans. The group includes faculty from the Departments of Anthropology, Biology, Chemistry and Biochemistry, Cognitive Science, Linguistics, Medicine, Neurosciences, Oceanography, Pathology, and Psychology.

The **Project in Display Phosphor Research** provides a forum for research on the synthesis, characterization, and processing of phosphors for high definition display applications. The project brings together faculty and researchers from the UCSD Departments of Chemistry and Biochemistry, Mechanical and Aerospace Engineering (MAE), and Electrical and Computer Engineering (ECE). The project was organized in 1992 in order to expand collaboration with other colleagues at UCSD and to extend research efforts to address both near-term and future research issues concerning phosphor materials and advanced displays.

The **Project in Econometric Analysis (PEA)** is concerned with the analysis of economic data and with techniques for modeling relationships between economic variables and testing economic theories. As economic variables have properties not generally found in other fields, standard procedures from mainstream statistics are often not appropriate. The field of econometrics has been developed to deal with these issues. Its importance is indicated by its effect on the methodologies in other social sciences, such as political science and empirical history, and the fact that several Nobel Prize winners in economics have been econometricians.

The Project in Econometric Analysis (PEA) supports the work of an active group of researchers and provides opportunities for productive inter-

action among faculty and students. Areas of active research include financial econometrics, non-linear time series modeling, properties of neural network models, the theory of economic forecasting and various actual applications including evaluations of models and forecasts in finance and economics. The PEA allows links with workers from other universities in this and other countries. In 1999–2000 and 2000–2001 the project had visitors from Europe, Asia, North America, and Australia; some were senior and some were pre- and post-doctoral students. Faculty members and graduate students associated with the project presented their research at workshops and conferences worldwide. In addition, PEA facilitates the submission of grant proposals to outside agencies.

The **Project in Geometry and Physics (PGP)**, established in 1987, provides opportunities for increased collaboration between mathematicians and physicists. The project hosts several scientific meetings each year and also sponsors a number of research seminars with distinguished scientists from inside and outside the UCSD community.

The **Project on International and Security Affairs (PISA)** is the campus affiliate of the Institute on Global Conflict and Cooperation (IGCC), a UC systemwide institute based at UCSD. PISA's mission is to encourage research, teaching and public discussion on international relations. PISA accomplishes this mission through the sponsorship of conferences, seminars, and lectures on world affairs for faculty, students, and the general public. PISA collaborates extensively with other campus research and teaching units. Recent activities have included a seminar on international relations theory, a workshop and seminar series on globalization, and support for international relations programming at Eleanor Roosevelt College.

The **Public Policy Research Project** was established to facilitate interdisciplinary research and educational opportunities in public policy and business-government interaction. Through conferences, focused research groups, and lecture series, the project acts as a catalyst for interaction among economists, political scientists, moral philosophers, historians, cognitive scientists, anthropologists, and sociologists. The project supports programs that: (1) help faculty obtain funding that are engaged in policy-related research, (2) conduct research appren-

ticeships for doctoral students working on research projects dealing with issues and processes of public policy, and (3) provide technical support and arrange faculty-proposed conferences within the scope of the project's mission statement.

Natural Reserve System (NRS)

The **Natural Reserve System (NRS)** was founded to establish and maintain significant examples of California's diverse ecosystems and terrain. These reserves are used for teaching and research in all disciplines, from geology and environmental sciences to anthropology and art. Faculty and students of the University of California and other institutions are encouraged to use any of the thirty-four reserves in the system for serious academic pursuits. The San Diego campus administers the following four reserves:

Dawson Los Monos Canyon Reserve: This 200-acre reserve is located in the cities of Carlsbad and Vista in north coastal San Diego County. Its young, stream-cut valley contains a year-round creek with precipitous north- and south-facing slopes. The major habitat types are Southern Riparian Woodland, Diegan Coastal Sage Scrub, Perennial Coastal Stream, Coast Live Oak Woodland, Mixed Grassland of native bunchgrass and introduced annuals, and South Coastal Mixed Chaparral. This area is also of unique and significant historical and archaeological value.

Elliott Chaparral Reserve: Located ten miles to the east of campus, this 107-acre reserve, adjacent to the large expanse of Marine Corps Air Station Miramar that is undeveloped, features Chamise Chaparral typical of the Southern California coastal plain and a large stand of mature planted eucalyptus. It is readily available during a normal three-hour lab period or for term paper-length field studies as well as for more lengthy projects.

Kendall-Frost Mission Bay Marsh Reserve: This sixteen-acre reserve, together with the city of San Diego's contiguous Northern Wildlife Preserve, constitute the last remaining forty acres of tidal salt marsh on Mission Bay and one of the few such wetlands remaining in Southern California. It is recognized for the habitat it provides for several rare and endangered birds

including the light-footed clapper rail, Belding's savannah sparrow, and the California least tern, as well as many resident and migratory shorebirds and waterfowl, and several fish species. An on-site trailer houses limited residential and laboratory facilities, and extensive facilities exist within ten miles on the UCSD main campus and at the Scripps Institution of Oceanography. There are opportunities for studying restoration ecology of upland and tidal habitats.

Scripps Coastal Reserve: This reserve consists of disjunct shoreline and cliff-top (or "knoll") portions. The shoreline part consists of the sixty-seven acre San Diego Marine Life Refuge extending seaward 1,000 feet from the high tide line, and surrounding the Scripps Institution of Oceanography (SIO) Pier. Habitats include sandy beach and submerged plain, to 60 feet below mean lower low water, seasonally exposed cobble beach, rocky reef, pier pilings, and upper submarine canyon ledges. Habitats of the cliff-top knoll and canyons include coastal sage scrub, maritime succulent scrub, southern coastal mixed chaparral, and disturbed grassland. The latter is particularly suitable for ecological restoration experiments. This reserve is enhanced by the availability of the laboratories and facilities of adjacent SIO and the main San Diego campus.

Campuswide Research Facilities

Academic Computing Services

See page 97.

San Diego Supercomputer Center

See page 100.

The UCSD Libraries

See page 106.