SPECIALIZED RESEARCH FACILITIES

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Office of the Vice President for Research

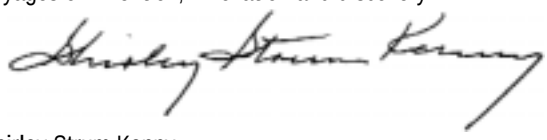
SPECIALIZED RESEARCH FACILITIES

From the President

One of Stony Brook's most exciting qualities is its youthful spirit of adventure. In that spirit, I invite you to explore the abundance of specialized resources displayed in this publication. In developing its mission as a major research university, Stony Brook has created an infrastructure for basic research and advanced technology development that is unparalleled in our region and unsurpassed almost anywhere in the country. It is our responsibility as a public institution to make these facilities available not only within our university community but to prospective partners off-campus with whom we may appropriately collaborate.

As a relatively young institution, our campus can make a special contribution by embarking on new journeys, defining new boundaries, forging new connections. By breaking down traditional barriers among academic disciplines, as well as between the academy and the business sector, Stony Brook can fulfill this promise. At the undergraduate level, we have pioneered new models of collaborative learning to prepare our students for lives in the twenty-first century. In our research and public service missions, we will similarly invent new modes of interaction to facilitate cooperative solutions for the intellectual challenges of our changing world.

Stony Brook welcomes the opportunity to help you pursue your own voyages of invention, innovation and discovery.



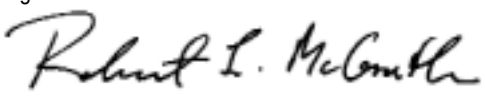
Shirley Strum Kenny

President

From the Provost

As Long Island's only public research university, a major part of Stony Brook's mission is to provide support for the economic development of the surrounding region and other areas of New York State. The sharing of the physical research facilities described in these pages and, more importantly, the intellectual capabilities and imaginations of Stony Brook's faculty, staff and students is our commitment to the growth of high technology and knowledge-based industries in our state. Stony Brook's record of excellence in its research endeavors is paying dividends – not only in the quality of the education that our students receive but also in the sustained economic growth of its community.

Research universities are engines of economic development. Stony Brook will continue to pursue excellence as the best guarantor of a bright economic future for the citizens of New York.

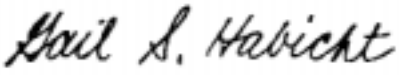


Robert L. McGrath

Provost and Vice President for Brookhaven Affairs

From the Vice President

This publication catalogs the excellence and abundance of research resources at Stony Brook. Obtained through the competitiveness and creativity of individual faculty, academic departments, and multidisciplinary groups, these research centers, programs, laboratories, and facilities represent an investment of hundreds of millions of dollars, primarily by Federal, State and private sponsors. These facilities support the ever-growing distinction of the University's research enterprise, and we are proud to make them available to our academic colleagues on and off campus, as well as in the industrial community.



Gail S. Habicht

Vice President for Research

SPECIALIZED RESEARCH FACILITIES

Contents

A Note on Contact Information

Unless otherwise noted, the addresses contained in entries may be completed as follows:
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All telephone numbers are in the (631) area code

The terms of access for any facility are governed by availability, applicable policies, and the conditions established by the responsible unit.

Comments, suggestions and questions can be sent to the Editor, Marc Dempsey, at:
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This publication is available in PDF form at: www.sunysb.edu/ovprpub/srf.pdf

On the Cover (clockwise from upper left)

1) A 200 kW High Velocity Plasma Torch, used for aerospace coatings, e.g. ceramic thermal barrier coatings for turbine engines (shown). 2) Detailed closeup of the Hubble Deep Field, the faintest view of the universe taken with NASA's Hubble Space Telescope, centered on an extremely distant galaxy. Photo courtesy of Kenneth Lanzetta, Amos Yahil and NASA. 3) The extraordinarily complete skull of the predatory dinosaur *Majungatholus atopus* discovered by a Stony Brook research expedition to Madagascar led by David Krause. 4) Ribbon diagram of the hexameric MoaC protein, an enzyme involved in the early steps of molybdenum cofactor biosynthesis. Molybdenum cofactor biosynthesis is an evolutionary conserved biosynthetic pathway and genetic deficiencies of the enzymes involved in this pathway lead to molybdenum cofactor deficiency, a fatal condition.

ADVANCED MATERIALS

Corrosion Science Laboratory

The facility provides electrochemical analysis of corrosion processes essential to the design of wrought alloys, coatings and thin film. The laboratory supports federally and industrially funded graduate research. The laboratory has facilities for testing for Microbially Influenced Corrosion (M.I.C.) and a commercial salt spray cabinet.

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http://doL1.eng.sunysb.edu/surfacechem1.html

Crystal Growth Laboratory

Crystal growth programs are supported by the AFOSR/DARPA Consortium for Crystal Growth Research that comprises six academic institutions, USAF Research Laboratory and industry. Its research program is also supported by NSF and NASA. These programs serve to broaden the talent base available to address specific and interdisciplinary problems in the field of crystal growth and wafer manufacturing. The programs provide access to highly specialized and costly facilities that would be otherwise unavailable.

A recently awarded NSF Major Research Instrumentation grant (MRI) has helped in further expanding the University's crystal growth research efforts in both basic and applied sciences. With the MRI funds Stony Brook is in the process of establishing an integrated experimental and theoretical, industry /university / federal laboratory research program for semiconductor processing at the pre-device level. The major instrumentation acquired through this grant includes: a next generation high pressure Czochralski crystal growth system with provisions for *in situ* synthesis of compounds as well as an applied magnetic field; an inner diameter wafering saw; a state of the art chemo-mechanical polishing apparatus; and a 2-axis/3-axis x-ray characterization instrument.

These instruments allow validation of numerical models that cannot be accomplished without conducting carefully designed experiments for a wide range of parameters, a feasibility study of new concepts, design verification, and testing of model-based feed forward control algorithms. The laboratoryl also serves as a clinic which industry can visit for intellectual support, theoretical modeling and experimental testing. Research on both elemental and compound materials is pursued with results directly applicable to electronics, opto-electronics, laser-based devices, photovoltaics, and sensors.

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Laboratory for Characterization of Advanced Materials

The laboratory focuses on the characterization of constituitive response and failure mechanics of 'advanced' materials such as heterogeneous multi-component materials, ceramic coatings for thermal barrier and wear applications, functionally layered and graded materials, materials for biological applications, and biomimetic materials. The following facilities currently exist in the laboratory: a full-field curvature measurement technique based on Coherent Gradient Sensing (CGS); an environmental chamber for thermal loading of specimens up to 1050°C; a flash infrared spot heater for rapid thermal loading up to 1800°C; micro-testing facility for mechanical and thermomechanical characterization at the microscale and digital image processing facilities for automated fringe analysis. Optical testing facilities, such as split-Hopkinson bars are being set up for high strain rate testing. The laboratory has a comprehensive complement of supporting facilities such as optical hardware, vibration isolation equipment, He-Ne lasers, a cold fiber-optic light source for non-invasive illumination, a high speed digital storage oscilloscope for dynamic data acquisition, a dedicated darkroom and a standard specimen polishing and preparation facility.

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Magneto-Optic Materials Laboratory

A facility for the preparation and characterization of magnetic thin films with large magneto-optic effects. These materials are used as digital data storage media, light modulators, and magnetic sensors. Thin film deposition equipment consists of an UHV metal MBE, a three source electron beam evaporator, and a high-rate magnetron sputtering system. The wavelength dependence of the magneto-optic effects can be studied in fields up to 5 Tesla in the temperature range of 2 to 300 K using a special optical dewar. Other characterization equipment includes a vibrating sample magnetometer, an inductive hysteresis loop tracer, and Hall effect and magneto-resistance loop tracers.

Current research projects:

- The preparation of films containing two magnetic phases which are exchange coupled anti-ferromagnetically (macroscopic ferrimagnets).
- Giant magnetoresistance of granular metals which consist of magnetic metal precipitates in a nonmagnetic metal matrix.
- Epitaxial growth of magnetic intermetallic compounds.
- Magnetic anisotropy of amorphous alloys.

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Mesoscale Electronics and Sensors Laboratory

Through a DARPA/ONR funded initiative a new laboratory for direct-write electronics is being established. This facility, based on a thermal spray processing, enables rapid prototyping and fabrication of mesoscale electronic circuits and embedded sensors on conformal geometries. The laboratory

also incorporates a comprehensive electronics characterization facility consisting of a Hewlett-Packard 8510B Network Analyzer (45 MHz-26.5 GHz) upgraded to a HP8510C capability by software input. The HP 4294A Impedance Analyzer (40Hz-110MHz) and Miller FPP5000 Four Point Probe for sheet or slice resistivity, V/I, metallization thickness and P-N type of semiconductor wafers and resistive films. In addition, magneto-transport property measurements and inductive hysteresis loopers are available.

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Microgravity Research Facility

A facility dedicated to solidification and crystal growth technologies, specifically the influences of gravity (convective and hydrostatic) on the growth of infrared detector materials (CdZnTe) and eutectic (Bi/MnBi) solidification. It includes moderate (<100°C) and high (<1500°C) temperature NASA-supplied Bridgman-Stockbarger furnaces with supporting constant temperature water mixers, programmable power supplies, and computer-controlled experiments, data acquisition, analysis, and display. Full interface demarcation capabilities are available, using stop/start or thermo-electric methodologies. Instrumented ampoules and cartridges are fabricated in collaboration with the Chemistry Glass Shop. Sample characterization focuses on advanced optical, infrared and x-ray techniques, including synchrotron infrared spectroscopy and synchrotron x-ray topography in collaboration with the Materials Characterization and X-Ray Topography Group Laboratories of the Materials Science and Engineering Department. Additional work is conducted in collaboration with the NASA Space Sciences Laboratory of the George C. Marshall Space Flight Center and the Department d'Etudes Nucleaires de Grenoble. The programs are also supported by the Process Modeling Laboratory, and the AFOSR/DARPA Consortium for Crystal Growth Research

Theoretical development includes dynamic modeling of the solidification interface during thermoelectric interface demarcation, the influences of Soret transport on crystal growth, and the development of a unified theory for plane front eutectic solidification, including undercooling, phase metastability, solidification velocity, and convection. Microgravity experiments are being developed for the mid-deck of the Space Shuttle and for the International Space Station.

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NSF Center for Polymers at Engineered Interfaces

The Center focuses on the design of polymer thin film properties through precise control of interfacial structure. The uniqueness of the investigations is the synthesis and study of engineered interfaces. At these interfaces molecular-level control of surface energy via chemical functionalities, symmetry, and order is accomplished. This is a significant departure from existing experiments on semi-conductor, metal, and metal oxide surfaces, with little or no control of surface interactions. The issues being addressed at the Center are:

- The effect of specific interactions at polymer interfaces on surface nanorheology, adhesion, friction and dynamics.
- Spinodal decomposition and dewetting of liquid polymer films on surfaces modified by self-assembled monolayers (SAM's).
- Nanoscale surface patterning with block copolymers.
- Surface adsorbed polyelectrolytes.
- Capillary electrophoresis and MRI contrasting agents.
- Exploring new directions in the development of engineered surfaces for cellular adhesion and protein adsorption.

A central goal of the Center is to address technological problems related to polymer thin films and to develop cutting-edge enabling technologies that take existing polymeric systems and markedly improve their properties. The Center has special capabilities in several areas:

- The ability to synthesize monodisperse, isotopically tagged polymers and ionomers of different chemical architectures.
- Preparation of a wide spectrum of organic monolayers by molecular self-assembly on a variety of surfaces.
- Characterizing the chemical composition and morphology of polymer films or nanoparticles with molecular scale resolution.
- Measurement of both surface and bulk mechanical and rheological properties of films.
- Development of theoretical models that describe the fundamental observations and are extendable to more complex technological applications.
- The ability to handle and test biological materials through collaboration with the School of Medicine.

The core institutions of the Center are SUNY Stony Brook, Polytechnic University and City University of New York.

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NSF Center for Thermal Spray Research

The Thermal Spray Laboratory (TSL) concentrates on the study of protective coatings produced by thermal spray techniques. While TSL is fundamentally an academic research laboratory, the nature of thermal spray technology requires that the research programs have a strong industrial orientation. Thus the faculty and staff of TSL actively seek wide interactions with industrial and governmental organizations to fulfill the needs of both educating engineering professionals and of serving the local and national industrial communities.

From its inception, some 20 years ago, TSL has played an important role in evaluations of materials and processes for diverse industries. These activities carried out by TSL personnel have been instructive to undergraduate and graduate students who carry out their research activities within the lab. In fact, a large number of our students have joined these companies as engineers after graduation. Indeed, it has been a mark of our success to see former students from TSL grow into positions of increasing responsibility within the thermal spray community.

The Thermal Spray Laboratory contains a comprehensive array of thermal spray equipment from processing to analysis. The lab is strongly oriented towards materials engineering, with an emphasis on feedstock materials and the characterization and properties of coatings. A listing of generic thermal spray devices and test and evaluation equipment contained with-

in or accessible to TSL is given below.

- Combustion wire, rod and powder feed thermal spray torches
- Two-wire electric arc guns
- A wide range of plasma spray devices, DC and RF
- Reduced pressure plasma spray system
- High velocity oxy-fuel spray device (HVOF)
- On-line diagnostics
- Powder processing and characterization

A comprehensive coating characterization laboratory has been established comprising a mercury intrusion porosimeter, thermal property measurement equipment including a 1500C push rod dilatometer, a laser flash thermal conductivity measurement system and oxygen measurements. In addition, a well equipped tribology laboratory exists consisting of Instrumented microindentation apparatus, high load vicker hardness and toughness measurement system, Falex pin-on-disk tribometer, Universal micro-tribometer, slurry abrasion and cavitation erosion test equipment. Support equipment includes a Zygo scanning white light interferometer for 3-D profiling and optical microscopy.

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Rapid Prototyping Facility

Stony Brook's Rapid Prototyping (RP) facility currently houses a Stratasys FDM3000 and a DTM2500+. The 3000 prints three dimensional objects using ABS plastic, medical ABS, an elastomer, and casting wax. The built volume is 10x10x16". Layer thickness can vary from 2 to 30 mil, depending upon speed. Also, the support structure is now water soluble. The 2500+ builds objects out of polyamide (PA), glass-filled PA, an elastomer, copper PA, rapid-steel, casting polystyrene, casting Zr-sand, and casting Si-sand. Stainless steel has been recently added. The built size is 15x13x18". Layer thickness approaches 2mil. This facility can be used for academic research and education and industrial services.

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Surface Analysis and Thin Film Analysis Laboratory

The facility houses four electron spectrometers, all capable of X-ray Photoelectron Spectroscopy (XPS) and two capable of Scanning Auger Microscopy. The instruments are all capable of Ion Depth Profiling, sample micro-manipulation and cooling with liquid nitrogen.

Equipment:
V.G. Scientific ESCA lab MkI with LEG200
V.G. Scientific ESCA 3MKII
V.G. Scientific CLAM II WITH LEG 100
V.G. Scientific CLAM 100

The facility is available both for graduate research and industrial research projects. Current research includes studies of:

- Microbially influenced corrosion (MIC)
- Stainless thin films
- Cleaning and joining technology associated with printed circuit board manufacturing.

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X-Ray Beamline Facility for Synchrotron Topography

The Stony Brook Synchrotron Topography Research Group at Brookhaven National Laboratory's National Synchrotron Light Source (NSLS) is centered in the University's Department of Materials Science and Engineering and engages in the non-destructive imaging of defect microstructures, including dislocations, precipitates, twins, stacking faults, etc. This permits image-detailed descriptions of dislocation motion and structures attendant to plastic deformation and fracture, semiconductor and optoelectronic materials processing, understanding of crystal growth phenomena, and other interesting materials behaviors. Facilities at Brookhaven include a high-flux beamline, which is fully computer controlled, and ancillary darkroom and microscope facilities.

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BIOTECHNOLOGY

See also LIFE SCIENCES AND BIOMEDICINE
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Center for Biotechnology

New York State Center for Advanced Technology
in Medical Biotechnology

Fosters economic development in New York State through programs promoting biotechnology-related research, university-industry collaboration, technology development and technology commercialization. One of fourteen Centers for Advanced Technology in specialized areas identified as strategic growth prospects for New York State.

Collaborative research programs being developed focus on technological areas of importance to New York State's biotechnology industry, including infectious diseases, cell and developmental biology, oral and skin research, nuclear magnetic imaging, spectroscopy, chemical synthesis, pharmaceutical discovery, and biomedical engineering, among others.

Programs include:

• Innovative Technology Grant: Funds early-stage research projects selected by a scientific review panel as having both scientific feasibility and potential for commercialization. Priority given to collaborative projects between faculty and New York State companies.

• Central Facilities Support: Funds state-of-the-art facilities for biotechnology related research that might not otherwise be available to faculty, biotechnology company participants in the Long Island High Technology Incubator, and outside companies and institutions.

• Technology Transfer: Markets technologies developed through the Innovative Technology Grant Program. The Center has also played a strategic role in the development of industry support organizations including the Long Island High Technology Incubator and the New York Biotechnology Association. Provides full or partial sponsorship of high-level scientific conferences, as well as sponsorship of regional business conferences and educational programs of interest to biotechnology companies and researchers.

• Education: Provides support to several educational programs including the Biotechnology Teaching Laboratory, which provides hands-on laboratory experience in biotechnology techniques to high school students, industry employees, and adult interest groups.

• The Center's Undergraduate Internship Program places qualified students in two year research positions at a local biotechnology company. The Graduate Student Internship in Biotechnology and Patent Law provides graduate students with one semester internships at local law firms specializing in intellectual property.

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DNA Sequencing Facility (HSC)

The DNA sequencing facility is an on-campus service that provides university researchers with access to automated DNA sequencing technology at prices below those of commercial facilities. The latest in sequencing technology as well as computer facilities (as developed for the Human Genome Sequencing Project) will soon be available.

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University Microarray Center

The University at Stony Brook opened a Microarray Center in July, 2000. This state-of-the-art core facility, located on the third floor of the Centers for Molecular Medicine building, offers DNA microarray analysis for researchers to monitor the state of expression of genes in living cells. This platform technology is a powerful tool for molecular biologists to monitor gene expression in the cells that are the focus of their research. Each human cell is estimated to contain approximately 100,000 genes total. The pattern of gene expression reflects the type of tissue and its biological state of activity. Microarray technology will tell researchers critical information that will allow them to understand which biological circuits are ON or OFF and ultimately point to cures for disease. Because this technology has utility for many different fields of research it is considered a platform technology.

A full service operation is planned at the USB Microarray Center that initially utilizes the Affymetrix GeneChip® System. GeneChips are provided at substantial discounts through a preferred academic access agreement between AMDeC, Academic Medicine Development Company, a partnership of over 30 of New York State's pre-eminent medical schools, academic health centers, and scientific research institutions. GeneChip expression analysis arrays are available for human, mouse, rat, yeast, arabidopsis, E.coli and other organisms. In addition, the facility supports 'directed' arrays available from Affymetrix for genotyping, disease management, and the new GenFlex Tag® Arrays for parsing as many as 2000 customized sequences. The Center processes RNA samples and provide researchers with data on CD. A computer workstation, equipped with a variety of bioinformatics tools for data management and analysis, is available. Internet access, networked for bioinformatics communications on campus, is expected to be a major part of microarray data analysis. Consultation on experimental design and data mining is available.

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CAMPUS COMPUTING FACILITIES

Information Technology Division of the University Hospital & Medical Center / Health Sciences Center

In its broadest scope, the Information Technology Division (ITD) of the University Hospital & Medical Center (UH&MC) / Health Sciences Center (HSC) is responsible for delivering services, providing support, and developing initiatives in the areas of computer applications and networking to the members of the HSC and UH&MC.

The ITD is organized into various departments in order to achieve these goals. No single department is devoted exclusively to the support of research endeavors. Instead, each contributes to these from its own perspective. Basic research databases and publications may be accessed from servers supported by Medical Informatics in collaboration with the HSC Library; patient data may be obtained by a combination of applications run by Hospital Information Services and the repositories managed by Integration and Database Systems, the integrity of which is supported by Technical Support; access to all information, in a fast and timely fashion, depends on the quality and integrity of the computer network maintained by Networking; etc. The various components can be, very succinctly, summarized as follows:

Client Support
Maintaining the vast array of personal computers and workstations that are deployed throughout the University Hospital and, to a more limited degree, elsewhere in the HSC.

Hospital Information Services
Maintaining the computer applications that support Patient Care, Clinical Systems, Financial Systems, and all the interfaces among them.

Integration and Database Systems
Maintaining, designing, and updating information databases that are central data repositories for patients' medical records, as well as centralized links to human resources and other administrative specialized databases.

Medical Informatics
Supporting the academic mission of the HSC. Developing and deploying computer assisted instruction and curriculum management database tools. In collaboration with Media Services, using videoconferencing to disseminate instructional information. Maintaining centralized information databases and applications for biomedical graduate education, such as genetics and molecular biology. Co-managing with the HSC Library the students' computer laboratory and classrooms.

Networking
Maintaining and updating the computer network infrastructure that allows for information flow between servers and clients. These extend to include the complete East Campus, the clinics at Stony Brook Technology Center (Tech Park), and many satellite clinics in Suffolk County.

Technical Support
Maintaining the large computers and operating systems where Hospital Information Services applications run.

Telecommunications
Maintaining and operating paging devices and patient television services at University Hospital.

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University Computing Center

The Division of Information Technology has the overall responsibility to manage the computing and network services at Stony Brook. The University's computing and networking environment is characterized by an ever-changing array of hardware, software, network connectivity and consulting services. In addition to services listed below which are available to the entire university community, individual departments offer computing and networking facilities for their own constituents.

The campus network is connected to the Internet1 over a T3 (45MB) connection. A separate OC3 (155MB) connection provides Internet2 services to the research community. A T1 link also connects the campus to the SUNY Intranet. All of the academic buildings are connected to the network with fiber-optic cable. Off-campus access to the computer network is available by calling 246-2000.

IBM 9762, SUN E5000 and SUN E450 computer systems comprise the administrative computing environment. These machines serve as the administrative servers and database repositories for the University's business systems. Electronic mail is provided through Lotus Notes, Unix mail, and POP3 and IMAP servers. High-speed printing is provided by the Xerox Docuprint and 4650 printers.

Client Support Serves are available to assist users with computing and networking needs.

General computing resources are available to students through Instructional Computing, whose offices are located in the Melville Library. Here students can use Macintoshes, PC's and UNIX workstations. Student consultants are also available to answer questions and assist students in using these systems. Students can obtain information on the additional eight public sites as well as documentation for using the various computers. One-hour introductory courses are offered to help students in the use of the public computing facilities. Any Stony Brook student may obtain an account on the instructional computing facilities for e-mail, Internet access and general computing. Computer accounts are available from the Library SINC site.

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COMPUTING AND INFORMATION TECHNOLOGY

Applied Algorithms Laboratory

The laboratory conducts research on applications of combinatorial algorithms, including computational biology, pattern recognition, computational geometry, and algorithm engineering. The laboratory contains SUN workstations and PC-based NT/Linux computers.

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Artificial Intelligence Laboratory

The primary focus of the Artificial Intelligence Laboratory is to build an AI system called SYNCHEM which synthesizes organic molecules. Another research activity of the laboratory is to investigate the performance and search behavior of heuristic search algorithms executing in parallel and distributed systems. The project has major industrial and government support.

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Automated Verification Laboratory

Research is conducted in this lab on automated techniques for specifying and verifying the correctness of reactive systems; i.e. systems that maintain an ongoing interaction with their environment such as embedded systems and process control software. Two techniques emphasized in the lab are Process Algebra, a specification formalism for reactive systems, and Model Checking, an automatic technique for proving properties of systems.

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Center for Visual Computing

The Center for Visual Computing (CVC) is a University-based center dedicated to research in the technology of and applications for digital images. The technology of digital images, or Visual Computing, promises a radical refinement of product quality and the human-machine interface in many areas, such as digital cameras, bar-coding, the "portable office," and three-dimensional fax machines. Visual Computing research activities include visualization, computer graphics, image processing, medical imaging, virtual reality, computer-aided design, and multi-media. Among its recent research successes, the Center played a vital role in the development of a new non-invasive computer-image technology that could soon replace a traditional colonoscopy.

The CVC incorporates eight state-of-the-art laboratories at Stony Brook, including the lead Visualization Laboratory. All the departments within the college, as well as many departments within the School of Medicine and the College of Arts and Sciences, are active in visual computing research or its applications. Over 100 research scientists, visiting scholars, post-doctoral fellows, and Ph.D. students participate in CVC research and educational activities.

The CVC operates as an academic-government-industry cooperative research center. Significant funding comes from the NSF, NIH, the Office of Naval Research, the Department of Energy, and the Department of Defense. Industrial participants such as Intel, Mitsubishi, Hewlett Packard, General Electric, Symbol Technologies, Inc., Ford, and Boeing provide additional support.

The center's computing and visualization facilities include Silicon Graphics, Hewlett Packard and Sun Microsystems graphic super-workstations and a large collection of graphic peripherals such as stereo visualization platform, datagloves, trackballs, etc..

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Computer Language and Systems Laboratory

Conducts research on many aspects of computer languages and systems. Contains Sun and Silicon Graphics workstations. Active research projects include high throughput databases, concurrent systems, logic programming, automated reasoning, and languages for parallel computing.

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Computer Vision Laboratory

This laboratory has state-of-the-art equipment for experimental research in three-dimensional machine vision. The facilities include 3 SUNSPARCstations, 2 PC's, video cameras, digitizers, laser printers, etc.

- Fundamental problems in Image Focus Analysis (IFA), and Image Defocus Analysis (IDA) for three-dimensional (3D) machine vision have been investigated.
- Theoretical principles, computational algorithms, and practical application issues have been addressed in detail in 3 Ph.D. theses completed so far and 3 in progress.
- The practical applications of IFA and IDA have been demonstrated for rapid autofocusing, 3D robot vision, and 3D microscopy.
- The IDA and IFA techniques are now being integrated with Stereo Image Analysis (SIA) for fast and accurate depth-map recovery of 3D scenes.

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Experimental Computer Systems Laboratory

The primary research theme is designing, implementing, and evaluating novel core computer systems technologies, with the current focus on 3D

graphics architecture, Internet processors, integrated real-time resource scheduling in OS, intra-address space protection using segmentation hardware, high-performance parallel network routers and firewalls, and a distributed video server and database.

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http://www.cs.sunysb.edu/~chiueh/

Parallel Computing Laboratory

The Department of Applied Mathematics has a low cost, high performance super computer constructed from commodity components. The machine, called the Galaxy, currently has 200 Pentium II Processors, and will soon grow to 256 processors. These machines are used for the simulation and modeling of complex mathematical systems describing the behavior of natural phenomena. Faculty in the Department of Applied Mathematics and Statistics who are nationally recognized experts in high performance scientific computing are interested in working with regional industrial scientists on problems that require parallel supercomputers for their solution.

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Operating Systems Laboratory

The laboratory is used to design hardware and software for computing networks that facilitate fast parallel solutions to technical problems. The most recent work involves design of superconducting cryo-switches for petaflops computing and internet backbones. Equipment includes SUN, Apple, and Alpha workstations plus PC's, routers, and web servers.

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Parallel and Neural Processing (PNP) Laboratory

The laboratory currently has two SIMD parallel computers, a 64-processor Unix-based and a 128-processor PC-based system. Both systems are from Adaptive Solutions, Inc. The 64-processor is capable of 1.28 billion multiply/accumulates per second; whereas the 128-processor has a capacity of 2.56 billion multiply/accumulates per second.

The laboratory supports research in parallel computing and neural networks. Current research projects include adaptive critical neural networks for control, parallel neural networks through Parallel Virtual Machine (PVM), Bayesian neural networks, and parallel image processing applications.

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Personal Computers in Education Laboratory

This laboratory mainly serves graduate students in the MS/TSM Educational Computing concentration and in the new graduate certificate program. Both PC and Mac-based microcomputers are available for graduate students and participating faculty members. All aspects of educational computing are explored. Primary research and development activities include courseware design, computer modeling and simulation, data collection and analysis via probeware and the use of telecommunications in education. A collection of educational software is also available for use by local educators.

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SAMSON Laboratory

This laboratory focuses on the design, implementation, and evaluation of cluster-based parallel computing systems consisting of commercial off-the-shelf (COTS) workstations connected by high-speed and low-latency networks. The current aim of this lab is to build a "Scalable Active Memory Server on a Network," in which a cluster of large-memory COTS workstations provide a high-speed paging service via a gigabit fiber-optic network to memory intensive applications running on client machines on the desktops. Of particular interest is research into "active memory services," in which the computing power of the memory server nodes is harnessed to perform application-specific storage management functions, such as intelligent pre-fetching and concurrent garbage collection. The goal is for client applications to run nearly as fast using the shared network memory server as they would with dedicated local memories.

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Secure and Reliable Systems Laboratory

Our increasing reliance on networks and distributed software systems to support critical infrastructures (e.g., banking and commerce, telecommunications, transportation, power distribution and medicine) has prompted interest in making these software systems robust against malicious attacks or spontaneous faults. Our research in this context is aimed broadly at developing new approaches, techniques and tools for solving these problems. Topics of research interest include network and computer system security, specification-based approaches for developing reliable software systems and advanced software analysis, instrumentation, testing and debugging tools. The laboratory emphasizes experimental research.

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Visualization Laboratory

Conducts research on all aspects of 2D and 3D graphics, visualization, and multimedia. Contains extensive computing facilities, including Silicon Graphics, Hewlett Packard, and Sun graphic super-workstations, and a large collection of graphic peripherals such as datagloves, trackballs, etc. Active research areas include 3D medical imaging, custom architectures for 3D graphics, flight simulation, and manufacturing.

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http://www.cs.sunysb.edu/~volvis/vislab.html

ELECTRON MICROSCOPY

Facilities for electron microscopy, including EMs, STEMs and related devices, may be found in several departments. For information regarding the capabilities of specific facilities and the conditions under which they may be used, please contact the individual department representatives.

Biological Sciences (Neurobiology and Behavior)

The Department of Neurobiology and Behavior maintains an electron microscopy facility on the fifth floor of the Life Sciences Building. This facility contains two electron microscopes: a JEOL 100C and a JEOL 1200EX2. The JEOL 1200 is equipped for on-line image acquisition and storage. The facility is available to qualified users at a rate of $60/hour-beam time. Fresh chemicals for the development of negatives are supplied. Film is to be supplied by the user or purchased at $.50/negative. Training of novices is not available.

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Geosciences

Transmission Electron Microscope Facility

JEOL 200CX 200 keV transmission electron microscope with EDS analytical system for characterization of inorganic materials. Side-entry goniometer stage and various specimen holders allow a wide range of imaging conditions, contrast analysis, and electron diffraction. Scanning-transmission imaging mode is also available. High-spatial-resolution quantitative elemental analysis with Si(Li) detector. Facilities for sample preparation and ion-beam thinning of specimens are available.

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Materials Science and Engineering

The Department of Materials Science and Engineering maintains extensive electron microscope capabilities particularly well suited for studies in the physical and engineering sciences.

Includes a scanning electron microscope (SEM) for surface studies of bulk materials up to magnifications of about 50,000X. Common applications of this instrument include failure analysis and the imaging of microelectronic structures. It is equipped with a Robinson backscatter detector for high-resolution, element-sensitive imaging, and an energy dispersive X-ray spectrometer for detailed elemental (chemical) analysis. The combination of high-magnification imaging and chemical analysis makes this a powerful instrument for solving many materials problems. Also in the facility are two transmission electron microscopes (TEMs) for the study of materials thinned to the point of electron transparency. One operates at 100,000 volts and the other at up to 120,000 volts. Both are capable of magnifications of several hundred thousand times and are used for detailed studies of the structures

of materials, including thin films and interfaces between different materials. The more powerful instrument is equipped for elemental chemical analysis, with an energy dispersive X-ray spectrometer and a parallel-recording electron energy loss spectrometer. It has extensive beam scanning and control capability. TV recording facilities are also available.

The laboratory has a wide range of facilities for specimen preparation, including coaters, electrochemical thinning devices, and ion mills.

Users are charged an hourly rate for instrument time, and if assistance is required they are usually charged a consultant fee.

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University Microscopy Imaging Center (UMIC)

See LIFE SCIENCES AND BIOMEDICINE, page 22

ELECTRONICS

Communications, Signal Processing, Speech, and Vision (CSPV) Laboratory

The Communications, Signal Processing, Speech, and Vision (CSPV) Laboratory has several SUN SPARCstations and desktop computers with specialized software for research in telecommunications networks and signal processing. The computers are networked to departmental computing facilities allowing access to shared campus resources and the Internet. The CSPV Laboratory supports the research efforts of five faculty members and about fifteen graduate students whose work is in the areas of communications and signal processing. Ongoing research projects involve mobile and wireless networks, teletraffic performance modeling, image processing, computer communications, digital speech processing, data transmission using coded modulation, multiple-access systems, dynamic channel assignment, network performance evaluation, signal detection, information theory, Bayesian parameter estimation and computer vision.

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Digital Signal Processing Laboratory

The digital signal processing laboratory has PC-based and VME-based signal processing equipment, an excellent complement of basic test equipment. The PC-based equipment includes systems with Texas Instruments fixed-and-floating-point processors (TMS320C1x, C3x, C620x, C670x) with full analog-in to analog-out capabilities and in-circuit emulation. In addition, there are full sets of development tools (assemblers, linkers, simulators, and debuggers) for all three generations, and C compilers for the second and third generations.

- The VME-based equipment includes several VME card-cages, an assortment of A/D and D/A converts, and a Radisys EPC-3 controller.
- The test equipment includes oscilloscopes, power supplies, meters, and signal generators. The lab also has a high-speed Tektronix 7904 oscilloscope with various plug-ins, including a logic analyzer, and a HP 3585-A spectrum analyzer.

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Digital Systems Design Laboratory

This laboratory contains fourteen work stations consisting of a Tektronix dual trace oscilloscope and an E.L. Cadet digital designer which has a function generator, power supplies, switches, lights, speaker, and three bread boards for construction and testing of circuits developed in the CAD Laboratory. An IC tester is available for general use.

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Electrical Engineering Computer Aided Design (CAD) Laboratory

The Electrical Engineering Computer Aided Design Laboratory is the primary computing resource for all undergraduate courses taught in the department. The EE CAD Laboratory offers undergraduate students access to CAD software tools used to analyze, model, simulate and understand engineering concepts better. As the importance of computer aided design has grown through the years, it has become a necessary part of electrical engineering design and as a consequence a fundamental tool for teaching engineering concepts. This is reflected in EE CAD Laboratory's close ties with both the analog and digital systems design laboratories. Students design, model, and simulate all analog and digital circuits prior to building them and testing them for laboratory experiments.

The EE CAD Laboratory currently has 22 Dell Dimension Pentium II 333MHz PC's, 4 Dell Pentium II 266MHz PC's, 15 Dell Pentium 133MHz PC's, and 6 Dell 486P/33 PC's. All of the computers are networked via switched ethernet 10 Base-T to a Dell Poweredge file server running Novell 4.1 as the network operating system. All the Pentium PC's run MS Windows NT Workstation as the client operating system. Two network laser printers, an HP 4000TN and a Compaq Pagemarq 20, are available for students to print their results.

The lab is in a transition period: a major effort is being undertaken to upgrade the hardware and software packages in the lab to support both the existing EE major and the newly created Computer Engineering major. This involves the purchase of new PC's and updating or acquiring new CAD software packages to provide a complete set of software tools to our undergraduates. The following software packages are currently available to the users on the network:

- Workview Office - Viewlogic Systems Inc.
- Matlab - The Mathworks Inc.
- Comnet III - CACI
- Maple V - Waterloo Maple Inc.
- Electronics Workbench - Interactive Image Technologies Inc.
- Borland C++, Turbo Assembler - Borland
- Pspice - Microsim Inc.
- Texas Instruments TMS329 family development tools

All undergraduate Electrical and Computer Engineering students have access to this laboratory facility.

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Embedded Systems Design Laboratories

The Embedded Systems Design Laboratories are devoted to teaching, research, and system design projects. The laboratories are located in two adjoining rooms in the Light Engineering building: Y228 and Y230.

- Room 230 is used primarily to support the laboratory portion of two undergraduate courses: ESE 380 and ESE 381, Embedded Microprocessor Systems Design I and II. This laboratory contains 10 student stations, each of which can support a group of 2 students. Each student station is equipped with a personal computer (PC), a full function solderless breadboard, an EVB188EB/+ Single Board Microcomputer, a Fluke model 45 dual display DMM, a Phillips PM3055 50 Mhz oscilloscope, and a variety of other test equipment.
- The lab station PC's are networked (via a 10Base-2 Ethernet LAN) to a high performance Pentium network server. The server, which has four high capacity, high speed SCSI hard drives, is currently running the Novell Version 4/1 network operating system in a duplexed SFT configuration. The LAN is bridged to the campus Ethernet backbone. This provides high speed access to a variety of on and off campus computer systems, either through direct log on or via the Internet.
- Room 228 is an advanced laboratory which supports undergraduate and graduate embedded system design and research projects, as well as the laboratory portion of an undergraduate upper level VHDL digital design course. This room is configured with design stations that are equipped with Pentium II based workstations that are also networked to the laboratory's Novell server. Each workstation provides access to several sophisticated software design packages, including Synario from Minc Corp. and Model Technologies' VHDL Simulator.
- The design stations may be configured with a variety of test and debugging equipment. Available are microsystem testers, in-circuit emulators, logic analyzers, oscilloscopes, counter/timers, and a variety of other standard lab test equipment. Also provided in this room are two device programming stations that support a large number of programmable logic devices including EPROM's microcontrollers, stand-alone and complex PLD's, and FPGA's. Currently this lab supports embedded system designs based on the 80C88, 80C188EB, and several single chip microcontrollers, such as the 80C51 family. Digital systems design using VHDL and CPLD's and FPGA's from Vantis and Altera are currently supported.

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Fiber-Optic Sensors Laboratory

Development and fabrication services for individuals interested in integrated fiber optic systems for a variety of diverse applications, ranging from submicroscopic particle sizing to displacement sensors. Integrated fiber optics allows delivery of laser beams to remote location and inaccessible areas. The techniques of measurements can be either coherent or incoherent. Some of the recently completed projects include:

- Integrated fiber optic light probes for measurement of deflections in rotating turbo-machinery.
- Fiber optic system for early detection of cataractogenesis.
- Fiber optic systems for DNA Sequencing.
- Biosensors for detection of microbes.

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Fluorescence Detection Laboratory

The laboratory, funded by the National Institutes of Health, supports research in high resolution fluorescence detection for different applications, such as DNA sequencing.

- DNA sequencing: the laboratory is fully equipped for testing different

kinds of fluorescence detectors for capillary DNA electrophoresis.
• Fluorescence Sensors: this laboratory has equipment for design and prototyping of electronic systems for photoelectrical sensors, including single-photon sensitive devices.
• Optical Systems: this laboratory is for designing laser based fiber optical systems for highly sensitive fluorescence detectors.
• Imaging: Equipped with the support of Olympus America Corp. and featuring the Fluoview fluorescence imaging system (scanning confocal microscope).

Current projects include development and design of sensitive DNA sequencing systems based on fluorescent detection.

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Instrumentation Laboratory

This laboratory contains eighteen workstations consisting mainly of Tektronix equipment. Each work station has a fluke dual trace digital oscilloscope, Tektronix mainframe power supply with modular dual power supply, digital multimeter, two function generators, and a frequency counter. Included at each station are General Radio capacitance and resistance decades Simpson analog volt-ohm-current meter, and a bread board for the construction and testing of circuits designed in the laboratory. A curve tracer and inductance/capacitance meters are available for general use.

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Microelectronics Laboratory

The Microelectronics Laboratory in the Department of Electrical Engineering is equipped with state of the art tools for characterization and modeling of microelectronic and optoelectronic devices and systems. The characterization set-ups are based on modern electronic and optical measurement instruments including:
• Semiconductor parameter analyzer HP 4145B
• Signal vector analyzer HP89442B (up to 3GHz)
• Nicolet Optical Spectrometer 860 E.S.P. Magna-IR System (0.6-20μm)
• HP Microwave Spectrum Analyzer HP 85292L (9KHz-22GHz) with Lightwave Converter 11982A (1200-1600nm)
• HP71450B Optical Analyzer (0.6-1.7mm)

Laboratory modeling capabilities are supported by SUN Ultra 2 Systems (model 1200 with 200MHz Ultra SPARC-1 processor) and a variety of PC's.

Current projects include:
• Studies of phenomena limiting the temperature performance of lasers operating in the range of 2-4mm.
• Hot carriers thermometry in heterostructures.
•The role of hot photons in limiting the bandwidth and efficiency of QW lasers.
• Studies of characteristics of 1.3 mm lasers.

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NSF Industry/University Center for Design of Analog and Digital Integrated Circuits

The Center for Design of Analog-Digital Integrated Circuits (CDADIC) is part of the National Science Foundation's Industry/University Cooperative Research Center program. CDADIC's mission is to advance the state-of-the-art for design tools, testing techniques, and circuit design methodologies for analog and analog-digital circuits. The Center has made significant progress in developing analog technology that is as reliable and effective as pure digital technology.

Research projects at Stony Brook in the past year include:
• "Application Specific Active Pixel Image Sensors". Researchers are investigating the photosensitivity of array image sensors in standard CMOS (Complementary Metal Oxide Semiconductor) technology, the technology that is used to make analog and digital chips. This research has potential applications in barcode scanning and electrophoretic DNA sequencing.
• "Analog Low Voltage CMOS Design Including Wireless RF Applications". Researchers are using a standard CMOS process to design low voltage analog circuits with an emphasis on tunable continuous time filters; these circuits have many potential applications in electronics such as laptop computers.

The CDADIC consortium is headquartered at Washington State University and also includes the University of Washington and Oregon State University as member institutions. There are over 20 member companies participating in the consortium, including Analog Devices, AMD, Boeing, Hewlett Packard, Motorola, Symbol Technologies, and Tektronix. The electronic design and manufacturing industry has provided $1.2 million in funding for the Consortium.

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Opto-Electronics Laboratory

Characterization of semiconductor devices and wafers (transistors, diodes, photodetectors, light emitting diodes and lasers).

• Measurements of the devices current - voltage and current - output optical power characteristics within the temperature range 4.2-400K under CW and Pulse (t pulse = 10-8 sec) excitation.
• Spectral characterization of light emitting devices within range of wavelength 0.5 um - 5 um, within temperature range 4.2K-300K under Pulse and CW optical and electrical excitation can be provided.
• Consulting service for design and fabrication of semiconductor devices is available.

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Semiconductor Optoelectronic Laboratory

The Semiconductor Optoelectronic Laboratory at the Department of Electrical and Computer Engineering is equipped with state-of-the-art measurement systems for testing and characterization of heterostructures and heterodevices. The characterization set-ups are based on modern room temperature and low temperature (4.2K - 400K) probe stations and optical crystostats in conjunction with a variety of electronic and optical measurement instruments including:

- Semiconductor parameter analyzer HP4145B which allows the testing of electrical characteristics of the devices in CW regime.
- Microwave Spectrum Analyzer HP8592L with Lightwave Converter 11982A which allows the carrying out of measurements of device characteristics within frequencies ranging up to 17GHz.
- Lightwave 136-1058 short pulse laser which allows lifetime measurements.
- Optical Spectrometer 860 E.S.P. Magna-IR System which allows mid and far infrared LED and laser spectral characterization with high effectiveness.
- 0.5m SPEX spectrometer and Lightwave 136-1058 short pulse laser with corresponding electronics, which serve as the basis for a time reserve spectroscopy system.
- Labview programming system carries out control of all measurements.

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ENVIRONMENTAL SCIENCES AND TECHNOLOGIES

Flax Pond Marine Field Station

Flax Pond is a 146-acre salt marsh preserve, flushed with the tides through an inlet to Long Island Sound. This tidal wetland is located five miles from the Marine Sciences Research Center, on a pristine section of Long Island's North Shore. Hosts colonies of breeding terns, plovers, herons, egrets, and other water birds. Songbirds regularly visit during summer to feed in the marsh. Fringed with thickets of marsh grasses, shrubs, and trees and harboring a rich variety of marine plants, fish, and shellfish, Flax Pond sustains a large diversity of species. It has been formally designated a significant fish and wildlife habitat by the New York State Department of Environmental Conservation.

The Flax Pond Marine Field Station, consisting of Flax Pond and a laboratory, serves as a research resource for scientists. The Flax Pond Marine Laboratory is used primarily for instruction and research by the center's faculty and graduate students, but is also available to external users under appropriate collaborative agreements. The lab has 8,000 square feet of usable space, a running seawater system that draws water from the pond to more than 20 seatables and aquaria, and an 800-square-foot greenhouse for seaweed research.

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Living Marine Resources Institute (LIMRI)

Responds to the problems facing our commercial and recreational fisheries industries, applying the diverse specializations of the Marine Sciences Research Center's research faculty and staff to understanding basic processes governing the health of shellfish, finfish and plants that play a critical role in the regional, state, and national economies. LIMRI has collaborated with several shellfish aquaculture firms on Long Island along with town and state resource management agencies, to improve our knowledge of local finfish and shellfish resources. Research and related programs address shellfish biology and population dynamics, finfish biology and population dynamics, noxious phytoplankton blooms, fisheries management issues, larval recruitment processes, and seaweed physiology and mariculture.

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http://129.49.28.99/GEC/HTMLLIMRI.html

Marine Sciences Research Center Analytical Services Laboratory

This facility contains instrumentation for the following analyses: Carbon, nitrogen, and sulphur in solid samples such as biological materials, sediments, and organic compounds (Carlo Earba EA-1108 Elemental Analyzer). Dissolved total and organic carbon in freshwater and marine water samples at very low levels (Shimadzu TOC-5000). Dissolved

nitrate, nitrite, phosphate, ammonia, and silica in marine and freshwater samples (TRAXX Analyzer). The facility supports basic research projects at the Marine Sciences Center and has well developed precision, accuracy, blank, and detection limit information. For information and rates outside users should contact David Hirschberg.

David Hirschberg, Director
Marine Sciences Research Center
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Research Vessel *SeaWolf*

The Marine Sciences Research Center has begun the renovation and conversion of an 80 foot vessel to serve as the center's new research vessel, replacing the Research Vessel *Onrust* after 25 years of service. The vessel is now undergoing a complete renovation into a modern, multipurpose research vessel for MSRC.

The new vessel will have far greater capabilities than the *Onrust*. It will have double the amount of lab space, and feature separate wet and dry lab facilities with such features as protected power supply, running seawater and zero overboard discharge. The number of accommodations will also double, with berths for eleven personnel, a spacious galley, and full washroom. On deck a sophisticated hydraulic system with built in redundancy will power a 6 ton A frame and a 1 ton side frame, allow for a variety of winch operations, and be fully convertible for trawling. The majority of deck machinery will be installed above the shelter deck, keeping the main deck clear- an important safety feature when accommodating large groups of students on board. The new vessel will have a range of 2000 nautical miles, be able to work out to 200 miles offshore and stay at sea for up to 10 days. A 700 h.p. engine will power the vessel with a 65kW main and 30kW backup generator providing ship's electricity.

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Swan Pond Biological Station

Located in the 2,500-acre Robert Cushman Murphy County Park in Manorville, which encompasses pristine woodlands, ponds, and streams on the South Shore of eastern Long Island, the station provides a small laboratory and educational and meeting facilities. Accommodates public environmental educational programs and University academic programs.

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Waste Reduction and Management Institute (WRMI)

The Waste Reduction and Management Institute focuses on regional waste management problems – primarily those that affect the citizens of New York, but also those generated by New York's actions that affect surrounding states. Beyond WRMI's regional focus, however, are the potential benefits of research with national application. Research, environmental assessment, education, and policy analysis are the tools WRMI uses to achieve its goal: to reduce the impact of waste generation and disposal on society. The aims of WRMI's research and environmental assessment are to alleviate the impacts of marine pollution and waste disposal, promote recycling and reuse of waste materials, develop creative products from and uses for waste materials, and promote reduction of the amounts of materials in manufacturing processes that end up as waste.

WRMI operates a world class-100 clean facility for the analysis of organic carbon and anthropogenic, bioactive, and carrier metals. This laboratory allows for state-of-the-art determinations of metal contaminations in a variety of saline and fresh water environments.

Public education by WRMI comes in many packages: outreach information through brochures and public speaking engagements, symposia on waste management issues, and a formal certificate program offering an 18 credit graduate-level curriculum in waste management through Stony Brook's School of Professional Development.

Research programs include:

- Stabilization of wastes such as incineration ash and dredge spoils to allow for beneficial uses
- Assessment of engineering properties, environmental and economic impacts, and social consequences of using secondary materials
- Assessment of marine pollution issues
- Toxicants in marine food webs
- Biogeochemistry of organic pollutants
- Assessment of alterations of coastal environments
- Development of marine environmental monitoring plans
- Groundwater impacts from landfills
- Trace metal distributions, sources and fates in estuarine systems and groundwater

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GRAPHIC SERVICES AND PHOTOGRAPHY

Media Services (HSC)

Medical Illustration Unit

Graphic design and production services:

• Presentation text and graphics (charts and graphs); page layout and typesetting services for publications; scientific poster and poster title design; diagrams and schematics; photo illustration and composites; logo design; surgical and anatomical illustration; mounting and lamination; web graphics and web page construction.

Digital Imaging services:

• Color laser copies; output 35mm slides and color laser or ink-jet prints from electronic file; large-format printing (up to 3 ft. x 150 ft.); color transparencies; scanning; electronic file transfer.

Medical Photography Unit

Scientific and general photography

• Surgical, clinical, macro photography, public relations, locations, autoradiographs and gels.

Studio photography

• Specimen, clinical, special set-ups, portraits and passports.

Laboratory services

• E-6 slide film processing, b&w film processing, custom b&w printing, color and b&w copy slides, and slide duplication.

Digital imaging

• Slide imaging from files, scanning, file manipulation and digital color printing services.

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University Medical Imaging Center (UMIC)

Please see LIFE SCIENCES AND BIOMEDICINE
page 19

HUMANITIES AND FINE ARTS

Electronic Music Studios

Analog, voltage-controlled and digital equipment for electronic music production. Teaching and production facility for studio users (graduate students and faculty in music) working with electronic sound generation, modification, storage, and editing; and concrete sound manipulation, editing, and storage. Equipment for instruction in basic acoustics and electronic music composition/experimentation with or without live acoustic instruments or voice. Recording and mixing techniques; timbral experimentation.

Daria Semegen, Director
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The Humanities Institute

Founded in 1987, the Humanities Institute at Stony Brook has three main missions: to stimulate new modes of interdisciplinary research within the humanities and social sciences; to build bridges between the human sciences and the medical, technical and natural sciences; and to reach out to the local community through public lectures and film series. To achieve these ends, HISB sponsors Resident Fellows and Two-day Distinguished Visiting Fellows to present their new research and interact with Stony Brook and other local faculty and students; organizes symposia and conferences and film festivals; and works with community groups on programs of broader interest.

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www.sunysb.edu/humanities

Institute for Medicine in Contemporary Society

The Institute sponsors interdisciplinary programs in the medical humanities using the resources of the University and of the surrounding Long Island community. CONTEXTS, a journal for discussion of issues arising in the experience and care of the ill, is published five times during the academic year. A Visiting Fellows Program brings scholars from various disciplines to the University for inter-disciplinary seminars. Conferences are offered to local hospitals, professional groups, and the general public on issues of medical ethics. Institute faculty are available to local hospitals for consultation on the development of ethics committees.

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The Poetry Center

A "showcase" for American poetry, the Center houses a small collection of poetry books, audio and video tapes of readings, and is host to a poet's reading series. Some readers who have appeared over the last few years include Henry Taylor, Virgil Suarez, Marilyn Hacker, A. R. Ammons, Paul Beatt, Sharon Olds, and Lucille Clifton.

Adrienne C. Locke, Acting Director
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English
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INFORMATION RESOURCES

Community of Science

The University is a subscriber to the Community of Science, a Web service for scientists and scholars in the arts, humanities, biomedical, physical, natural and social sciences, engineering and applied sciences.

As an institutional subscriber, Stony Brook provides faculty members with access to a suite of valuable research tools that allow them to:

• Find research grants: COS Funding Opportunities is a database of more than 15,500 available research grants. COS Funding Alert sends the most relevant opportunities to you by e-mail each week.
http://fundingopps.cos.com
• Learn about research trends: COS Funded Research database tracks research activities and projects sponsored by the NIH, NSF, USDA, SBA, and others.
http://fundedresearch.cos.com
• Identify collaborators and peer reviewers: COS Expertise includes more than 300,000 scientists and scholars from institutions in the United States, Britain, Canada, and Australia.
• Promote your research: Researchers at universities and qualified R&D organizations worldwide can see your expertise profile.
http://expertise.cos.com

COS helps you find funding, collaborate with peers, and promote your research. We hope you find these tools useful. You may create or update your expertise profile with recent publications and current research interests by logging in to your COS Workbench (http://login.cos.com) and enter your username and password.

Community of Science recently released COS Citation Importer for MEDLINE. This tool makes the process of updating profiles easier than ever, by populating many of your existing faculty and researcher profiles with the appropriate MEDLINE citations.

COS has recently expanded the use of COS Citation Importer to include Ei Compendex. Ei Compendex is a bibliographic database of engineering publication abstracts. Due to the amount of data involved in this type of project, the variances in the names of people and institutions, and the mobility of faculty, COS cannot guarantee that the data will always be 100% accurate. There may be a small percentage of errors in the assignment of publications to individuals. We hope that you will let us know if there are data that are not in the profiles which you were expecting to find there, or data which have been inserted into the wrong profile.

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Research Informatics
Office of the Vice President for Research

The Office of the Vice President for Research maintains a computerized information system dealing with research and scholarly activity. The web-based system provides wide ranging and up-to-date access to both the University's campus and off-campus constituencies.

The USB Research Informatics Server provides a convenient starting point for accessing information dealing with all aspects of research and scholarly activity. It can form the basis for seeking funding opportunities, sponsor program deadline dates, campus policies and procedures examining policy and management issues; sponsor-specific, general mandates such as OMB circulars, campus policies and procedures, compliance issues, and extracting current or historical data about the campus' research mission in tabular or graphic format.

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http://www.research.sunysb.edu

SPIN: Sponsored Programs Information Network
Office of the Vice President for Research

The SPIN database contains information on funding opportunities for research, graduate and postdoctoral fellowships, curriculum projects, and many other types of grant support. Over 6,500 profiles of federal, foundation, voluntary health organization and corporate funding opportunities are on the database. Coverage includes active RFA's and Federal Register announcements.

The profiles of sponsor funding interests are updated at least annually or as soon as new information becomes available from the sponsoring agencies or organizations. A typical profile provides information on the address, contact person, telephone number, fax address and e-mail address, application deadlines, funding limit and duration, matching and cost-sharing requirements, and a detailed textual description of the award program. There is no charge for a search, and results can be forwarded by electronic mail for same day review.

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LIFE SCIENCES AND BIOMEDICINE

Atomic Force Microscopy Laboratory for Cell Studies

The Atomic Force Microscopy Laboratory for Cell Studies utilizes inverted Atomic Force Microscopy technologies (Topometrix TMX2000) to study the morphological and mechanical properties and behavior of living cells. Atomic force microscopy can be utilized both for imaging and as a micro-displacement actuator, with external control of Zpiezo available for customization of displacement protocols. A PC with high speed A/D capability and image processing is used for digital recording and manipulation of cantilever deflection, piezoelectric positioning, and topological data. Thermal control facilities, bright field and fluorescence microscopy are available.

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Bioelectromagnetics Research Laboratory

This facility has been developed as part of ongoing investigations of electromagnetic interactions with living cells, tissues and organisms. Apparatus for in vitro and in vivo, low frequency (< 3 KHz) exposures to both electric and magnetic fields are available permitting controlled exposures to 100 KV/m electric fields and 5 milliTesla magnetic fields, with design and construction expertise available for specialized exposure requirements. Analytical equipment includes flow cytometry, luminescent monitoring, quartz crystal microbalance, atomic force microscopy.

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Biomechanics Testing Laboratory

The Biomechanics Testing Laboratory (BTL) maintains mechanical testing and computational modeling capabilities suited for in vivo and in vitro studies of organs, tissues and biomaterials. Facilities include:

• MTS universal mechanical testing machine. This machine applies a maximum 50 KN loading force with maximal 173 mm displacement. The machine can also be equipped for delicate (1N) load evaluation as well as torsional loading. The system has been recently upgraded with the TestStar IIs control system and a Windows-NT based controller permitting tensile, compression, flexure, fatigue, fracture toughness, creep, peel, and tear loading testing. The system is available for testing biomaterials and for characterizing the biomechancial properties of implantable devices and components. Current areas of research include prostheses, bone remodeling and fatigue, soft tissue yield and ultimate strength measurements, orthopaedic hardware mechanics, spinal system, joint motion and strength, and dental wear.

• Chatillon stepper motor drive test machine for static or low frequency functional loading, suitable for simple tensile and compressive biomaterial mechanical testing. The machine provides both high (0-2500 N) and low (0-5 N) loads using LVDT control.

• Non-invasive ultrasonic tissue testing system. This system is currently available for in vitro biological tissue strength and density testing. The system includes transmitting and receiving transducers in 100 KHz, 500 KHz, and 2.25 MHz, adjustable sample positioning stage with water tank, HP pulse generator, Stanford Scientific wave function generator, and Tektronix 100 MHz Digital Oscilloscope. Proprietary hardware and software is being developed to increase the accuracy and precision of the measurements. The system is available for testing complex biologic tissues such as cortical and trabecular bone. Collaborations with the Department of Radiology facilitate correlations with CT and MRI measurements.

• Numerical modeling of biological tissues. Consultation on finite element modeling of hard and soft biological tissues. Contains extensive computing facilities, including Dell Precision 400 MHz NT workstation and IBM RISC/6000 workstation. Preprocess modeling is handled by using ABAQUS/Pre and PV-WAVE software. ABAQUS version 5.7 finite element modeling package is used in the analysis. Active research areas include 3-D bone remodeling, porous materials, skin/muscle modeling, implant-tissue interface, and dental evolution.

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Biomedical Engineering Department

Health Sciences Center

The Biomedical Engineering Department is responsible for the safety of medical devices used at University Hospital. The department maintains a database of device-user experience using on-line data collection and in-hospital technical repair staff. The department is the hospital's technical liaison to the FDA and other healthcare regulatory agencies.

The staff of biomedical, clinical and electrical engineers and technicians conduct healthcare technology assessment, with device manufacturers in the clinical environment, to solve problems and promote the advancement of medical instrumentation.

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Cell Culture and Hybridoma Facility

The Cell Culture/Hybridoma Facility is a core facility of the School of Medicine, located on the 2nd floor of the Life Sciences Building, within the Department of Molecular Genetics and Microbiology. CCHF was created in 1977, as a central facility of the Department of Microbiology, and has expanded its service base to laboratories University-wide as well as related academic, research and technological institutions.

The staff of CCHF works to identify new services to assist researchers. In addition to standard services (including development of monoclonal antibodies and growth, maintenance and storage of cultured cells), new services include production of high concentration monoclonal antibodies

through in vitro ascites. As always, culture media, sera and media supplements, as well as conditioned medium for hybridoma growth (feeder layer replacement) are available for purchase through CCHF.

CCHF is supported by the School of Medicine, the Office of the Vice President for Research, the Department of Molecular Genetics and Microbiology, and the Center for Biotechnology.

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Center for Analysis and Synthesis of Macromolecules (CASM)

CASM is a protein chemistry and DNA sequencing core facility whose services include protein sequencing, peptide synthesis, analytical HPLC, preparative HPLC, MALDI-TOF mass spectrometry, and DNA Sequencing. Protein sequencing is performed on a Perkin-Elmer Biosytems Procise 492 Protein Sequencing System using either pulsed-liquid or gas-phase chemistry. The amount of protein/peptide needed is less than 10 picomoles. Advice is always available on how best to prepare samples for sequence analysis.

Peptide Synthesis is performed on a Perkin-Elmer Biosystems Model 431A Peptide Synthesizer using Fmoc chemistry (Perkin-Elmer Biosystems FastMac Chemistry) at the 0.25 mmole scale. Cleavage of the peptide from the resin is performed using trifluoroacetic acid. If highly purified peptide is desired, the crude peptide can be purified using preparative reversed-phase HPLC.

MALDI-TOF Mass Spectrometry using the Bruker Protein TOF Instrument. The instrument is being used for the mass analysis of proteins and peptides and also for sequence analysis. As new techniques are developed, they will be added to our repertoire.

DNA Sequencing is performed using a Perkin-Elmer Biosystems Model 373XL Stretch using Big Dye Chemistry. We also welcome DNA samples where the investigator desires the PCR to be done by us.

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Chemical Synthesis

See PHYSICAL SCIENCES
page 27

Diabetes and Endocrine Research Center

The Diabetes Endocrinology Research Center (DERC) is a major research and education effort at Stony Brook, first initiated in 1979 as the Diabetes & Metabolic Diseases Research Program. In 1992 the DERC was established and has since grown to include more than 40 research groups in both clinical and basic research in the area of diabetes and endocrine-related areas. The DERC is the home of an institutional National Research Service Award Postdoctoral Training program funded by the NIH for the past 15 years. The DERC offers expertise and training (doctoral and post-graduate) in virtually all facets of the biochemistry and cell biology of metabolic diseases, particularly diabetes and obesity. Research interests include cell signaling and signal transduction pathways. For further details on the services and expertise available through the DERC and the research programs of its members, please contact the individual indicated below.

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Division of Laboratory Animal Resources (DLAR)

The Division of Laboratory Animal Resources (DLAR) is located in four buildings with the Health Sciences Center as the major facility. Services provided include aseptic surgical suites, radiology, necropsy and specialized technical assistance. There are three veterinarians, two veterinary technicians and animal care support staff.

DLAR is AAALAC accredited, has an approved assurance statement from OPRR and is licensed with the NY Department of Health and the USDA for animal use in teaching and research. The DLAR houses many different species from amphibians to mice to non-human primates as part of the University biomedical research and teaching effort that requires animals.

There are recharges for maintaining animals in the facility, for surgical procedures and for specialized technical services.

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Flow Cytometry Facility

Established in 1991 to provide the University and surrounding scientific community with a state-of-the-art flow cytometry core facility. This facility is a joint venture between the School of Medicine and the University Medical Center. The Center currently has two instruments (a three laser Becton-Dickinson FACS Vantage cell sorter and a Becton-Dickinson FACScan analyzer) depending on the investigator's needs. Some of the research applications supported include but are not limited to: multi-fluorochrome and multiparameter analysis, immunophenotyping, cell sorting, DNA cell cycle analysis, receptor-ligand interactions, green fluorescent protein analysis and sorting, and ion flux analysis. Consultation for experimental design and technical protocols are available free of charge. This facility is directed by Marc Golightly, Ph.D and supervised by Christopher Pullis.

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Gait and Motion Laboratory

The Department of Anatomical Sciences operates a facility that is equipped for telemetered recording of muscle activity, measurement of substrate reaction forces, and high speed 3D motion analysis. All physiologic, kinematic, and kinetic data can be correlated with visual records of subject behavior and are gathered real-time by computer for later analysis. Because operation of the equipment requires faculty supervision, any extensive project will entail collaborative research arrangements.

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Glassware Washing and Sterilization

Complete glassware washing and sterilization services provided to laboratories in the Life Sciences Building on a fee-for-service basis.

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Living Skin Bank

The Living Skin Bank, located in the Department of Oral Biology and Pathology in the School of Dental Medicine, provides state of the art therapy in the form of cultured epithelial allografts and autografts for the treatment of partial and full thickness burn injury. As part of its mandate to provide improvements to current therapies, the laboratory has ongoing research programs in the areas of wound healing, epithelial differentiation and the impact of nutritional molecules on these processes. In addition, the Living Skin Bank has developed capabilities for the growth of new cell types, one of which is responsible for the lipid secretion of sebaceous glands.

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Magnetic Resonance Imaging Facilities

See PHYSICAL SCIENCES, University Nuclear Magnetic Resonance Center, page 29

Medical Image Processing Laboratory (MIPL)

The MIPL conducts research on assorted areas of image processing and analysis, with an emphasis on radiological applications. Though it is a research lab with its own funding - not a service facility - we encourage collaborations with other researchers who may have use for our expertise in image processing and analysis theory and computer implementations. The MIPL is well equipped with several high-speed workstations and display devices. Other research groups in clinical and biological sciences have found our facilities and resources to be a useful inclusion on grant proposals. There is no charge structure per se.

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Medical Linear Accelerator

See Radiation Oncology, this page

Musculo-Skeletal Research Laboratory

The major focus of the Musculo-Skeletal Research Laboratory is targeted towards understanding the mechanisms responsible for the growth, healing, and homeostasis of the skeletal system. We emphasize an interdisciplinary, multifaceted approach to study the biochemical, molecular, cellular, tissue and organ level physiology of the musculo-skeletal system. Specialized facilities include: in vivo strain gauge recording capability; apparatus for dynamically loading skeletal tissue in vivo or ex vivo; and, bone histomorphometery facilities for undertaking histological analyses of both calcified and decalcified skeletal tissues.

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New York State Center for Advanced Technology in Sensor Systems

Funded by the state government, the NY State Center for Advanced Technology in Sensor Systems (Sensor CAT) provides an organizational framework and intellectual and material resources for the development of sensor-related technologies in New York State by facilitating partnerships between NYS industry and University research. For our business partners, we provide access to sensor-related intellectual resources and state-of-the-art infrastructure and prototyping and manufacturing of SUNY and beyond, as well as to our extensive network of industrial connections.

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Peptide Synthesizer

See Center for Analysis and Synthesis of Macromolecules, page 20

Protein Microsequencer

See Center for Analysis and Synthesis of Macromolecules, page 20

Radiation Oncology

The Department of Radiation Oncology is primarily a clinical facility with its main site at University Hospital and a secondary location on the campus of Brookhaven National Laboratory. These cancer treatment facilities include 3 high energy medical linear accelerators which generate photon and electron beams with energies ranging between 4 MeV and 25 MeV. In addition, the brachytherapy facilities include a computer controlled high dose rate iridium-192 afterloading system and a stock of clinical cesium-137

brachytherapy sources. Related clinical and research facilities include:
- Radiotherapy simulator (diagnostic x-ray)
- Radiotherapy 2D computerized dosimetry and treatment planning computer
- 3D dose planning workstations (several DEC Alpha platforms)
- Laser scanning film digitizer and image processing workstation
- Computer controlled radiation beam measurement system comprising a waterproof scanning ionization chamber in a large water phantom.
- Numerous ionization chambers of assorted sizes and volumes with corresponding electrometers.
- Thermoluminescence dosimetry (TLD) system
- Solid state diode dosimetry system
- Silver-based and radiochromic film densitometry hardware/software
- Precision extrapolation ionization chamber for surface dosimetry measurements.
- 3D Polymer Gel based radiation dosimetry

Our Brookhaven facility, located within the Medical Department at BNL, includes collaborative ties to the positron emission tomography (PET) program and other brain studies.

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Somatosensory Research Laboratory

Combining the disciplines of neurophysiology and soft tissue biomechanics, this laboratory is set up to explore how the peripheral nervous system encodes mechanical states in soft tissues ranging from gentle touch to pain. Instruments and apparatus available in this facility include: optical kinematic position systems in transmitted and infrared light, tensile and compressive actuators for controlled loading of soft tissues, electrophysiological stimulus and recording system for single neurons, and in-vitro 3D spinal loading apparatus.

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Transgenic Mouse Facility

The Transgenic Mouse Facility produces genetically altered mice for basic and biomedical research. The facility staff is available for consultation on all aspects of transgenic and gene-targeting projects.

Current services include:

Transgenic Mouse Production
DNA provided by the investigator is purified and injected into one-celled mouse embryos. The injected embryos are transferred to foster mothers. DNA from the resulting pups is analyzed by the investigator to identify transgenic founder mice. The founder mice are then delivered to the investigator for their studies.

Gene Targeting in Embryonic Stem Cells
DNA provided by the investigator is electroporated into embryonic stem (ES) cells. The ES-cells are selected for antibiotic resistance. Cells from the selected cell-lines are sent to the investigator for DNA analysis to identify correctly targeted clones. Frozen vials of each line are maintained while they are under analysis.

Chimeric Mouse Production
Gene-targeted ES-cells are injected into mouse blastocysts. The injected blastocysts are then transferred to foster mothers. After chimeric pups are weaned they are transferred to investigators for further breeding and study.

The Transgenic Facility mouse colonies are housed under maximum isolation conditions in the Division of Laboratory Animal Resources and are routinely screened for exposure to pathogens. A current health report will be provided to investigators.

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University Microscopy Imaging Center (UMIC)

UMIC has equipment and personnel resources to conduct research projects requiring advanced light, electronic-light and electron microscopy techniques. UMIC is fully integrated to the University-wide computer network and the Internet. Most microscopes, image acquisition devices and printers are linked via a fast local area network to servers.These servers provide a combined file storage capacity of over 80 GB. Images acquired or processed at the facility can be retrieved from remote workstations using file transfer protocol (FTP) at ftp.umic.sunysb.edu (password is required). Image files are backed up regularly on to tape and archived digitally (CD).

Microscopy services
Electron microscopy includes transmission electron microscopy (TEM) and scanning electron microscopy (SEM). Light microscopy services include laser scanning confocal microscopy, epifluorescence confocal microscopy, confocal reflected/transmitted microscopy, bright and dark field microscopy, phase contrast microscopy, Nomarski differential interference contrast (DIC) microscopy, epi- and transmitted fluorescence microscopy, epi- and transmitted polarization microscopy, epi- and transmitted polarized microscopy, stereo microscopy and video microscopy.

Imaging Services
In addition to photographic film, images may be acquired using video, PMTs and a wide range of CCD cameras. Three dimensional reconstructions and volume analysis of confocal z-series are also available. Images can be processed, assembled into composites and printed using dye sublimation technology.

Sample Preparation
Semi-thin cryomicrotomy and microtomy of plastic or paraffin embedded specimens and standard histological staining are available. Also available is ultrathin microtomy, critical point drying, metal/carbon sputtering, metal/carbon rotary shadowing and freeze-fracture/freeze-etching.

Other Services
The facility also has a PhosphorImager system for the analysis of autoradiograms made from electrophoretograms and membrane blots of radiola-

beled material. The PhosphorImager is fully integrated to the network to facilitate file transfer, image processing and printing. This system is accessible 24 hours-a-day, 7 days-a-week.

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MASS SPECTROMETRY

University Mass Spectrometer Facility

The Mass Spectrometer Facility was created in 1974 to place sophisticated instrumentation in a central facility and provide complex analyses for research faculty throughout the University. Trained personnel perform analyses, maintain the instruments, and assist in collaborative research projects. Instrumentation has been upgraded significantly by successful grant applications, and new mass spectrometer techniques have been added to the facility in recent years. Samples are run on a fee for service basis, and a schedule of fees is available. Dr. Charles Iden is the Director of the Facility and will provide information on sample submittal and data interpretation.

Five instruments provide a variety of analyses using different ionization techniques. The most recent instrument acquisitions are a Micromass Quattro LC/MS/MS and a Micromass Platform LC/MS. The Quattro is a tandem quadrupole instrument that operates in the electrospray ionization (ESI) mode and is used for structure determination and sequence analysis of bipolymers such as oligonucleotides, peptides, and polysaccharides. The Platform LC/MS also utilizes ESI and is used for qualitative and quantitative LC/MS analyses. A Fisons Instruments Trio-2000 LC/MS has multiple capabilities and several ion sources, including a dual electron/chemical ionization, thermospray ionization LC/MS, electrospray ionization (ESI), fast atom bombardment (FAB) ionization, and a particle beam LC/MS interface. It is linked to a Hewlett Packard gas chromatograph. A Kratos MS890/DS90 high resolution GC/MS is used extensively for FAB analysis and high resolution accurate mass measurements. FAB has been used for the analysis of inorganic compounds and biomolecules. A Hewlett Packard GC/MS instrument is used for routine low resolution analyses. This instrument is in excellent operating condition, and the computer system for data acquisition and display was upgraded recently.

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Isotope Geology Laboratory

See Physical Sciences
page 28

MECHANICAL ENGINEERING

Computational Fluid Dynamics Laboratory

Facilities

- 3 IBM RS6000 RISC machines running the AIX Unix operating system
- 1 Sun SPARCstation running the Solaris Unix operating system
- 4 networked high performance PC's running Windows NT & Windows 95
- 4-Processor Origin 2000 parallel computer
- 1 DEC Alpha 2100 RISC machine running the DEC Unix operating system
- Systematic Operating time on the parallel machines at the NSF-supported NPACI program at the San Diego SuperComputing Center.
- 1 Tektronix Phaser 450 Thermal color printer
- 1 HP Laserjet 4V printer
- 1 HP Deskjet 1600CM inkjet color printer
- Slide projector & screen

Research In This Laboratory

- High-Speed Flows
- Direct Numerical Simulation (DNS) and Large Eddy Simulation of Turbulence
- Turbulence Modeling
- Chemically-Reacting Flows
- Parallel, distributed and high performance computing
- Gas turbine engine heat transfer and aerodynamics

Software (other than what is developed in-house)

- Tecplot
- Scientific Workplace (Word & Maple)
- Microsoft Office
- FAST Flow Visualization System
- GRIZ Post-Processing System
- The TETRUSS System from NASA Langley (GRIDTOOL, VGRID, SOLVER, VPLOT)

Current research topics include the DNS of multi-step, chemically-reacting mixing layers, DNS of turbulent boundary layers, PDF analysis of turbulent reacting mixing layers.

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Computational Solid Mechanics Research Facility

Computational simulations are an integral part of modern research in solid mechanics, structural mechanics, and materials engineering. In addition to the raw computing power available in advanced scientific workstations, software for post-processing and graphical display of computational results allow for the evaluation of design and processing variables and the simulation of performance and life-cycle for materials and structures at size scales from nanometers to hundreds of meters. Computational solid mechanics is a major component in the R&D cycle of all modern industries, including aerospace, electronics and controls, automotive, civil structures, factory automation, and chemical processing of materials among others.

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Laboratory for Experimental Mechanics Research

The goal is to promote basic research in experimental solid mechanics with emphasis on photomechanics techniques and their application to fracture and fatigue studies. Research is conducted in optical techniques such as photoelasticity, moire methods, holographic interferometry, speckle photography and interferometry, holospeckle interferometry, white light and chromatic speckle methods, and speckle methods with electron microscopy.

Additional research areas include application of various photomechanics techniques to the study of fracture and fatigue of ductile metals and composites, determination of singularity field at crack tip, crack propagation in homogeneous and composite materials, and grain boundary deformation; equipment includes nine lasers (He-Ne, Argon, Ruby and Copper Vapor), optical benches, testing machines, SP-2000 high-speed digital camera, polar-iscopes, and image processing facilities.

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Laser-Based Measurement and Diagnostics for Thermal Engineering Laboratory

A high-precision, laser-based technique was proposed to measure the thermal diffusivity and the thermal conductivity of liquids. The experiment is based on a photothermal deflection method, in which a CW He-Ne laser is used as a probe beam and a NiCr resistance wire serves as a heating source. A numerical simulation of the heat conduction and beam deflection is used to determine the thermal diffusivity and the thermal conductivity of the test liquid from the experimental data. Results for five liquids, glycerol, 1-propanol, 2-propanol, methanol and ethanol are presented with very good agreement found between measured values and those reported in literatures.

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Ultrafast Laser Materials Processing and Micromachining

Research involves the application of low-power lasers for precision measurements and diagnostics, and high-power lasers for materials processing and fundamental research into laser-material interactions at very high

pulse intensities, and at extremely short pulse durations. The major focus area is liquids, with some work done on solid and gas states as well.
Recent research results, some of which have been both published and patented, include a novel laser based technique for measuring the temperature or concentration of a liquid surface; a real-time, bulk concentration measurement technique; a high precision, laser-based thermal property measurement system; and an on-resonance technique to measure magnetostriction.

Lasers:

- Lexel Ar^+: ion laser, 5W single line, 25W mulltimode, CW output in 440-550 nm range
- Photonics Industries GM30 Nd: YLF pulsed laser: 100ns, 532nm, 22 mJ/pulse 0-5KHz rep. rate
- Photonics Industries TRA-12 Ti: pulsed laser/amplifier: 100fs-100ps, & 2-6 ns pulse, ~800, 400 and and 257nm (turntable), 5KHz rep. rate, 1 mJ/pulse
- Several low-power, high-stability He-Ne lasers and solid state lasers for precision measurements

Major Measurement equipment:

- Tektronix 400 MHz, 2 GS/sec digital oscilloscope
- 6 Keithley Model 2000 6.5 digit multimeters
- EG&G 7260 digital lock-in amplifier
- Two 4' x 8' optical tables w/active vibration isolation
- Milligram and microgram-resolution precision scales

Other Equipment:

- 4 400, 333, and 200 MHz Pentium workstations
- Drill, mill, lathe, grind capabilities within lab
- Lithography based, two-layer printed circuit board fabrication within lab
- Full compliment of optical and electrical components

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Manufacturing Automation Laboratory (MAL)

The objectives of MAL are to advance the science and technology of design and manufacturing automation, to face challenges in the 21st century, and to become competitive in design and manufacturing automation through research and education excellence as well as collaboration with leading industries. Conduct research in the fields of robotics, manufacturing automation, flexible manufacturing automation, flexible manufacturing systems, manufacturing systems with robots and computer vision, and modern wiresaw technology in microelectronics wafer manufacturing. The lab also provides the opportunity for high school students to conduct summer research in manufacturing using the state-of-the-art industrial robot with computer vision system.

The research facility includes a four degree-of-freedom (dof), AdeptOne industrial robot with computer vision system equipped with MotionWare and VisionWare in an object-oriented programming environment, a conveyor belt, a four dof IBM SCARA robot, a Dynamite CNC milling machine, a desktop Raid prototype machine, and a single-pass wiresaw with slurry system. Software includes SmartCAM, AIM, and others.

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Optical Metrology Laboratory

This laboratory conducts research in the areas of optical metrology and 3–D machine vision. Current research projects include: small-angle measurement based on the internal-reflection effect, laser measurement systems for rapid calibration of machine tools, surface profile measurement of high-precision surfaces, 3-D surface contouring by digital fringe protection and phase shifting, and color-encoded digital fringe protection for high-speed 3-D surface contouring. Major equipment includes a coordinate measuring machine (Brown & Sharpe MicroVal PFx), a laser interferometer system (HP5529A Dynamic Calibrator), a digital projection system (In Focus LitePro 620), a high resolution B/W CCD camera (Kodak 1.6i; 1534x1024 pixels/10bit), a color digital camera (Kodak DC 210), a high end image processor board (Matrox Genesis), a Unix workstation (SUN Sparc LS 10), a high end graphics NT workstation (Dell Workstation 410), multiple personal computers and laser and inkjet printers, and a foundation-isolated optical table.

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Process Modeling Laboratory

This laboratory pursues both basic and applied research in the area of process modeling, simulation, and animation. Current research projects include: natural and forced convection, multiphase flow, heat transfer in porous media, surface tension driven flows, magneto- and electro-hydrodynamics, macro- and micro-segregation, thermomechanics, melting/solidification, thin film, low and high pressure crystal growth, Bridgman and hydrothermal growth, rapid solidification thermal spray, digital image processing, parallel computing and process animation.

Equipment includes a state of the art IBM 9076 SP2 (8-nodes) scalable parallel computer, Silicon Graphics Onyx2 and Indigo2 machines, twelve single and multi-processing SUN computers, several high-end PC's, a Tektronix dye sublimation thermal color printer and other peripherals. The SUN and SGI workstations are capable of creating video animation from computer simulations, analyzing experimental videos using direct input to the computer and digital image processing. Several in-house developed and commercial software packages are available for materials modeling, CFD simulations, and digital image processing.

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Robotics and High Speed Machinery Laboratory

The Robotics and High Speed Machinery Laboratory (RHSML) conducts research in kinematics, dynamics, vibration and control areas as related to high-speed and precision machines and devices. Both theoretical and experimental aspects are emphasized. Current research includes simultaneous structure and control design of computer controlled machines including robots, optimal design of machine structures and integration of smart materials into the structure of machines to enhance their operating speed and precision. Other current research areas include the study of dynamics and vibration in ultra-high speed machines; the study of the effects of the kinematics structure of machines on their attainable speed and precision; design of smart materials based actuators and structures; design of special purpose robotic systems, and other related topics. The RHSML is equipped with computational facilities and software for modeling and simulation purposes and experimental hardware including PC based controllers with multi-channel data acquisition capability and the necessary electronic instrumentation, sensors and drives to construct and experiment with various designed devices and systems.

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System Engineering and Integration Laboratory (SEIL)

The objectives of the research conducted in SEIL are to promote research and knowledge of mechatronic systems and to investigate issues related to technology and application-oriented systems. Specific research areas include micro-electromechanical systems (MEMS), ergonomic assessment of airline seats, mechatronic systems integration, contact mechanics of anthropomorphic robotic systems, integrated wiresaw and wafer manufacturing process with surface measurements, and the Taguchi Methods.

The facilities and equipment include: a SUN Sparc 20 UNIX workstation, a SUN UltraOne workstation, a SUN web server, several Pentium PC's, laser printers, high-resolution fluid flow measurement station, a two-axis computer controlled drilling system, and others. Software includes MATLAB on PC and Unix workstations, Canvas, Abaqus, and SDRC I-DEAS.

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Thermal Sciences Research Laboratory

This laboratory conducts experimental and computional research in the areas of thermophysical property measurements, convective heat transfer, melting/solidification, heat transfer in porous media. Experimental equipment includes several digital acquisition systems, oscilloscopes, stabilized power supply, He-Ne laser, optical bench, constant temperature baths and circulators, viscometers, refractometer, and digital multimeters. A state-of-the-art visualization and digital image processing facility has been developed to video record and analyze the fluid flow and temperature fields. The equipment used for this purpose includes a Sony CCD video camera, a Sony video recorder, a low noise-to-signal ratio VCR for editing, a high resolution Sony TV, special light sources and a Canon camera for still photography.

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Ultrafast Thermal Phenomena and Thermo-Optical Measurement Laboratories

The mission of the laboratory is to investigate and develop novel laser-liquid technologies for measurement, diagnostics, and processing. Taking advantage of the unique properties of laser-generated light, techniques are being developed to make temperature, concentration, index of refraction, and thermal property measurements, with an emphasis on liquids. At much higher laser intensities, such as those generated with nan-, pico-, and femtosecond lasers, a variety of interesting, non-classical behavior can arise when such light interacts with liquids. Such interactions provide opportunities for novel techniques for heating and modifying liquids.

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PHYSICAL SCIENCES

Advanced Technology Laboratory (ATL) and Cryogenic Fluids Facility

The Cryogenic Fluids Facility (S287 Physics Building) supplies liquid helium and liquid nitrogen to faculty, graduate students, and undergraduate students for research and teaching needs in the Physics Department. Subject to prior approval by the Faculty Steering Committee and the Manager, it can supply limited amounts of these cryogenic fluids to on-campus research users who must transport to and from the facility their own storage dewars to receive the cryogenic liquid being purchased.

- Liquid helium charges: $4.06/liter with $2.61 credit for each one liquid liter equivalent of helium gas returned to be reliquefied.
- Liquid nitrogen charges: $0.15/liter plus $8.00 "per trip charge" to cover costs of maintenance, upkeep, and cooling down the plumbing for a fill. The above costs assume that the cryogenic fluid user/purchaser fills his/her own dewar. Extra charges are levied if ATL personnel are asked to carry out the fill.
- The ATL is fully utilized (95% or greater) by research-related projects of faculty and graduate and undergraduate students in the Physics Department. Subject to time availability and prior approval by the Faculty Steering Committee and ATL Manager, special arrangements can be made to meet research-related requirements of other campus departments and units, including incubator companies.
- Charges for work: Cost of all materials and special tools plus labor charges.

Labor for USB Research Foundation or State accounts: $12.00/hour plus 15% overhead charged by Research Foundation: total = $13.80/hour.

Labor for off-campus work that must be research-related and "one-of" type work (no routine or production work): $30.00/hour.

- Vacuum brazing (radio-frequency and radiant heating) and heat treating.
- Tube furnace (with flowing gas).
- Spot welding of small assemblies.
- Thin film vacuum deposition of various metals and compounds.
- Mass spectrometer helium leak checking of vacuum and pressure vessels.
- Electric-discharge-machining (EDM) of (odd) shape holes in conductive materials.
- Mechanical (fore-vacuum) vacuum pump testing and repair.
- 99.999% pure helium gas for cryogenic refrigerator/vacuum pump re-pressurization. (Fabrication of silicon nitride beam targets.)
- Wafer dicing capability for parting and slicing silicon wafers and crystals.
- Aluminum anodizing and electrolysis chemical nickel plating facility.

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http://www.geocities.com/ResearchTriangle/Forum/2442

Center for High Pressure Research

Designated by the National Science Foundation in 1991 under the Science and Technology Center Program, the Center for High Pressure Research has received $7 million over five years for "fundamental science that directly contributes to the nation's economic competitiveness." The only NSF Science and Technology Center at a public university in New York State conducts the following research:

- High-pressure research: Synthesizes and characterizes materials at high pressure and temperature. Operates systems to pressures of 25 Gpa, and 2500° C for recovery experiments and a pressure system to 15 Gpa at 1200° C with in situ X-rays from the National Synchrotron Light Source at Brookhaven National Laboratory.
- Acoustic characterization: Determines elastic properties using ultrasonic and Brillouin spectroscopy on samples as small as 100 microns.
- Electron microscopy: A 200 kev scanning transmission electron microscope for sample characterization.
- Electron microprobe: Major element chemical analysis on samples with resolution of 5-10 microns.
- X-ray diffraction: Several X-ray systems for X-ray diffraction with ability to characterize single crystal structures for 50-micron-sized single crystals, and powder diffraction analysis for specimens with a spatial resolution of 50 microns.

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Chemical Synthesis Center

The Chemical Synthesis Center (CSC) provides state-of-the-art design and synthesis services to industrial and academic scientists for the preparation of chemical substances. Although its primary focus is on those molecules used in biological and biomedical research, synthesis of other compounds is routinely undertaken. In the past, the major users of the center have been workers who do not wish to prepare their own molecules, or who do not have access to synthetic facilities.

The CSC consists of a fully equipped synthetic chemistry laboratory in the Graduate Chemistry Building, together with the necessary equipment for the purification and analysis at the milligram to one hundred gram scale. Equipment is available for most routine chemical transformations including ozonolysis, low pressure hydrogenation and photochemical reactions. Since it is located in the Chemistry Department, the facility has access to all of the Department's major instrument facilities. Those include FT-IR and UV-vis spectroscopy along with NMR spectrometers which range from 250 to 600 Mhz (proton). ^{1}H, ^{13}C, ^{19}F, and ^{31}P-NMR are routinely available with other nuclei on request.

Services the CSC can provide include:

- Consultation, including literature searches, to select molecules of interest.
- Synthetic design for new molecules or modifications of known molecules.
- Chemical syntheses.
- Purification and documentation of chemical homogeneity.
- Verification of structure by spectroscopic and physiochemical methods.
- A limited amount of long-term contract research is also undertaken.

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http://www.research.sunysb.edu/research/facil/chsyncnt.html

Direct Current Plasma Emission Spectrometer (DCP) Laboratory

The DCP is a high-resolution argon plasma emission spectroscopic instrument designed for simultaneous abundance determinations of up to 20 elements, in solution. It is a low-level analytical technique with current detection limits typically in the range of 0.1-100 parts per billion, in solution. It is ideally suited for analyzing waters and other dilute solutions and for materials that can be dissolved in dilute acids, such as rocks, minerals, ceramics, metals, and so forth.

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DNA Sequencing Laboratory

The laboratory, which is funded by the National Institutes of Health, supports research in high resolution DNA fluorescence detection for different applications. The DNA Data Acquisition Laboratory has different sets of equipment for each of the laboratory's facilities. The sets of equipment are grouped by local network and can be used temporarily in each working space. The DNA Acquisition Laboratory currently has four different laboratory facilities.

- DNA Sequencing Laboratory: This laboratory is fully equipped for testing different parts of fluorescence detectors for capillary DNA electrophoresis.
- Fluorescence Sensors Laboratory: This laboratory has equipment for design and prototyping of electronic systems for photoelectrical sensors, including single-photon sensitive devices.
- Optical Systems Laboratory: This laboratory is for the design of laser based fiber optical systems for high sensitivity fluorescence detectors.
- Imaging Laboratory: Equipped by support of Olympus America Corp. and based on fluoview fluorescence imaging applications.

Current projects include development and design of a highly sensitive DNA detection system, based on new principles of fluorescence detection.

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Electron-Microprobe Facility

The Geosciences Department's electron microprobe (Cameca Camebax) is a state-of-the-art micro-analytical instrument for the quantitative chemical analysis of solid materials. Analytical capabilities include:

- Quantitative analysis of major elements (Z>8, including oxygen) by wavelength-dispersive spectrometer (WDS) analysis with analytical precision to ±1%.
- Quantitative analysis of minor and trace elements by WDS with analytical precision to ±5%.
- Semi-quantitative sample characterization (composition and homogeneity) through energy-dispersive spectrometer (EDS) analysis for elements (Z>8), secondary electron (SE) imaging, and backscattered electron (BSE) imaging.

The electron microprobe is currently used primarily by scientists in the Department of Geosciences and the Mineral Physics Institute to analyze geologic samples and high-pressure experimental run products. Scientists from other departments (Marine Sciences Research Center, Physics, Materials Science) have also used the facility to analyze a variety of materials, including ceramics, alloys, soils and sediments, high-T superconductors, glasses and composites.

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Isotope Geology Laboratory

The Isotope Geology Laboratory has three surface emission mass spectrometers for high precision analysis for isotope composition or isotope dilution analysis of U, Pb, Rb, Sr, Sm, Nd, B, Ba, La, Ce, Eu, Gd, Dy, Er, and Yb. For most elements the analysis can be done in sub-microgram quantities. Isotope composition analysis has a precision (2 sigma) of 40 parts per million for Sr and Nd and 500 parts per million for Pb. Isotope dilution analysis has a precision (2 sigma) of 1% or better for most elements. The mass spectrometers include:

- An automated 6-inch 60 degree sector single collector NBS (NIST) design mass spectrometer.
- An automated 12-inch 90 degree sector single collector NBS design mass spectrometer.
- An automated multiple collector model 262V Finnigan MAT mass spectrometer.

The facility may be used by members outside the department for a fee. The outside user must be skilled in mass spectrometric analysis or be prepared to become a skilled mass spectrometric analyst. Sample analysis must be made by the outside user. This includes chemical preparation of the samples as well as the mass spectrometric analysis. We are prepared to analyze rocks, minerals, or waters. For these we have complete facilities for rock crushing, mineral separation and chemical preparation. Non-geologic samples may be analyzed depending on their character.

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Superconductor and Nano-Scale Device Fabrication Laboratory

This research lab fabricates small-scale superconducting circuits using 1um design rules. Lithography tools include two SEM-based EBL systems as well as a Kasper and a DUV mask aligner. Clean rooms include a small class 100 room as well about 1,300 square feet of class 1,000 space. Deposition systems include sputtering, E-beam, and thermal sources as well as an off-axis sputtering system for high Te superconductors. Other equipment includes RIE, a

wafer dicer, SEMs, and optical microscopes. Other capabilities include the use of self-aligned multilevel EBL masks for the fabrication of devices having 50 nm resolution or less.

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University Nuclear Magnetic Resonance Center

The Nuclear Magnetic Resonance Center (NMRC) utilizes the Chemistry Department's broad range of state-of-the-art high resolution nuclear magnetic resonance spectrometers to provide academic and industrial scientists with a variety of spectral services.

Routine 1-D proton, carbon, fluorine, or phosphorus survey spectra can be measured to aid in determining chemical structure. Studies of chemical kinetics or exchange are also routinely possible.

NMR spectroscopic methods can be applied to the qualitative and quantitative chemical analysis of mixtures. This can be especially important for the analysis of complex small molecule pharmaceutical preparations that are difficult to analyze by the usual gas or liquid chromatographic methods. Complex molecules can be analyzed using two-dimensional correlation experiments, i.e. COSY, NOESY and/or HETCOR pulse sequences. The full analysis of large biomolecules, including polysaccharides, polypeptides or oligonucleotides, generally requires longer multidimensional experiments run on the 600 MHz spectrometer.

The NMRC is housed in the Chemistry Department. The facilities include the following instrumentation:

Spectrometers:

• 300 MHz Bruker AM and Bruker/GE QE spectrometers with 5mm probes for routine measurements of ^{1}H and ^{13}C spectra at room temperatures. Certain 2D experiments are also possible.

• A 250 MHz Bruker spectrometer with a 5mm quad probe for routine ^{1}H, ^{13}C, ^{19}F, and ^{31}P NMR spectra. Virtually all other non-radioactive NMR active nuclei can be observed with a 10mm broadband probe. Both probes permit variable temperature measurements over a range of -100 to + 100° C.

• A new 500 MHz multinuclear instrument.

• A 600 MHz Bruker AMX spectrometer with a 5mm inverse probe and multinuclear capability is available primarily to obtain spectra of more complicated natural products and biological macro-molecules. It is capable of variable temperature operation. A comprehensive upgrade allowing gradient enhanced spectroscopy has been completed for all three spectrometers.

• A GE satellite data station is available to process data from the 300 MHz Bruker/GE QE spectrometer. All spectrometers, except the AM-300, are linked via Ethernet to Silicon Graphics workstations. This allows archival storage of data and/or off-line data processing using Biosyn/Felix. Data transfer through the Internet is also possible.

A fee schedule is available on request.

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http://www.research.sunysb.edu/research/facil/nmrcnt.html

X-Ray Crystallography Facility

The X-Ray Crystallography Facility housed in the Chemistry Department consists of two automated single crystal diffractometers: a state-of-the-art Bruker AXS unit equipped with the latest CCD detector technology and sophisticated software and an older Enraf-Nonius CAD-4 diffractometer.

A graduate student assistant under faculty supervision will determine crystallographic structures for suitable single crystals.

A fee is charged for each structure determination.

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X-Ray Microscopy Laboratory

Principal facilities are located at the National Synchrotron Light Source, Brookhaven National Laboratory. They include an undulator source of soft X-rays, two spherical grating monochromator beamlines, and two room temperature and one cryogenic x-ray microscopes. These microscopes offer 30-50 nm spatial resolution imaging of micrometer thick specimens, and x-ray absorption spectroscopy with 0.1-0.5 eV resolution over the energy range 250-800 eV. They are used for studies in biology, polymer science, environmental science, and other fields. An adjacent preparation laboratory includes inverted and upright microscopes, a fume hood, and basic cell culture facilities. Additional activities include x-ray holography, and imaging by the reconstruction of diffraction patterns. The X-1A insertion device team includes participants from North Carolina State University, Lawrence Berkeley Laboratory, Argonne National Laboratory, and other institutions, and is funded in part by the National Science Foundation and the Department of Energy.

Additional facilities include an image analysis laboratory based on the IDL software running on a Linux computer.

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SHOPS

Electronics Center

Physics and Astronomy

Capabilities:

• Specializes in the electronics design and fabrication of digital and analog circuits, and electronics systems.
• In-house design and fabrication of single and double-sided printed circuit cards up to 7.5 inches by 9.5 inches in area (without plated through holes for in-house fabrication).
• Layout of multi-layer, high density printed circuit boards (fabrication by commercial PC board house).
• Repair service for all types of electronic, laboratory and test equipment.
• Wide variety of electronics and computer system components in stock for fast turn-around on fabricated units and equipment repair.
• Consulting services are available in design engineering, software, computer upgrading, and general printed circuit design requirements.

Rates:

USB Research Foundation or State accounts: $20.00/hour .
Off-campus work that must be research-related, prototype, or "one-of" type projects (no production work): $30.00/hour.

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Shop-Electronics

Geosciences

Labor for USB Research Foundation or State accounts: $20.30/hour.

On rare occasions, “one-of” type research related work (no routine or production work) can be done for an off-campus research organization by special, prior arrangements. Labor is charged at $20.30/hour plus a Research Foundation overhead charge of 15%: total - $23.45/hour

This facility designs and fabricates prototype electronic instrumentation to support faculty research programs. Additionally, staff members install the prototype equipment and work closely with researchers to trouble-shoot equipment and offer advice for improving effectiveness of instrumentation. They also provide advice on current technologies in order to assist in the purchase of new equipment.

The staff members have the skill and resources to work on a variety of large complex systems including: fixed focus and rotating x-ray analysis systems, mass spectrometers, electron microscopes, electron microprobe, high pressure and temperature equipment, vacuum systems, optical equipment and lasers, computer interfacing, microprocessor circuits, and printed circuit boards.

James Broyles, Director of Laboratories
Geosciences
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Shop-Electronics

Ocean Instrumentation Laboratory
Marine Sciences Research Center

The Center’s Electronics and Ocean Instrumentation Laboratory is at the leading edge in the burgeoning field of the application of microelectronics to field oceanography, providing new and better tools to collect oceanographic data. The laboratory is available for custom instrumentation design and development projects. Recent projects have included an advanced salinity-temperature-depth (STD) profiler, a low-cost remotely-operated vehicle (ROV), and ISORES (Intermittent Sediment/Oxygen Resuspension System) developed to aid research on bacterial breakdown of hydrocarbons. In addition to instrument design and development activity, the laboratory maintains an inventory of shipboard and moored instruments available for rental by SUNY and other clients.

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Marine Sciences Research Center
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Shop-Glass

Full service state-of-the-art glass shop services for research projects requiring design, fabrication and repair of apparatus and components from all varieties of specialty glasses and quartz. It is equipped with an extensive array of glass lathes, cutting and grinding machines, and vacuum apparatus. Personnel design and fabricate complex apparatus from pyrex to quartz. Services include consultation; on-site construction of vacuum systems; repair and modification of existing apparatus, vacuum lines, and stills; and access to an extensive stock of laboratory glassware and specialty glasses, including optical windows. Custom-made glassware fabricated in the shop spans the gamut from low-temperature optical cells to electrophoresis apparatus.

A fee is charged for labor and materials.

Rudolph Schlott
Scientific Glass Blower
312 Chemistry Building
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632-7891; Fax: 632-7960

Shop-Machine

Division of Biological Sciences

The Machine Shop provides the following services in the support of research at Stony Brook:

• Precision machining of all ferrous and non-ferrous materials, including all types of plastics (plexiglass, vinyl, etc.).
• Custom designing and manufacturing.
• Spot welding-brazing-hand-soldering and soft-soldering.
• Repair of broken equipment.
• Modification of lab microscopes and cameras.
• Custom made tissue culture chambers, [^{32}P] radiation enclosures, all types of electrophoresis chambers and accessories (e.g. horizontal, vertical, mini-blotters, elutors, combs, spacers, gradient makers, light boxes, etc.)
• Specializing in prototype research and development.

Guy Crerend, Supervisor
Room 067, Life Sciences Building

Phone: 632-8523; Fax: 632-8577
http://129.49.19.42/division/machineshop.html

Shop-Machine

Chemistry

Routine machine shop services for research projects requiring design and fabrication of apparatus and components from a variety of metals and synthetic materials. A fee is charged for time and materials.

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Shop-Machine

Geosciences

Labor for USB Research Foundation or State accounts: $20.00/hour.

On rare occasions, "one-of" type research related work (no routine or production work) can be done for an off-campus research organization by special, prior arrangements. Labor is charged at $20.00/hour plus a Research Foundation overhead charge of 15%: total = $23.00/hour

This facility designs and fabricates complex mechanical systems used in faculty research programs. Additionally, this facility installs the prototype equipment and works closely with researchers to trouble-shoot equipment and offer advice for improving effectiveness of instrumentation. Provides advice on current technologies in order to assist in the purchase of new equipment.

The staff have designed and built a number of complex systems, including motorized X-ray diffractometer systems, telescope drive systems, hydraulic systems, support tables, high pressure apparatus.

In addition to the traditional machines and hand tools found in a machine shop, the ESS facility contains large surface grinder, cylindrical grinder, computer controlled (CNC) milling machine and a multi-turret lathe.

James Broyles, Director of Laboratories
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Shop-Machine

Physics and Astronomy

Labor for USB Research Foundation or State accounts: $20/hour. Charges for work: Cost of all materials and special tools plus labor charges. Labor for off-campus work that must be research-related and "one-of" type work (no production work): $30.00/hour.

Capabilities:
• Precision machining in all materials (stainless steel, aluminum, brass, steel, ceramics, plastics, and exotics).
• High quality Gas Tungsten ARC Welding (GTAW) in stainless steel, aluminum, and steel from .010 inches to 1 inch thick). For all fabrication requirements ranging from ultra-high vacuum chambers to large structures.
• High quality brazing and silver soldering facility.
• Precision assembly and test available for all systems manufactured (gear trains, power transmission, high vacuum, housings, electronic equipment racks, precision motion devices, etc.).
• Heavy equipment manufacturing capability (five-ton crane, two-ton fork lift truck, multiple two-ton chain hoists).
• Wide variety of raw materials in stock (stainless steel, aluminum, copper, brass, steel machinable ceramics, plastics and fiberglass).
• Consulting services are available for manufacturing, tooling, assembly and design requirements.

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Shop-Refrigeration

The Refrigeration Shop will service and/or repair any type of temperature control system from ovens to ultra-cold freezers.
• The Refrigeration Shop has the capacity to repair vacuum pumps, shaking water baths, water pumps, gel-dryers, incubators, stills, pure water systems, gas and air systems, centrifuges (except ultras), UV light tables and ice machines. If an item in need of repair is not identified, please call for further information.
• This shop has full capabilities to design, modify and to enhance temperature control systems. All our technicians are EPA-certified, type Universal for refrigerants.

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http://129.49.19.42/division/refrigeration.html

SOCIAL SCIENCES

Center for Survey Research

The Stony Brook Center for Survey Research is a state-of-the-art facility designed to conduct telephone and mail interviews with people and organizations on Long Island, in New York State, and throughout the United States.

The Center provides high quality research services to University faculty and administration, federal, state, and local government agencies, media, and nonprofit organizations using a computer-assisted-telephone-interviewing system (CATI) that satisfies the highest standards of academic and government researchers.

The staff at the Center conduct all phases of surveys including sample and study design and can assist researchers in formulating questions, designingquestionnaires, and conducting analyses as needed.

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Social Sciences Data Analysis Laboratory

Provides two computer labs for academic instruction and research to faculty, staff and students. Stony Brook is a member of the Inter-University Consortium for Political and Social Research. The Social Science Data Lab serves as the liaison office between the University and the Consortium. We retrieve the databases requested by faculty and students from the Consortium and make them available through a network server. Users can directly download these databases from the server for their teaching and research.

The Lab maintains equipment to convert datasets stored on an IBM cartridge to a format that is usable by the PC Windows operating systems. It also maintains software to interchange datasets used by various statistical packages and has the capacity to record datasets onto CD media for faculty and students.

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University PreSchool

This on-campus teaching/research facility, sponsored by the Department of Psychology, enrolls children from approximately 18 months to five years of age; admission is open to children of families in the surrounding community. Graduate students and faculty utilize the facilities for research and/or observational purposes. Students may also elect to participate in the classroom on a regular basis in order to gain greater knowledge of and experience with young, normal children. Research facilities include rooms with one-way mirrors, video equipment, an eight-channel dynagraph, and telemetry equipment.

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INTERDISCIPLINARY

AIDS Education and Resource Center (AERC)

The AIDS Education and Resource Center, a special project in the School of Health Technology and Management in the Health Sciences Center, initiated its response to the HIV/AIDS epidemic in 1984 and has continued its efforts to the present day through grants and contracts funded by state and federal agencies and private foundations.

The Center's mission for the last 12 years has been to promote HIV prevention education, increase community awareness, influence public policy, and facilitate professional health care and research relevant to the HIV/AIDS epidemic The mission has been carried out through the development of HIV/AIDS curricula and its implementation through both community education programs targeted at the general public and professional training programs for multidisiplinary groups of health and human services professionals, educators and students.

Drawing from a multidisiplinary faculty and staff, the Center has trained more than 50,000 participants since its inception in 1984. All programs are tailored to the specific training needs of each group, with an emphasis on psychosocial sensitivity and cultural competency.

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Cancer Institute of Long Island

The Cancer Institute of Long Island at Stony Brook is an active-matrix style clinical and basic research center under the auspices of the School of Medicine. The Cancer Institute of Long Island provides a template for a concerted, multidisciplinary approach to basic and clinical research, detection and molecular analysis of cancer, comprehensive care of cancer patients, and developments of new diagnostics and therapies targeting cancer. Working in close collaboration with the Brookhaven National Laboratory and the Cold Spring Harbor Laboratory, the Cancer Institute of Long Island provides value-added to major research efforts that make optimal use of resources shared by the three institutions, all in close proximity. The Cancer Institute of Long Island serves the greater Long Island region, a population of nearly 3 million, as a support center for regional activities in cancer research, training, and community service, providing a regional network for physicians, cancer-awareness groups, and other medical services in the area.

Cancer and Cancer Genetics
Cancer & Cancer Genetics is the research arm of the Cancer Institute of Long Island at Stony Brook, a cutting-edge cancer center providing a multidisciplinary approach to basic and clinical cancer research, detection, and analysis, while offering comprehensive care to cancer patients. Our Physician-Scientist training opportunities are unparalleled, offering the clinically-trained MD an exciting environment rich with interaction among cancer biologists, cancer geneticists, structural biologists, and experts in fields of developmental genetics and infectious disease.

Early Breast Cancer Detection

Advances in imaging are increasing the sensitivity of detection of breast cancer at its earliest stages. Sophisticated epidemiology provides a base for national studies aimed at cancer prevention. The infrastructure on which these translational clinical efforts advance is based on the work of the strong, internationally-recognized cancer biologists, geneticists, and specialists working at the Centers for Molecular Medicine.

Strategic Opportunities for Research
Some of the promising areas of investigation include the identification of new tumor markers through powerful chip technologies, the application of novel genetic approaches to deduce signatures of specific cancers, and the mapping of cancer on Long Island, creating a home advantage for regional analysis of breast and other cancers.

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Centers for Molecular Medicine and Biology Learning Laboratories

www.cmm.sunysb.edu

Cancer and Cancer Genetics
See Cancer Institute of Long Island,
directly above

Center for Developmental Genetics
The research programs in the Center for Developmental Genetics take advantage of the powerful tools that are available for studying gene function in several of the most important model systems, including fruit flies, frogs, and mice. The Center provides an important central source for investigators across the Stony Brook campus who have interests in studying the genetic basis of fundamental processes associated with human diseases.

Important areas of research in the Center include:

Regulation of Gene Expression
Research in the Center for Developmental Genetics studies the molecular mechanisms used to switch genes on and off during embryonic development. These studies provide information on the functions of genetic regulators that are essential for the development of bone and blood, and yield important insights on the effects of mutations associated with leukemia.

Signal Transduction
Signaling pathways play pivotal roles in controlling both proliferation and differentiation during development. Work on one of these pathways has revealed new strategies that can be incorporated into the development of therapeutic treatments for colon and pancreatic tumors.

Cell Development and Function
Key molecules are required for the proper development and function of cells that make up our nervous system. One set of studies investigates genetic defects that may lead to deafness. Work on another project has provided important information on the pathways responsible for neuronal degeneration during stroke.

Genetic Diseases
Mouse models are being developed for human genetic diseases. One project here has identified a gene that may be responsible for the birth defects that lead to cleft palate in humans.

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Center for Infectious Diseases
The Center for Infectious Diseases conducts basic and applied research on microbial pathogenesis-how microbes cause disease and how the body fights off the infection. Strong research is being done in three areas:

Lyme Disease Research
Stony Brook is ideally positioned to study Lyme disease. Not only is this disease most prevalent in the Long Island area, but the first isolation from patients of the spirochetal bacterium that causes Lyme disease, and the antibiotic regimen to combat it, were both achieved here. Scientists at the Center for Infectious Diseases are studying how this microbe interacts with the blood and other tissues of the patient to learn more about the way it spreads in the body, and how it causes diseases of the skin, heart, joints, and nervous system. The Center is also studying epidemiological and clinical features of Lyme and other local diseases carried by ticks and mosquitoes.

Fighting Intestinal and Urinary Tract Infections
Scientists at the Center for Infectious Diseases are at the forefront in the study of how these intestinal and urinary tract microbes interact with their hosts to cause disease. Much of the initial work that demonstrated evidence of crosstalk between these bacteria and the cells they invade was done here at Stony Brook. The Center is continuing to find ways to understand further the complex relationship between bacteria and their host cells; and to design new treatments and ways to prevent the diseases altogether.

Understanding and Combating New Infections
The Center for Infectious Diseases will collaborate with clinicians to carry out epidemiological and clinical studies that may speed up the time it takes for research discoveries to evolve into new therapeutics for diagnosis and treatment. Two emerging target areas of study are the use of known genetic systems of bacteria to find new ways to outsmart them and exploration of newfound relationships between infectious agents and diseases previously of uncertain origin.

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Center for Structural Biology
The Center for Structural Biology is housed on the ground and first floors of the Centers for Molecular Medicine. The Center has advanced instrumentation for NMR spectroscopy, X-ray crystallography, computation, and biophysics.

NMR spectroscopy
The Keck NMR Center for Structural Biology houses a 700 MHz spectrometer for solution NMR studies and a wide bore 600 MHz spectrometer for solid-state NMR studies. Both instruments have three radiofrequency channels capable of high resolution, multidimensional experiments. Multidimensional NMR spectroscopy provides a versatile approach for obtaining high resolution structures of biological macromolecules in solution

and membrane environments. High resolution structures can be obtained of proteins, DNA, RNA and their complexes in solution using traditional methods and of membrane proteins using magic angle spinning techniques.

X-ray crystallography
The x-ray facility houses two Riaku x-ray generators and area detectors for macromolecular crystallography. Crystallography provides a direct approach for obtaining high resolution molecular structures of biological macromolecules with virtually no limitations on molecular size.

Computation
The Center for Structural Biology has a 16-processor Origin 2000 server for intensive computational studies and numerous SGI molecular graphics workstations. Computational methods and molecular graphics are intrinsic components of both crystallography and NMR spectroscopy which use computational strategies for model building and the refinement of molecular structures.

Biophysics
The Center houses instrumentation for biophysical studies of macromolecules including a step-scan FTIR spectrometer, a circular dichroism spectrophotometer, fluorimeter and several absorption spectrometers. Biophysical approaches for measuring binding constants, reaction rates, and the structural changes of key catalytic groups are critical for studies of protein folding, enzyme reaction mechanisms and low resolution structure analysis.

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Biology Learning Laboratories (BLL)
The BLL provides the foundation for a research-oriented, multidisciplinary curriculum. The labs offer research-grade equipment and close proximity to scientists working to solve the most important and exciting questions in life sciences.

Research-Oriented Instructional Laboratories
Utilizing innovative teaching approaches, the faculty have created a research-oriented environment in the instructional laboratories to better prepare students for advanced study. Students have the opportunity to design their own experiments and acquire the essential skills and expertise to engage in independent research.

Multidisciplinary Training
The sixteen instructional laboratories housed in the BLL accommodate a wide range of courses offered by faculty in the College of Arts and Sciences, the College of Engineering and Applied Sciences, the Marine Sciences Research Center, and the School of Medicine. Students may select from a variety of laboratory courses including biochemistry, bioengineering, botany, cell biology, ecology, embryology, genetics, molecular biology, pharmacology, physiology, and zoology.

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General Clinical Research Center (GCRC)

The General Clinical Research Center is a focal point for clinical research within the University Hospital and Medical Center. The GCRC at Stony Brook is one of 77 NIH centers funded nationwide. The GCRC is designed to provide investigators with the resources they need to conduct clinical research under controlled circumstances, and to encourage collaboration among basic and clinical scientists through studies that may translate into new or improved patient care methods.

The Center focuses on concerns that are of particular importance to Long Islanders, such as Lyme Disease and Breast Cancer. The GCRC also has a major interest in metabolism with studies on Diabetes Mellitus, Lipodystrophy Syndrome in HIV Disease, regulation of protein metabolism in surgical patients, stroke prevention, Prostate Cancer, Schizophrenia, Dupuytren's Disease, Cardiovascular Disease and Heart Disease prevention.

Goals
- To provide an optimal setting for controlled clinical investigation of normal and abnormal body function as well as investigation of the causes, progression, prevention, control, and cure of human disease.
- To encourage collaboration among basic and clinical scientists in order to develop and maintain a national core of expert clinical investigators.
- To introduce health professionals into the rewarding field of clinical research.
- To translate advances in basic science into new or improved methods of patient care.

Department Functions
The GCRC provides the environment, support staff and nursing staff to perform research protocols. The staff of the GCRC promotes excellence in interdepartmental communication and cooperation in:
- Assisting investigators in recruiting, screening and interviewing subjects.
- Assisting investigators in statistical analysis of their research protocols.
- Providing education and support to new investigators, their team members and coordinators.
- Assisting investigators in carrying out their approved research protocols.
- Providing clinical care/assistance for investigator initiated research protocols.

The GCRC is equipped with a broad range of resources to assist investigators with any component of their research. The resources are grouped into two categories: physical resources and staff resources.

Physical resources
- Three fully-equipped private inpatient rooms, including one isolation room
- One treatment /procedure room
- Five outpatient rooms, including one pediatric exam room
- Computerized data management and analysis system
- Data entry room and training room
- Interview room
- Children's play room

Staff resources
- Nursing Core (7 T&R nurses, 1 clinician, nurse manager, 1.5 patient care specialists and 1 clerk)
- Nutrition consults available
- Laboratory Core- three major components: sample processing, immunoassay and gas chromatography mass spectrometry
- Biostatistics & informatics core

- Recruitment & retention core

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UNIVERSITY-RELATED ECONOMIC DEVELOPMENT PROGRAMS

Center for Biotechnology

See BIOTECHNOLOGY page 7

Center for Corporate Training

Continuing education programs customized to meet the unique needs of each organization. Focus is to improve skills and enhance job performance for the Long Island business community. In the business/industry contract training area, certificate and management development programs are offered on site or at the University.

These programs reduce travel time and offer a cost-effective benefit to companies. Programs focus on the specific needs and goals of workers and integrate corporate objectives with on-the-job tasks. Serves approximately 500 persons annually in private business and public agencies and New York State government employees who are members of the Public Employees Federation.

The Center for Corporate Training specializes in Technical and Manufacturing Management Development through programs and processes which address all aspects of process improvement through Quality Standard Implementation including ISO 9000, supplier partnering, strategic planning and more. Resources also include Executive development, leadership mentoring, climate surveys, project management, OSHA, and various programs specific to professional licensing and development. Eligible companies may receive state funding to offset program cost.

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Center for Education on Substance Abuse (CESA)

The Center for Education on Substance Abuse (CESA) develops credit and non-credit education and training programs on substance abuse. Programs are developed in cooperation with the New York State Office of Alcoholism and Substance Abuse Services (NYOASAS), Suffolk County Coalition for the Prevention of Alcoholism and other Drug Dependencies, Inc., New York State Driver Rehabilitation Program, and the Long Island chapter of Employee Assistance Professional Association.

CESA presently is offering The Substance Abuse Certificate Program. This program is designed to train and educate counselors, teachers, social workers, nurses, psychologists, medical personnel, labor and management personnel and other individuals who wish to enter and work in the field of substance abuse. This program will also benefit individuals needing recredentialing hours and individuals now working in the field of substance abuse who wish to qualify for the CESA credential. Courses are offered at days and times convenient for the working professional.

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Center for Excellence and Innovation in Education

The Center for Excellence and Innovation in Education plays a major role in the Long Island region by supporting, strengthening, and developing: (1) teacher education and development programs; (2) educational research and development programs; and (3) school-community-university partnership programs. Programs include:

- Liberty Partnership Program: Academic-year support services for "at-risk" junior and senior high school students.
- Teacher Opportunity Corps: Increasing minority entrants into the teaching profession.
- Camp Sea Wolf: An environmental education residential summer camp program for 11-15 year-old boys and girls held at a campsite on the East End of Long Island.
- Chautauqua Program: Three-day short courses for teachers offered each spring with support from the National Science Foundation.
- The Journal of College Science Teaching: A publication for the National Science Teachers Association, edited at Stony Brook, which reaches 5,000 college and university teachers across the nation.
- All the Way Program: A unique school-university-industry partnership program which offers supplementary educational curriculum, intensive social services, and a caring family support system for children and their families in Washington Heights, New York.
- Student Research Support Program: This academic year program, co-sponsored with the Science Outreach Program, brings more than 2000 Long Island high school students to the campus to learn how to do research projects in both the natural and social sciences.
- Summer Research Institute for High School Students: This five-week summer program, co-sponsored with the Science Outreach Program, enables high achieving Long Island high school students to participate in faculty research projects in both the natural and social sciences.
- Discover Lab: A science education center, co-sponsored with the Science Teacher Program, that during the academic year brings together elementary and middle school students, inquiry-based, hands-on science activities, and beginning and master teachers from the University's teacher preparation program.
- Co-sponsorship with appropriate University units of a broad range of studies, curriculum development projects, professional development courses and workshops, conferences and colloquia.

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Center for Regional Policy Studies

Conducts basic research in public policy issues ranging from regional planning to all its subsets, e.g. housing, land use, transportation, etc., regional economic and fiscal analyses; governmental productivity and related public administrative issues that are regional in scope. As a link between the university and the public sector, provides all levels of government agencies with detailed, up-to-date statistical material on which they base key planning and operating decisions. Among its major studies:

- An office space analysis for the Suffolk County executive, with an analysis of rental vs. County-owned space in determining the future office space needs of the County.
- An economic impact analysis of Stony Brook University on the surrounding communities.
- A study for the Long Island Lighting Company analyzing the requirements of the Clean Air Act by encouraging the use of alternative fuel vehicles.
- A study to develop a plan to implement the use of alternative fuel vehicles and apply for Clean Cities designation by the Department of Energy.
- A study for the New York State Transportation Department to reduce single occupancy vehicle worktrips on Long Island by means of compressed work weeks and/or telecommuting.
- A study outlining a comprehensive strategic plan for economic development on Long Island, providing the first all-inclusive look at Long Island's economy in more than 20 years. The study goes beyond Long Island's original 1970 Master Plan, projecting regional growth through the year 2010.
- In a study conducted for the Bi-County Temporary State Commission on Tax Relief on Long Island, the center examined approaches by which taxation can become more responsive to regional needs.
- A feasibility study of joint commercial-military use of the Calverton airport.

Other research has included:

- Labor force projection studies that served as the first element in the development of the strategic economic development plan for Nassau and Suffolk Counties. The work was designed to have application throughout the state and around the country. NYS Urban Development Corporation.
- A tourism marketing survey for Nassau and Suffolk Counties. The survey culminated in a plan for promoting tourism-related activities on Long Island. NYS Urban Development Corporation.
- A productive analysis of the Department of Social Services to enhance the work-flow process and operational efficiency.

Co-sponsor with the Department of Political Science and the School of Continuing Education of an 18-credit graduate certificate program in Long Island Regional Studies.

Maintains close working relationships with the Long Island Regional Planning Board, Hauppauge, on the development of data; the Regional Plan Association, New York City, for the exchange of data and pertinent information for the metropolitan area; Housing for Americans, a regional group working specifically on the housing problems facing the region, the Center for Suburban and Regional Studies at Towson State University, Maryland; and the Center for the Urban Policy Research at Rutgers University.

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Office of Economic Development

The Office, part of the Office of the Vice President for Research, is responsible for linking the academic and research resources of the campus with the economic needs of Long Island and New York State. Stony Brook is the intellectual engine for the globally competitive high technology and knowledge-based industries that are defining the region's and State's economic future. The Office sustains institutional participation in the region's principal business organizations, works closely with State and municipal economic development agencies, fosters efforts to promote industry-university collaboration, especially in entrepreneurial ventures, and is responsible for research outreach publications in print and Web media.

Ann-Marie Scheidt, Director

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Long Island High Technology Incubator, Inc. (LIHTI)

Opened in October, 1992, the incubator assists in the development of new high-technology businesses and new ventures by existing firms.

The 42,000 square-foot building is located on Stony Brook's East Campus. Operations are overseen by Long Island High Technology Incubator, Inc., a not-for-profit membership corporation of the Stony Brook Foundation and the State University Research Foundation.

The project builds on the success of the University's Interim Incubator Program, initiated by the Center for Biotechnology, which has provided space in academic buildings to start-up companies since 1986. Incubator "graduates" have added hundreds of jobs to the Long Island economy and occupy over 150,000 square feet of industrial space. They earn gross revenues of tens of millions of dollars.

Tenants in the facility are primarily start-up companies that benefit from the University's research activities or academic programs in developing, using, or producing new products, processes, or services. The facility houses more than two dozen start-up companies in laboratory and office space divided into modules as small as 500 square feet.

Shared overhead services include telephone and telecommunications connections, utility connections, maintenance and janitorial services, and hazardous waste disposal. Tenants share a receptionist, conference room, and kitchenette.

Business advisory services–provided through external professional networks–include accounting, computer services, patent assistance, product evaluation, and corporate tax advising.

The Collaborative BioAlliance, housed in a 30,000 foot expansion of the Incubator facility, began offering contract biomanufacturing services in 1996, saving small biotechnology companies the large capital expense of production investments while enabling them to produce commercial quantities of therapeutic products.

Tenants have access to specialized University resources. The University's Small Business Development Center provides counseling and programs on entrepreneurial development and new business management.

The Incubator was financed by a $520,000 grant and a $2,305,000 low-interest loan from the New York State Urban Development Corporation, a $500,000 grant from the New York State Science and Technology Foundation, a $1.4 million grant for the biomanufacturing facility, and a $2,675,000 commercial loan provided through Fleet Bank and guaranteed by the New York State Job Development Authority.

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http://www.lihti.org/

New York State Small Business Development Center (NYS SBDC)

Reflects a partnership between higher education and the state and federal governments to improve economic prospects for entrepreneurs and small business owners in New York. This partnership builds upon the diversity and expertise of higher education to meet the varied and complex needs of the entrepreneurial sectors, the object being economic development and creation of jobs. The SBDC provides management and technical assistance to Long Island's small business community on utilizing faculty, staff and students to foster economic development through support of entrepreneurs. Works closely with all levels of economic development agencies and assistance programs.

Small business and entrepreneurial needs are served through three general areas of service classifications:

- Direct counseling: One-to-one counseling provided at no cost by full-time professionals, faculty, staff, students, and consultants (volunteer and fee paid).
- Training: Sponsored and cosponsored conferences and training events ranging from a few hours on a single component of business operations to extended coursework designed to build an individual's entrepreneurial capacity. The SBDC has sponsored 166 major conferences since January 1, 1989, including Starting and Managing a Home-Based Business, Doing Business with Suffolk County, Increasing Profits Doing Business with Government Agencies, and Economic Diversification Opportunities in Environmental Technologies.
- Research: Specific research topics on areas of current concern or an identified segment of the dynamic business environment are solicited for independent or sponsored projects.

The most frequently requested services include business plan development, export/international trade development, financial management systems, loan information, marketing assistance, new product development, organizational/management structures, site location analysis, start-up assistance, state/federal procurement opportunities, and technology transfer.

All entrepreneurs or small business owners are eligible for the program. However, emphasis is placed on services to women, minorities, veterans, and handicapped individuals. Priority is also give to manufacturing firms located in distressed areas, incubator ventures, exporters, and projects with substantial investment or employment potential. Special outreach activities and training events encourage members of these groups to make use of SBDC services.

To date, the SBDC has arranged more than $114 million in financing and has serviced more than 8000 from start-up entrepreneurs to established companies.

The SBDC has sought to develop outreach to state and federal agencies involved in economic development. Works closely with the U.S. Small Business Administration, the New York State Empire State Development Corporation, and the following state agencies: Urban Development Corporation, Job Development Authority, Business Development Corporation, Science and Technology Foundation, Office of Business Permits and Regulatory Assistance, and Energy Research and Development Authority. Utilizes a list of venture capital sources and participates in the Long Island Venture Group. SBDC has a working relationship with the 21 other state SBDCs, three of which are on Long Island, and are linked by computer network. Relationships have been established with the economic

development agencies of Suffolk County and the Towns of Brookhaven, Islip, and Babylon. While helping establish day care centers on Long Island, SBDC recognized the need for a "one-stop" source of regulations for operating day care centers. With a grant from the New York State Urban Development Corporation, the SBDC prepared a complete list of local mandated regulations of day care operations, thereby helping entrepreneurs wishing to establish much needed day care facilities to shorten the time needed to comply with government regulations. The information has been published in hard copy and as a computer software package to promote the broader distribution of this resource as an economic development too.

Two outreach offices service the east end of Long Island, one in Southampton, and one at Brookhaven National Laboratory. The first SBDC at a national lab.

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New York State Strategic Partnership for Industrial Resurgence (SPIR)

The Strategic Partnership for Industrial Resurgence (SPIR) was established on July 1, 1994, by the State of New York to utilize the extensive engineering resources of the SUNY system (the campuses at Stony Brook, Buffalo, Binghamton and New Paltz) to help industry in the State compete more effectively. SPIR fills a critical gap in existing State industrial assistance programs by providing technically advanced multi-disciplinary assistance on a fast turn-around basis. The intent is to help companies improve their market posture, retain existing employees and create new jobs.

At the College of Engineering and Applied Science at Stony Brook, we have engaged faculty and students from the departments of Applied Mathematics and Statistics, Computer Science, Materials Science and Engineering, Mechanical Engineering and Electrical and Computer Engineering in industrial projects. The students and faculty for the College of Engineering and Applied Sciences have worked in partnership with corporate engineers and scientists to ensure that New York has the technological edge to gain market share and develop new highly paid jobs.

Since its inception, Stony Brook's SPIR program has worked with more than two hundred New York State companies on more than four hundred projects. The technical assistance provided over the last five years by the College of Engineering and Applied Sciences faculty is estimated by our industrial partners to have led to more than 5,000 new and retained jobs.

The College of Engineering and Applied Sciences faculty partner with New York State companies on proposal applications to Federal agencies. Total Federal funding awarded to date has exceeded $55 million. This success strongly indicates the maturity and depth of commitment of the University-industry partnership that has developed at the University at Stony Brook following the establishment of the New York SPIR program.

SPIR project types include manufacturing proccess evaluation and improvement, new product development, joint industry-university proposals for Federal funding, and the creation of alliances among companies within each SUNY engineering school's region and throughout New York State.

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Stony Brook Software Incubator

Opened in 1998 in 6,000 square feet in the University's Nassau Hall, the Stony Brook Software Incubator provides ready access to the region's only national Top 20 Computer Science Department, T-1 Internet connectivity, specialized research facilities, libraries and campus amenities. The Incubator's unique partnership with Computer Associates International, the world's third largest software company, gives it unsurpassed capacity to fulfill its mission: providing the ideal setting for the start-up, successful growth and retention of the next generation of leading software developers and manufacturers.

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632-3150

Technology Learning Center

College of Engineering and Applied Sciences

The mission of the Technology Learning Center (TLC) at Stony Brook is to facilitate, coordinate, and promote the transfer of knowledge through the delivery of technology training to domestic and international industry. TLC uses teleconference facilities and Internet technology in undertaking these efforts, thereby keeping today's businesses on the cutting edge of the telecommunication revolution. To help companies keep pace with rapid shifts in technology, TLC offers on-site programs of graduate and professional study tailored to the specific needs of particular businesses. Specially appointed instructors with educational and industrial expertise currently offer ten to fifteen week instructional programs in C++, JAVA, Visual Basic, Microsoft COM, Active X with C++, Windows NT and Unix administration training. TLC also offers several graduate masters programs, as well as training programs for international students.

In addition to courses taught on the Stony Brook campus, TLC also employs a variety of methods to reach and instruct non-traditional students. These methods include:

- On-site teleconferenced programs of graduate and professional study.
- Programs of study also utilize the capabilities of the World Wide Web.
- "In Plant" courses are delivered at participating companies by CEAS faculty.
- Videotaped lectures.

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Technology Transfer and Industrial Relations

More than 700 inventions have been formally disclosed by Stony Brook faculty members, resulting in the issuance of over 240 patents and the signing of more than 250 license agreements to facilitate the commercial development of these inventions. The processing of invention disclosures, as well as the development and negotiation of licenses with off-campus organizations, is the responsibility of the Office of Technology Licensing and

Industrial Relations (OTLIR).

By State statute, The Research Foundation of SUNY owns all inventions and software resulting from research activities utilizing SUNY or Research Foundation owned or controlled facilities. When the facilities of other institutions or companies are used, inventions may be jointly owned. These provisions protect the interests of New York State and its taxpayers, who have contributed to the costs of university facilities. Long term exclusive licenses are regularly granted to companies agreeing to abide by the terms of the license agreement.

Other functions of OTLIR include the general protection of intellectual property and the inventor's rights, providing for confidential exchanges of information, and material transfers for technical evaluation purposes.

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Technical Training, Management Education and Human Resource Development

Stony Brook has the most comprehensive array of undergraduate, graduate and professional degree programs on Long Island, and provides additional certificate and non-credit offerings and short courses to address corporate needs for management development, technical instruction and continuous training. Many of these programs can be delivered on-site and customized to an employer's specific needs.

For information about specific programs call the numbers listed below. General information can be obtained from the University's Office of Economic Development, at 631-632-7006.

Part-time Graduate Programs

EngiNet/College of Engineering
and Applied Sciences
632-8380
http://dol1.eng.sunysb.edu/enginet/enginet/html

Harriman School for Management
and Policy
632-7180

School of Professional Development
and Continuing Studies
632-7050

Graduate School
632-7040

Evening Undergraduate Programs

Transfer and Evening Studies
632-7028

Short Courses, Corporate Training and Non-credit Instruction

Center for Corporate Training
632-7071

SPIR Workshop Program
632-8380