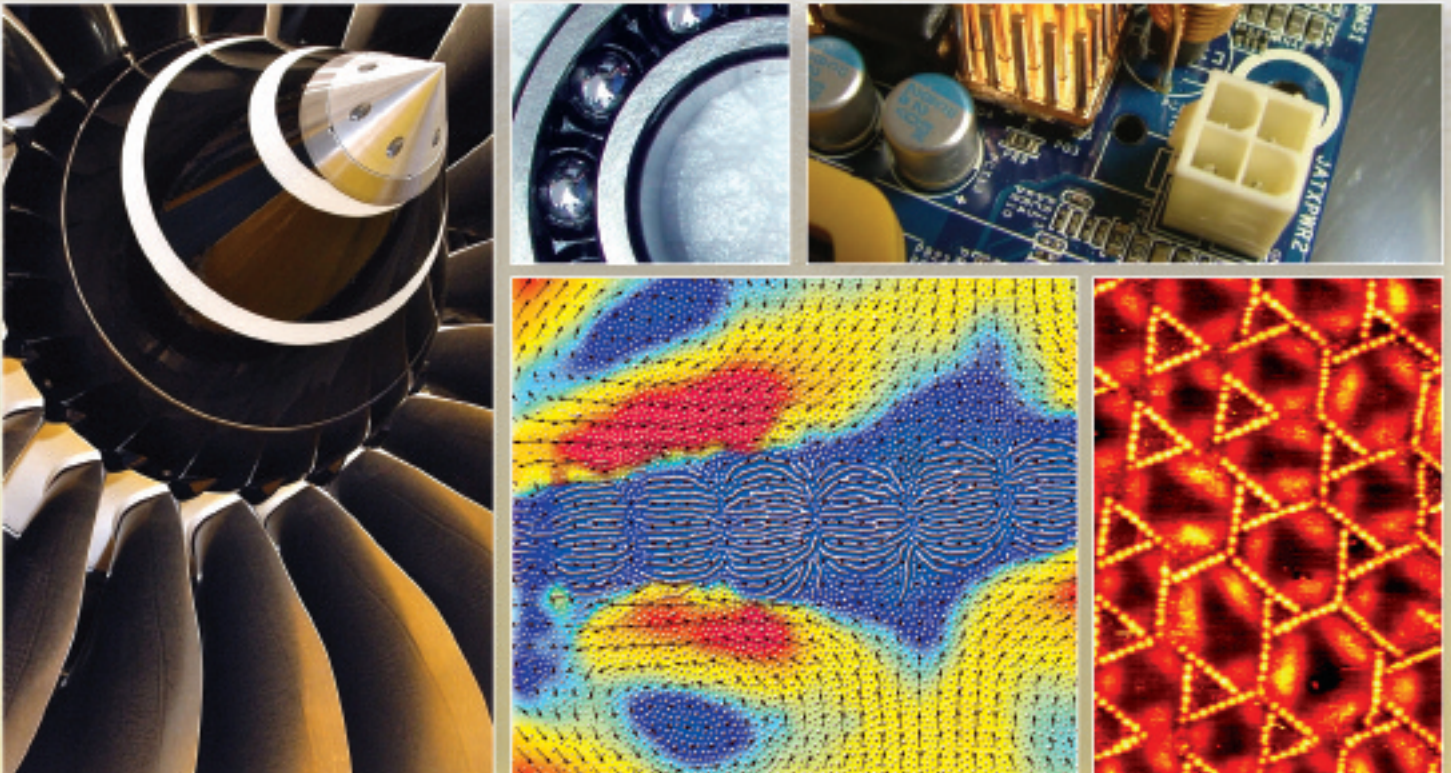


# *Annual Report 2009*

College of Engineering and Applied Sciences





# College of Engineering



Since our last report, I continue to be amazed at the progress in research, scholarship and innovation of our faculty and students. This is a time of incredible change, in technology and in the collaborative efforts needed to solve today's complex problems; our College is at the forefront of that change, developing innovative solutions and delving into the most significant quests for knowledge.



Our collaborative efforts with industry continue to have significant impact on local and global levels. The Center for Excellence in Wireless and Information Technology (CEWIT) has been completed and with over \$160 million in research and development funding is producing outstanding innovations in Network Technologies, Medical Technologies, Software Systems, Communications and Devices as well as Systems and Infrastructure.

The Advanced Energy Research and Technology Center (AERTC) recently drew record crowds to its energy conference which has become the premier conference of its kind in the northeast. The University is currently in the process of completing a \$45 million facility to house the programs of the Center. We have also completed construction on the new \$22 million NYSTAR research center, which houses the translational research activities of our Department of Biomedical Engineering, Center for Biotechnology and the SensorCAT. We have begun the design phase of a new building for our Computer Science and Information Systems programs which will include state of the art laboratories for our Center for Visual Computing and other exceptional research endeavors.

Our faculty are not only engaged in top notch research but continue to give back to the academic community in a myriad of ways.

**Dr. Miriam Rafailovich** of our Department of Materials Science and Engineering has mentored an outstanding forty-two regional finalists and semi-finalists in the annual Siemens Competition in 2008 and 2009. Joining Dr. Rafailovich in mentoring Siemens students are **Dr. Wei Zhu** of our Department of Applied Mathematics and Statistics, and **Drs. Wei Lin** and **Yi-Xian Qin** of our Department of Biomedical Engineering.



Since our last report we have also had several faculty members honored by the State University of New York for their outstanding work. **Dr. Erez Zadok** of our Department of Computer Science has won the Chancellor's Award for Excellence in Teaching, also of the Computer Science Department are **Drs. Michael Kifer** and **I.V. Ramakrishnan** who have won the Chancellor's Award for Excellence in Scholarship & Creative Activities and **Dr. Leo Bachmair** who has won the Chancellor's Award for Excellence in Faculty Service. **Dr. Esther Arkin** of the Department of Applied Mathematics and Statistics has received the Chancellor's Award for Excellence in Teaching and was also awarded the Esteemed Faculty Member Award from the Hillel Foundation.

**Dr. Devinder Mahajan** of our program in Chemical and Molecular Engineering has been honored for his outreach and guidance of students with the US Department of Energy, Office of Science Outstanding Mentor Award. **Dr. Robert Kelly** of our Department of Computer Science was awarded the Spirit Award for his work in connecting students with industry executives and managers for meaningful internships and mentoring relationships. **Dr. Alan Tucker** of our Department of Applied Mathematics and Statistics as well as **Dr. Gary Halada** of our Department of Materials Science and Engineering have each created unique programs to engage high school teachers and improve the quality of teaching within the STEM fields at the secondary school level.



Our College continues to grow with a wealth of new academic programs. We have received accreditation for our program in Chemical and Molecular Engineering from the Accrediting Board of Engineering and Technology (ABET) and have recently received approval by the State of New York to offer a new program in Civil Engineering. Our Department of Technology and Society has established a new Ph.D. program in Technology, Policy, and Innovation (TPI) which includes educational technology and education in engineering and applied sciences among its research areas.

Finally we have also launched a new Master's program in Systems Engineering. This multi-disciplinary program bridges our departments of Electrical and Computer Engineering, Mechanical Engineering, Applied Mathematics, Computer Science, Biomedical Engineering, and Technology and Society and integrates engineering knowledge to provide students with a novel combination of strong technical skills, integration methodologies, and communications skills.

# and Applied Sciences



In addition to the dedication our faculty, students and staff have for our College, I continue to be gratified by the relationships we have built with our alumni and corporate partners. Our scholarship donors continue to give wonderful support to

our students and we have recently been honored with two additional outstanding donations to the College. See page 34 for a listing of our scholarship recipients.

Robert J. and Kathryn B. Frey, on behalf of the Frey Family Foundation, have given a gift of \$1.5 million for the establishment of the *Frey Family Endowed Chair in Quantitative Finance* in our Department of Applied Mathematics and Statistics. The gift, along with \$500,000 in matching funds from the Stony Brook Foundation, will create a \$2 million endowed chair that will be used to bring a preeminent scholar in quantitative finance to our University. Robert J. Frey is not only an alumnus of our College but also teaches and mentors students in our Department of Applied Mathematics and Statistics.

Long Island business leader and philanthropist, Dr. Leo Guthart has endowed our College with \$500,000 to form the *Leo Guthart Endowed Fund for Excellence in Engineering and Applied Sciences*. This fund will provide scholarship awards for students as well as support innovative faculty teaching and research programs. Dr. Guthart intends that this fund will help our students, faculty, and researchers to have a major impact in technological advances and in educating the next generation of technological entrepreneurs.



As you can see from our triumphs above and in the following pages, the College of Engineering and Applied Sciences has excelled in research, scholarship and education. I am gratified by the hard work and dedication of our faculty, students and staff and it is my sincere pleasure to share with you these wonderful accomplishments.

*Yacov Shamash, Dean*

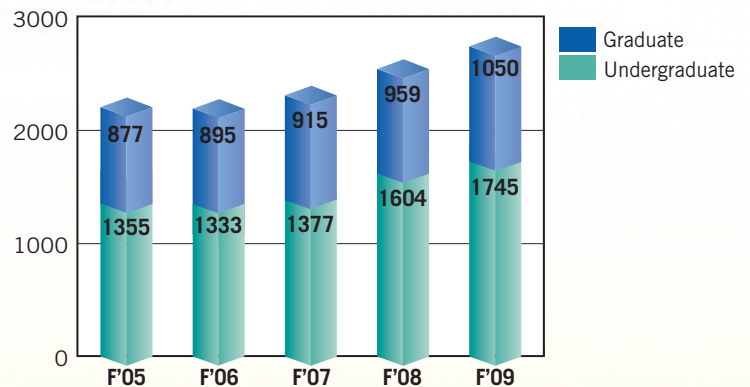
## Administration

Yacov Shamash *Dean*  
 Shmuel Einav *Associate Dean*  
 Imin Kao *Associate Dean*  
 Larry Noonan *Associate Dean*  
 Elyce Winters *Assistant Dean*  
 Clive Clayton *Director, SPIR*

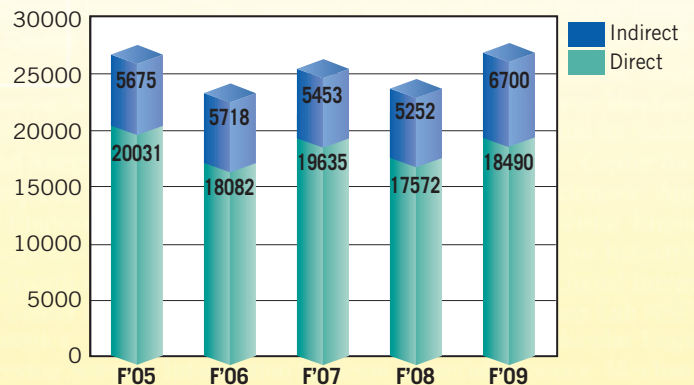
## Chairpersons

James Glimm *Applied Mathematics & Statistics*  
 Clinton Rubin *Biomedical Engineering*  
 Arie Kaufman *Computer Science*  
 Serge Luryi *Electrical & Computer Engineering*  
 Michael Dudley *Materials Science & Engineering*  
 Fu-Pen Chiang *Mechanical Engineering*  
 David Ferguson *Technology & Society*

**Headcount Majors (FT/PT)**



**Research Expenditures (000)**





## Overview



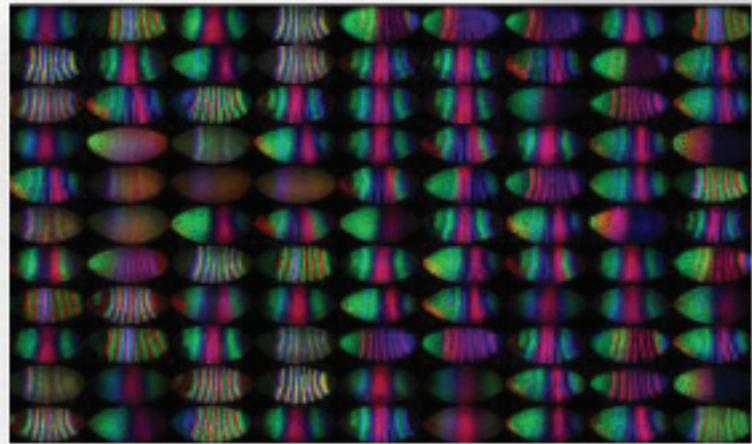
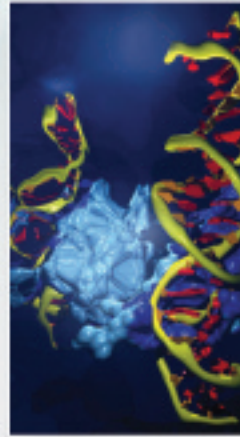
The Department has well-established strengths in computational applied mathematics, computational biology, operations research/industrial engineering, statistics, and quantitative finance. Faculty research projects are well funded from diverse public and private sources. AMS faculty are deeply involved in interdisciplinary research and convergent technologies. They collaborate with researchers from a score of different departments on the Stony Brook campus as well as from many other universities, National Laboratories, and industrial partners, large and small.

**Computational Applied Mathematics:** The Department is a partner in a five national laboratory – two university consortium to develop easy to use mesh and discretization tools as part of a major Department of Energy Computational Science initiative. The department is also leading the University's own effort in high-performance computing. Department Chair **Dr. James Glimm** is the Associate Director of the new Stony Brook New York Center for Computational Science which shares with Brookhaven National Lab a 127 teraflop Blue Gene supercomputer, one of the fastest supercomputers in the world. The focus of supercomputing in the department is fluid dynamics and shock waves, with diverse applications to material surfaces, enhanced oil recovery, Tomak design studies, high energy accelerator target design, groundwater pollution and rocket propulsion. The department is also a partner in the PSAAP (DOE) Scram Jet design center.



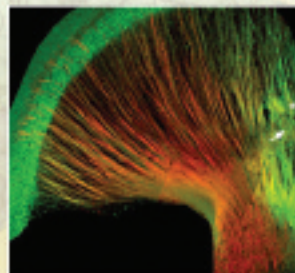
**Dr. James Glimm** is the recipient of the 2009 Society of Industrial and Applied Mathematics (SIAM) Fellowship award. Goals of the SIAM Fellows Program are to honor SIAM members who are recognized by their peers as distinguished for their contributions to the discipline; to help make outstanding SIAM members more competitive for awards and honors when they are being compared with colleagues from other disciplines; and to support the advancement of SIAM members to leadership positions in their own institutions and in the broader society.

**Computational Biology:** Computational biology is having a revolutionary impact on the life sciences in areas that extend from fundamental research to current industrial applications. The Department has expertise in multiple areas of biomedical research arising from evolving research interests of existing faculty in computational applied mathematics and from the recent recruitment of three research biologists whose interests have become highly mathematical.



**Dr. John Reinitz** and his lab team are gaining international acclaim for their work in mathematically modeling the gene circuits involved in the development of fruit fly embryos.

**Drs. Robert Rizzo** and **David Green** have recently joined AMS as Assistant Professors who specialize in protein structure problem. Dr. Rizzo is an expert in how certain anti-HIV drugs block HIV proteins in a fashion that is not easily overcome by the frequent mutations that characterize the HIV genome. Dr. Green is working on a variety of mathematical modeling problems involving protein binding. **Dr. Brent Lindquist** has an extensive collaboration with Cold Spring Harbor researchers studying the morphology of neurons.





# Mathematics and Statistics

**Statistics:** Most Stony Brook statisticians work in the area of biostatistics, collaborating with biomedical researchers at Stony Brook and across the country who are engaged in both clinical and lab research studies. **Drs. Wei Zhu** and **Hongshik Ahn** work on a variety of clinical trials of new biomedical techniques. **Dr. Steve Finch** is working with Stony Brook psychiatry faculty on a comprehensive study of mental illness in Long Island hospitals. **Dr. Nancy Mendell** works with Harvard medical researchers on a genetic basis for schizophrenia.

**Operations Research:** The department's operations research group focuses on real-world applications. **Dr. Eugene Feinberg** has developed statistical models and software to predict future electric demand on



Long Island and future bottlenecks in the electric distribution network. Computational geometers **Dr. Esther Arkin** and **Dr. Joe Mitchell**, with computer science collaborators, study a wide variety of algorithmic problems that arise in the processing geometric data. Problems of active research include collision detection for virtual manufacturing, visualization, robotics, air traffic management, and many areas of optimization.



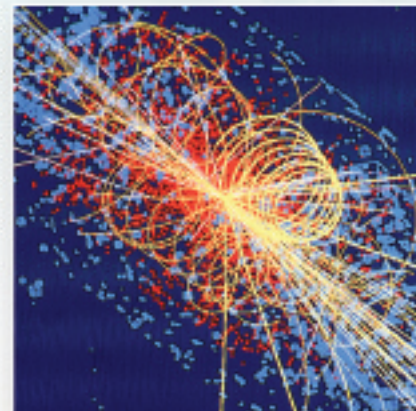
**Financial Mathematics:** The demand for sophisticated mathematical modeling and high speed computing in the financial world is unprecedented. Our faculty and graduates are deeply involved in this area. The department is strengthening its educational

and research programs in this area, led by **Dr. Robert Frey** who retired in 2004 as a Managing Director at Renaissance Technology. The focus of our graduate training is to combine quantitative finance (QF) with one of the existing graduate tracks rather than have a stand-alone QF track.

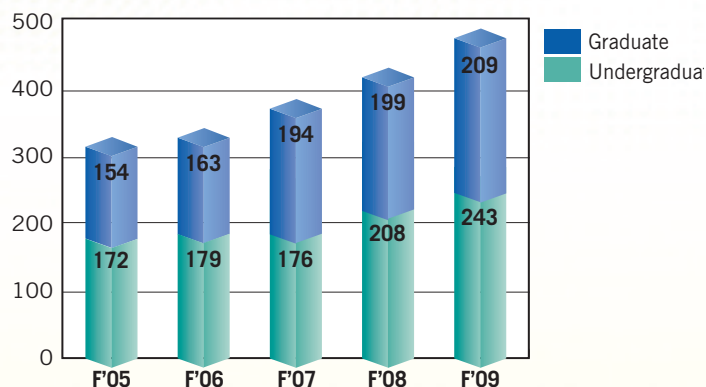
**Education:** **Dr. Alan Tucker** directs of a major initiative of the Mathematical Association of America called Preparing Mathematicians to Educate Teachers (PMET). The \$3M project has run a variety of workshops to get mathematics professors more engaged in improving school mathematics teaching.

## Student Achievements

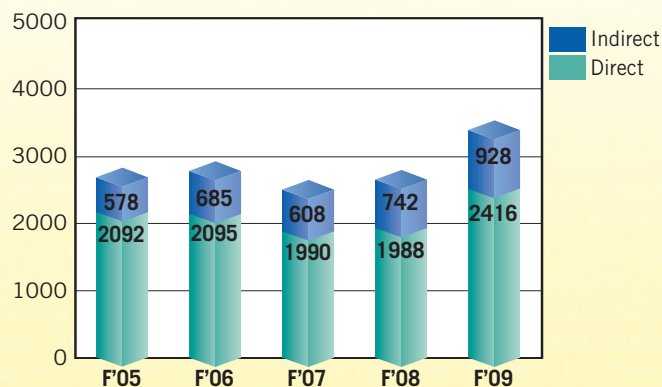
- The student club, **Organization of Actuarial Students**, was invited to compete in October 2008 in the St. Paul Traveler's Insurance Invitational Actuarial Competition. Only nine universities across the country were invited to compete.
- Wurigen Bo** won the 2009 Woo Jong Kim Award for the Best Dissertation in Applied Mathematics and Statistics.



Headcount Majors (FT/PT)



Research Expenditures (000)

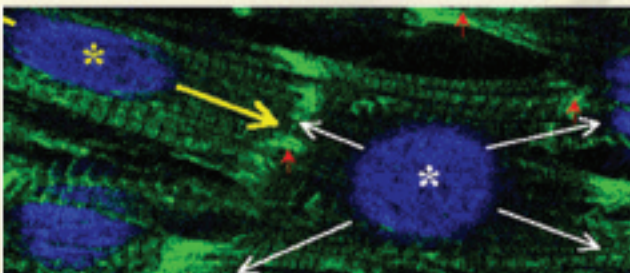




## Faculty Highlights



- **Dr. Yi-Xian Qin** has been awarded a four-year \$1.5 million grant from the National Space Biomedical Research Institute. This project is a collaborative effort between BME, our University's School of Medicine and General Clinical Research Center, and the NASA Johnson Space Center.
- **Dr. Richard Clark** in collaboration with Adam Singer of emergency medicine, has received NIH stimulus money, in the amount of approx. \$1.65M over two years, for their grant entitled: *Novel Peptide to Inhibit Burn Injury Progression*. These monies are the result of intense competition amongst biomedical researchers.
- **Dr. Mary D Frame** was named a Fellow of the American Physiological Society, Cardiovascular Section, 2009. This is reserved for the top 17% of APS members.
- **Dr. Stefan Judex** has secured a NASA grant worth \$531K for the period from 2008-2011, that will identify the response of the skeleton to repetitive changes in its loading environment.
- **Dr. Lilianne R. Mujica-Parodi** received \$1.22M from the Office of Naval Research. The primary purpose of the application is to assess the degree to which advanced computational methods of quantifying limbic dysregulation can accurately predict risk for vulnerability towards acute and chronic stress. As a secondary project, Dr. Mujica-Parodi's laboratory will investigate the neurobiological basis for interactions between assessment of threat for ambiguous stimuli, behavior inhibition, and conscious regulation of emotion, with applications for reduction of fratricide.
- **Dr. Yi-Xian Qin** was named one of seven NYSTAR distinguished professors. The award (\$500K over three years) will be used to establish research platforms for noninvasive diagnosis and therapeutics in osteoporosis and tissue regeneration.

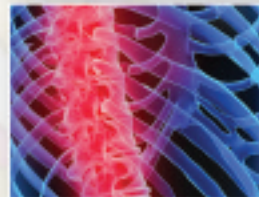
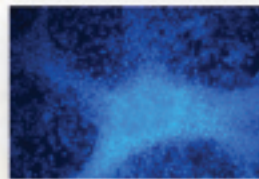


Stony Brook University celebrated the opening of the new Center for Biomolecular Diagnostics and Therapeutics, which will serve as the home of the Department of Biomedical Engineering. The Center is one of only eight New York State-supported Science, Technology, and Academic Research (STAR) Centers devoted to achieving scientific breakthroughs. The Center was constructed with help from a \$15.2 million grant from NYSTAR. Faculty in the Center work in diverse fields, including tissue engineering, biomechanics, bioimaging, biosensors, drug design and delivery. In the photo, faculty and students of the BME department are joined by staff from the Center for Biotechnology, cheering the ribbon cutting of the building.



## Research Highlights

A new ultrasound device created by **Dr. Yi-Xian Qin** may lead to early prediction of bone loss. A new form of ultrasound that assesses multiple parameters of hard tissue like bone may lead to early prediction of bone loss, a hallmark of osteoporosis, a disease affecting millions of Americans.



CNN.com, a world leader in online news and information delivery has covered a new study by BME faculty members **Drs.**

**Lilianne Mujica-Parodi, Helmut Strey** and colleagues. The CNN.com article covers their recent work published in the online journal PLoS One that reveals changes in brain activity when people are exposed to sweat from others who have been in a stressful situation. The BME Stony Brook researchers found that people may become more alert to potential threats when inhaling this "stress" sweat.

**Drs. Clinton Rubin, Stefan Judex and Yi-Xian Qin** have received a five year \$1.8M grant from the NIH. This collaborative work will investigate the biologic and physical mechanisms behind the anabolic potential of extremely low-magnitude mechanical signals, and how they strengthen both bone and muscle. It is envisioned that this research will provide the foundation to translate this work to the clinic as a safe, non-pharmacologic intervention for the control of osteoporosis and the augmentation and acceleration of fracture healing.



# Biomedical Engineering

## Student Achievements

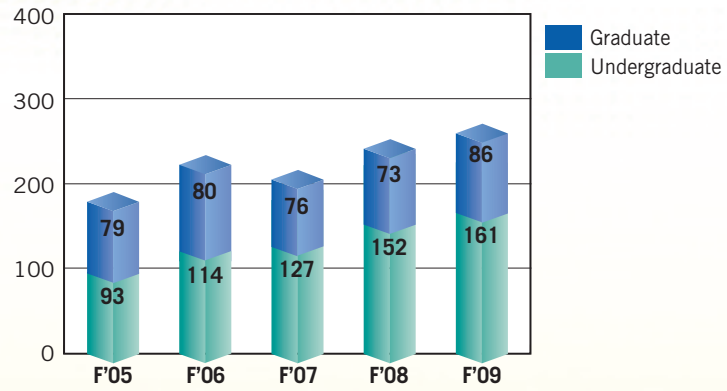
- Congratulations to BME undergraduate students **Alexander Bruno, Sarah Kantharia** and **Suraj Rambhia** for getting the 2009 Chancellor's Award for Student Excellence.
- **Kathleen Burke**, secured the Undergraduate Research and Creative Activities (URECA) Grant to travel to the 2009 Biomedical Engineering Society meeting (BMES).
- **Gülce Nazli Dikeçligil**, BME undergraduate, was awarded a URECA fellowship to support her BME research for an ONR-funded project investigating the neurobiology of fear and stress.
- **Elizabeth Fievisohn**, BME undergraduate, received a BMES Student Travel Award, WISE/CITIGROUP Travel Award, and a URECA Travel Award. She also received an Undergraduate Recognition Award and a Howard Hughes Medical Institute Summer Fellowship.
- **Jacqueline Gunther**, BME junior, received a URECA summer fellowship and worked in Dr. Emilia Entcheva's lab. She also received a URECA Travel Award to attend the 2009 Biomedical Engineering Society meeting (BMES). **Emily Hutton**, BME undergraduate, also received this last award.
- **Sandy Hernandez**, a BME senior this year, received a summer internship at NIH — *Biomedical Engineering Summer Internship Program (BESIP)*.
- **Hero Ozagha, Aseem Das, Kaitlin Clifford, Kunal Jagota**, and **Omair Siddiqui**, Senior Design students, won a special Science Education for New Civic Engagements and Responsibilities (SENCER) award.
- **Erica Palma**, a BME undergraduate, placed second in the physical sciences category, consisting of 29 finalist, in the 2009 SERCh Competition, at Oak Ridge.
- **Ujas Shah**, BME undergraduate Class of 2008 and current SB Medical Student, received a research award from Glorney-Raisbeck in Cardiovascular Research from the New York Academy of Medicine.

- **Mohit Sharma**, a BME senior, was awarded this year's CSEMS fellowship (Computer Science, Engineering, and Mathematics Scholarship Program).
- **Michael Scheid**, BME undergraduate, received a Howard Hughes Medical Institute Exceptional Research Opportunities (EXROP) program for summer 2009.

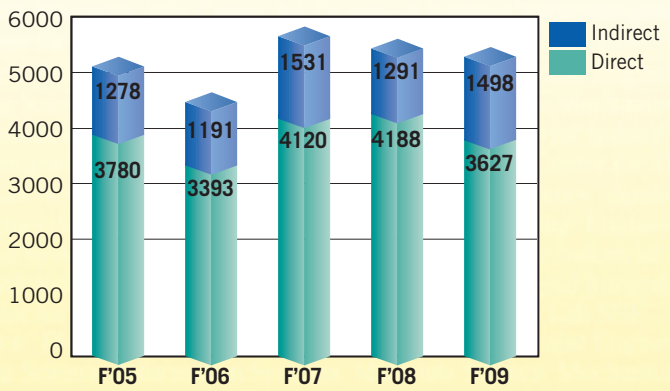


- **Melissa K.B. Georgi**, Ph.D. candidate, received a Travel Award (\$500) to present data at the Fall Microcirculatory Society Meeting, October 16-17, 2009.
- **Zhiheng Jia**, BME doctoral student, received a Sigma Xi Travel Award to present his work at the 2009 IEEE-EMBS Conference.
- **Andreana Leskovjan**, a current doctoral student working at Brookhaven National Laboratory, was selected to present at the President's Inauguration mini-symposium for graduate students, October 27, 2009.
- **Maggie Swierzewska** and **Danielle Green**, doctoral students, were recently published in the *Journal Physics in Medicine and Biology*, which has been chosen as a Featured Article.

Headcount Majors (FT/PT)



Research Expenditures (000)

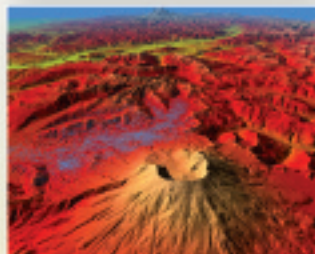
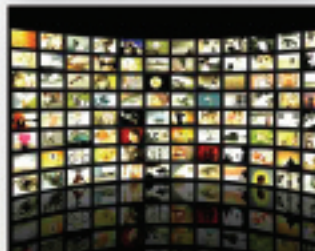
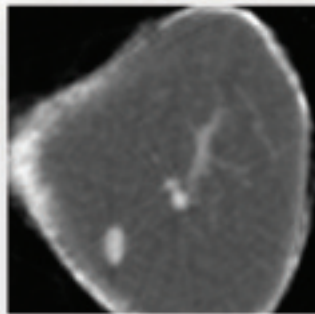




## Overview



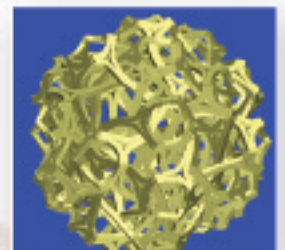
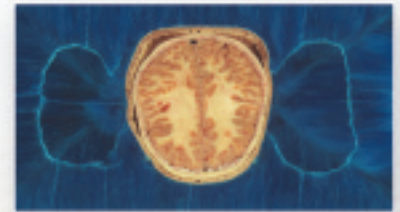
The Computer Science (CS) Department continues to excel in great creativity and innovation in CS research, education, community service and technology transfer; and offers a collegial atmosphere and a unique interdisciplinary culture. CS is the primary force in advancing the future of software and hardware technologies, among the most dynamic research areas within CEAS. The Department is ranked among the top 10% of research CS departments. Its illustrious alumni include the president of Stanford University, the president of the ACM, and many distinguished professors and industry leaders. Research missions are in computer systems (wireless, networking, security, operating systems), visual computing (graphics, visualization, imaging), intelligent information systems (databases, logic programming), verification of concurrent systems, algorithms, and interdisciplinary areas, such as biocomputing, high-performance computing, and digital media. Research funding is over five million dollars annually and increasing.



## Faculty Highlights

The Department boasts internationally renowned faculty who have been awarded the highest levels of recognition. Among its eminent faculty are 4 IEEE Fellows, 3 ACM Fellows, 3 Fulbright Scholars, 3 SUNY Distinguished Professors, 3 Young Investigator Awards, 13 NSF CAREER/PYI Awards, 10 NSF ITR Awardees, and many others. Recently:

- **Drs. Erez Zadok and Leo Bachmair** received the Chancellor's Award for Excellence in Faculty Service;
- **Dr. Arie Kaufman** was named ACM Fellow;
- **Drs. Michael Kifer and IV Ramakrishnan** received the Chancellor's Award for Excellence in Scholarship & Creative Activities;
- **Dr. Radu Sion** received the NSF CAREER Award;
- **Dr. Scott Stoller** received Outstanding Community Service Award from IEEE TC on Security & Privacy;
- **Dr. Erez Zadok** received a second IBM Faculty Award, and the Chancellor's Award for Excellence in Teaching.



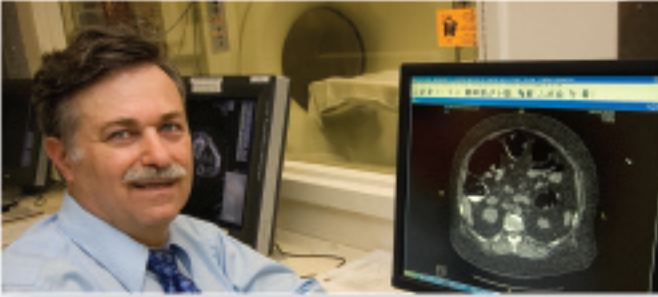
A new tenure-track faculty member, **Dr. Luis Ortiz** (Ph.D. Brown University, University of Pennsylvania, MIT) is a world expert in artificial intelligence and machine learning; computational game theory and economics.

## The Distinguished Lecture Series

CS Distinguished Lecture Series, co-sponsored by CEWIT, hosted annually 5-6 eminent world-class speakers. These excellent speakers attracted standing-room-only crowds of students, faculty and guests to their presentations.



# Computer Science



## Research Facilities

CS state-of-the-art research facilities are extensive, with over 20,000 square feet of space, including:

- Applied Algorithms Laboratory
- Applied Logic Laboratory
- Concurrency and Verification Laboratory
- Design and Analysis Research Laboratory
- Embedded Optimization Laboratory
- Experimental Computer Systems Laboratory
- File Systems and Massive Storage Laboratory
- Mobile and Sensor Networks Laboratory
- Network Security and Applied Cryptography Laboratory
- Secure and Reliable Systems Laboratory
- Security, Programming Languages, and Theory Laboratory
- Wireless Networking and Simulation Laboratory
- Center for Visual Computing (CVC) consisting of the Visualization, Geometric and Graphical Modeling, Visual Analytics and Imaging, Graphics Hardware, Computer Vision, Multimedia, and Virtual Reality Laboratories
- Center for Cyber Security (CCS) which received a \$1M NSF Cyber Trust award, a \$900K DoD MURI award, and other grants totalling over \$5M.
- Center of Excellence in Wireless and Information Technology (CEWIT) with a new 100,000 square feet facility is fully operational with 40 novel research laboratories.

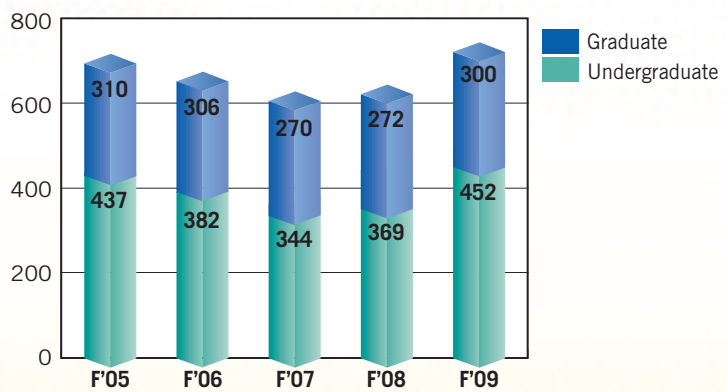


## Student Achievements

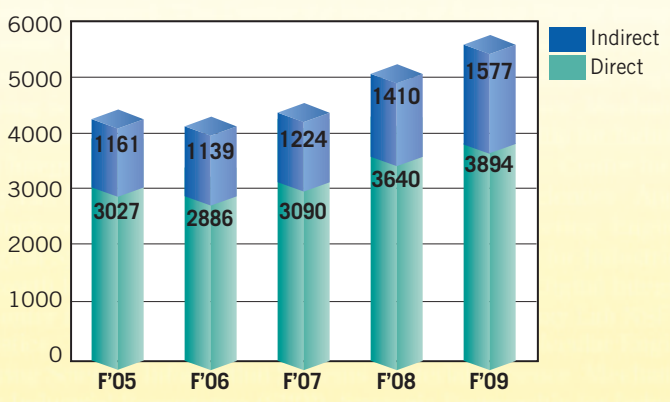
- The unique CS Honors program serves exceptional high-school students who benefit from smaller accelerated classes, personalized attention, research opportunities, and sponsored scholarships. This year's incoming class has an average SAT Math and Verbal score of 1420. Honors students have obtained internships and jobs at top firms.
- Our CS programming teams finished first and third in the 2008 ACM Greater NY Regional Programming contest and achieved honorable mention in the World Finals in Sweden. In 2009 they finished with two top ten teams.
- Stony Brook's team won first place in the 2009 Supercomputing Student Cluster Challenge.
- The Women in CS (WiCS) group is an ACM Women in Computer (ACM-W) Chapter.
- Linux Users Group at Stony Brook (LUGSB) membership exceeded 230.



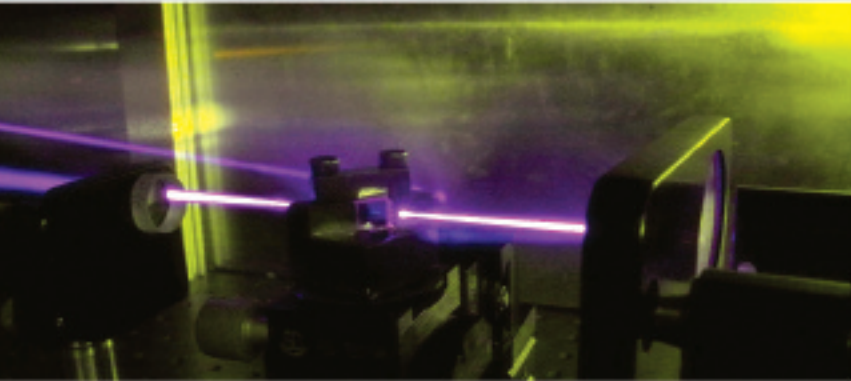
Headcount Majors (FT/PT)



Research Expenditures (000)







## Overview

The Department of Electrical and Computer Engineering (ECE) is in an extraordinary period of growth; new applications areas and increased expectations are accelerating due to new technologies and decreased costs. Pertinent to this development is the department's undergraduate and graduate teaching, which covers such areas as sensors, optical telecommunications, computer networks, computer architecture, signal processing, pattern recognition and machine vision, computer graphics, systems and controls, robotics, microprocessors, network theory, microwave electronics, and integrated electronic circuits and devices.

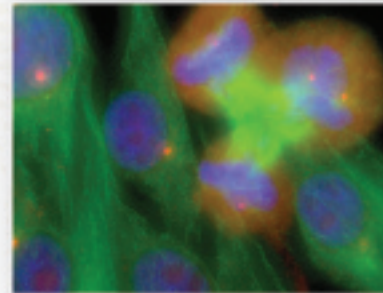
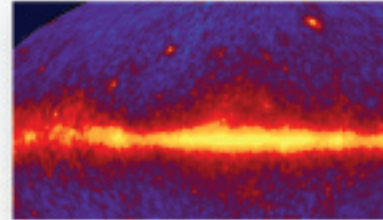


Since Long Island has one of the highest concentrations of engineering-oriented companies in the country, the department is strongly committed to meeting the needs of industry. The department's research is financially well-supported with funds coming from both governmental and industrial sources. Its research expenditures amount to over four million dollars per year, which is equivalent to over \$150,000 per faculty member. Several research laboratories are grouped under the umbrella of New York State Center for Advanced Technology in Sensor Systems (Director: **Dr. Serge Luryi**), designated and funded by the Governor of New York.

## Research Areas

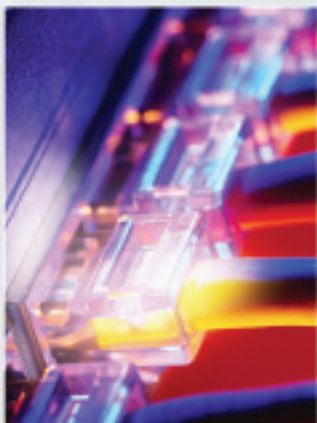
The department's research includes the following areas:

- Room-temperature, continuous-wave lasers for the detection of biological agents, infrared countermeasures, secure communications, and high intensity interactions.
- Instrumentation for DNA sequencing based upon single-photon detection of multicolor fluorescence.
- Gamma radiation sensors for homeland security applications.
- Fluorescence-based optically powered sensors.
- Parallel and distributed computer architecture for multigigahertz superconductor processors and for neural-network processors directed toward pattern recognition.
- Photographic techniques for three-dimensional topographic imaging.
- Integrated-circuits design implemented by automated simulation techniques.
- Signal processing for the detection of signals.
- Communications in computer networks and mobile telecommunications.
- Fiber-optics with applications to sensor technologies.



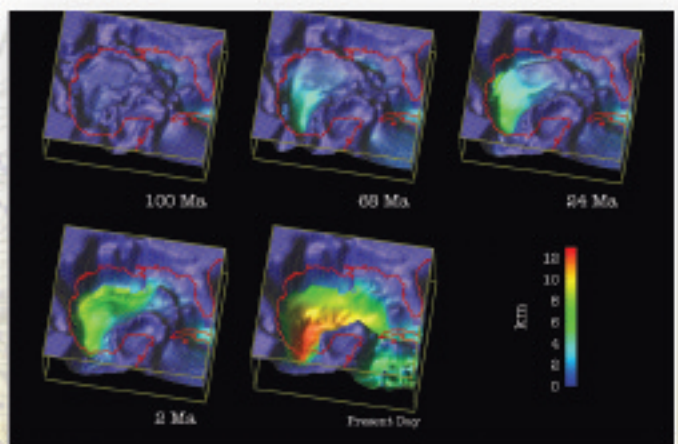


## Achievements



ECE offers an exciting new initiative in undergraduate engineering education, *Stony Brook Electrical Engineering Online*, ideal for professionals and other qualified students who want the advantage of an excellent education in engineering and career advancement. Though the program is administered by Stony Brook, faculty members are from Stony Brook University, University at Buffalo and Binghamton University. Currently, the program only offers upper division undergraduate courses, typically offered during the third and fourth years of the four-year undergraduate program in Electrical Engineering. *Stony*

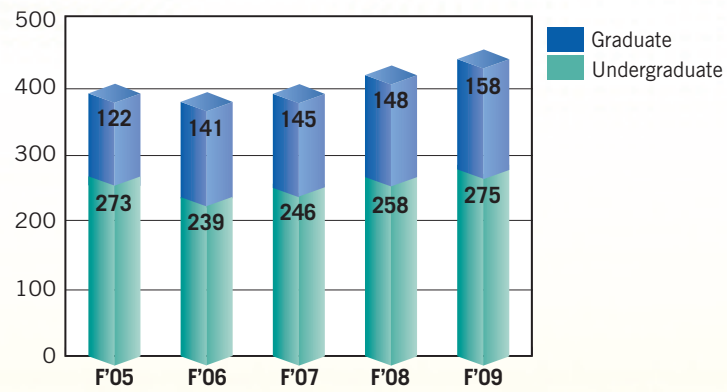
*Brook Electrical Engineering Online* provides all courses, materials, tests, labs, discussions, advising and contact with faculty completely over the internet.



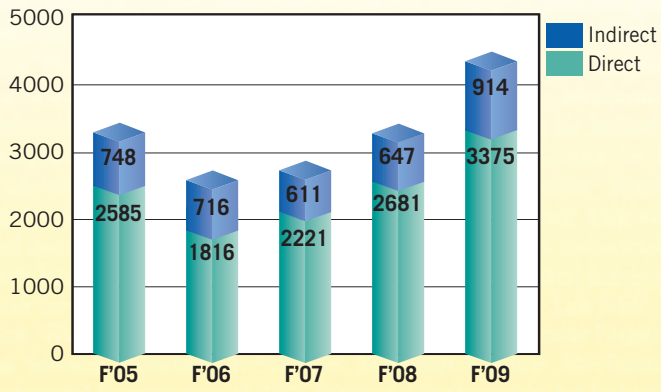
## Faculty Highlights

The department's faculty has been honored with a variety of awards and prizes. Three of its members are Distinguished Professors, six are Fellows of the Institute of Electrical and Electronic Engineers (IEEE), one is a Fellow of the American Physical Society (APS), and one is a Fellow of the Optical Society of America (OSA). Among the many awards won by the faculty and the research staff, there are prestigious medals from international academies of science, awards by the IEEE, recognizing excellence in education, best paper awards at engineering conferences, and best teaching awards from the University. Members of ECE faculty have been awarded substantial research funding by various federal agencies, including the National Science Foundation, Department of Homeland Security, National Institute of Health, Office of Naval Research, Air Force Office of Scientific Research, and the Army Research Office.

**Headcount Majors (FT/PT)**



**Research Expenditures (000)**





## Overview

The major strengths of Materials Science & Engineering at Stony Brook include the quality, depth and diversity of our research programs and our accomplished faculty. Our faculty members have won a number of national and international distinctions, including the National Medal of Technology and membership in National Academy of Engineering (**Emeritus Professor Richard Gambino**). Our faculty cover a comprehensive range of materials research enabled by diverse funding portfolios. Research programs that attract worldwide recognition include:

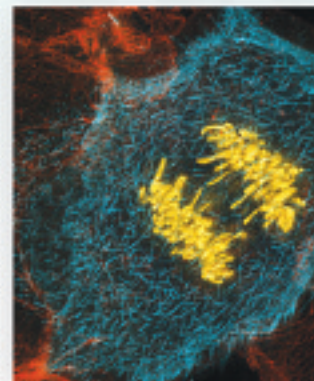
- Polymers
- Thermal spray coatings
- Metals
- Semiconductors
- Synchrotron X-ray topography
- Magnetism
- Modeling
- Environmental chemistry
- Nanomaterials
- Energy

We have been home to two NSF funded Materials Research Science and Engineering Centers (MRSECs): one in Thermal Spray Research and the other in Polymers at Engineered Interfaces. Our faculty has access to the analytical facilities at Brookhaven National Laboratory, NIST, Oakridge National Laboratory and Argonne National Laboratory, and we have active collaborations with international universities and institutions ranging from the European Synchrotron Radiation Facility in Grenoble France, to universities in Australia, Germany, New Zealand, Spain, Sweden, Japan and Canada.

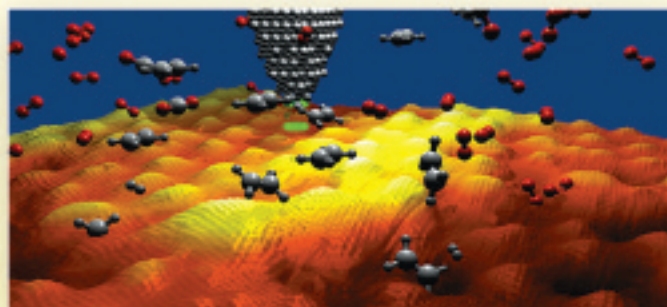
Our centers in Thermal Spray Research, Polymers at Engineered Interfaces, Crystal Growth and Nanomaterials and Sensor Development involve significant collaboration with industry. The Thermal Spray Research Center has created an industrial consortium with more than 24 paying members including leading energy system producers such as GE, Siemens, Mitsubishi and Caterpillar. The strength of our interactions with industry is also indicated by the extent of our involvement with the Strategic Partnership for Industrial Resurgence (SPIR) Program, which is run by **Dr. Clive Clayton**.

## Faculty Research

**Dr. Yizhi Meng** and her group are investigating the effect of substrate chemical and physical modifications on bone cell growth and are working to develop new biomaterials for bone tissue engineering. She is also advising undergraduate students in the Chemical and Molecular Engineering program on projects related to improving the cytocompatibility of bone implant coatings.



**Dr. Charles M. Fortmann** is working on applying his knowledge of solid state diffusion to problems related to protein folding, which has resulted in two patent applications and two publications. Working from theory, Dr. Fortmann developed the first practical Solarex amorphous silicon-germanium solar cells and formulated a thermodynamic description of the light induced degradation of amorphous materials that predicted (now confirmed) that these solar cells degrade to a light intensity and temperature dependent stabilized performance. He has: developed textured light trapping surface for crystal silicon solar cells resulting in two patents and a process that was part of every thin film panel shipped by Solarex; developed molecular diffusion barriers for thin film semiconductor devices; developed amorphous silicon-germanium alloy-based solar cells; explained the thermodynamic framework for photo degradation (JAP 94); explained the hydrogen dependence of the optical band gap in amorphous silicon (PR 98); and analyzed silicon photo-assisted deposition chemistry (AIChE 91). The protein-folding model has recently demonstrated the ability to predict protein structure from ab-initio and is in commercialization. Fortmann's solar cell patents and patent applications provide the core technology for start-up Idalia Solar Technologies LCC.



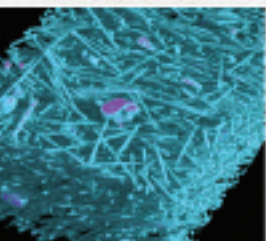


# Science and Engineering

**Dr. Tad Koga** has been awarded a National Science Foundation CAREER award for his work on the development of new “green” process environments for polymer surfaces using supercritical carbon dioxide (scCO<sub>2</sub>). The goals of this proposal are (1) to understand the novel phenomena at the polymer/scCO<sub>2</sub> interface and (2) to utilize the fundamental understandings for nanofabrication of functional polymer surfaces to be used as biogas membranes, solar cells, low-k films, conductive nanowires, etc. In order to characterize the *in-situ* structures and dynamics at the nanometer scale, the Koga group aims to integrate a variety of surface-sensitive X-ray/neutron scattering techniques available at national laboratories in the USA. This program also involves an international collaboration with the TAKAHARA Soft Interface project (PI, Prof. Takahara, Kyushu University, Japan, \$15M, 2008-2013). Dr. Koga was appointed as a research advisor of the project.



**Dr. Devinder Mahajan**, co-director of the program in Chemical and Molecular Engineering, was recognized with an *Outstanding Mentor Award* by the Office of Science, U.S. Department of Energy for advising over 60 undergraduate students including several from the CME program (2007). He along with colleagues from Columbia U. and USDA, organized an *International Workshop on Biofuels R&D*, in Calabria, Italy in August 2008. The event was sponsored by the Engineering Conferences International (ECI). He was a Visiting Professor at the Università di Roma *La Sapienza* under the Government of Italy fellowship. He was appointed Associate Editor for Bioenergy and Reaction Engineering, Journal of Renewable and Sustainable Energy (JRSE), a journal launched by the American Institute of Physics in 2009. He also joined the editorial boards of The Open Petroleum Journal (2008) and International Journal of Oil, Gas and Coal Technology (2007).

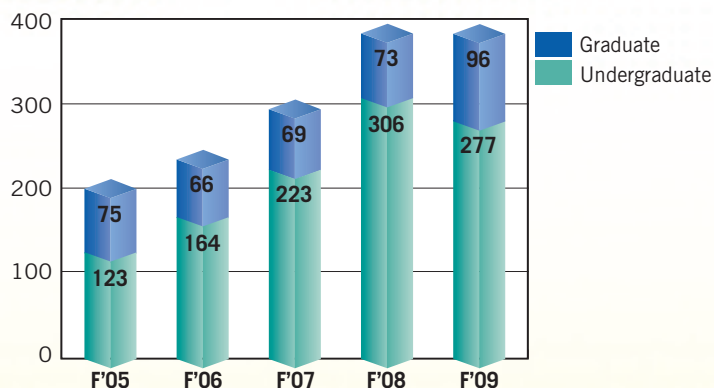


**Dr. Alex Orlov** and his colleagues have just been awarded \$890K from the NSF to acquire a unique analytical instrument for energy and environmental research. Proton Exchange Time of Flight Mass Spectrometric System can be used for determining biogeochemical fluxes between the atmospheric and marine environment as well as for

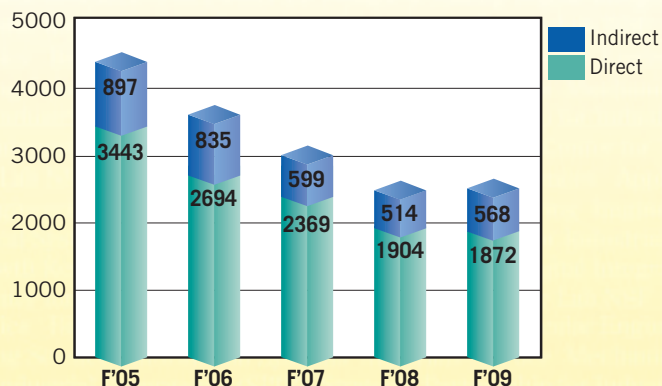
developing novel catalysts for transforming CO<sub>2</sub> into valuable chemical intermediates. Additionally, he is continuing a unique industrially sponsored collaboration to produce materials that can make our cities self-cleaning and environmentally friendly. Dr. Orlov’s research on environmental subjects has been recently featured in Nano magazine.

**Dr. Gary Halada** is continuing his work to expand the new Nanotechnology Studies minor, developed with a grant from the National Science Foundation and continued with supplemental funding to create a new Research Experience for Teachers program. The intent of this program is to help secondary school teachers incorporate nanotechnology concepts into the secondary school science and technology curricula. Dr. Halada also continues directing the Environmental Nanotechnology Research Group in the design of new, nature-inspired biomaterials for environmental remediation, “green” nanomanufacturing, and other industrial applications.

**Headcount Majors (FT/PT)**

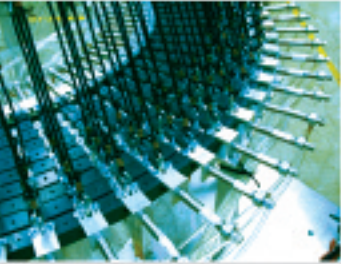


**Research Expenditures (000)**





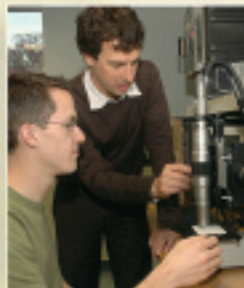
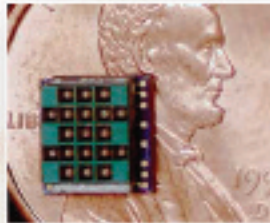
## Overview



Mechanical engineering is one of the core and broadest engineering disciplines offering students a wide range of career choices; its strong and broad technical foundation provides opportunities in both engineering practice and scientific research as well as non-engineering fields such as business, law or medicine.

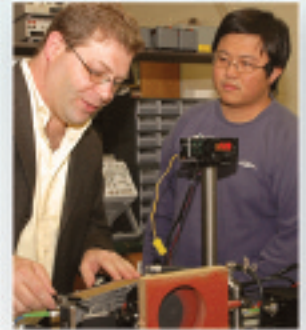
Our ABET accredited undergraduate program is designed to provide students with the detailed mechanical engineering education and training required for immediate entry into the job market. At the same time, the curriculum maintains enough flexibility to enable students to fully prepare themselves for graduate studies and research careers. Mechanical engineering classes are taught by full-time faculty members and undergraduates are encouraged to work directly with the faculty in their technical electives. Students also have the opportunities to participate in the Stony Brook University's URECA program and in national and international student engineering competitions. Our Senior Design experience offers students opportunities for solving real-world problems in a multi-disciplinary setting.

Our graduate program offers Masters and doctoral degrees in Design and Manufacturing, Computational and Experimental Solid Mechanics, and Fluid Mechanics, Heat Transfer and Thermodynamics. We also offer Masters degrees with special concentration in Energy Technology or Mechatronics. Our faculty members are involved in cutting-edge and cross-disciplinary research in areas such as MEMS, Nanotechnology, Computer Aided Engineering, and Biomedical Engineering.



## New Faculty

The department welcomed one new faculty member in 2008, **Dr. Lei Zuo**. Dr. Zuo had worked for four years in industry as a senior research scientist before joining the department. His research interests include vibration, control, energy harvesting, mechatronics design, and biosensors. He completed Ph.D. and M.S. from MIT, and B.S. from Tsinghua University.



## Faculty Honors

SUNY Distinguished Professor and Chair of the department, **Dr. Fu-pen Chiang** received the 2009 Frocht Award from the Society of Experimental Mechanics (SEM). This award recognizes the Experimental Mechanics Educator of the Year, in recognition of the students that he has produced over the years who are pursuing the art of experimental mechanics. Among the more than twenty Ph.Ds that he has produced, two MEC alumni stand out as the leaders of the field: Dr. Hareesh Tippur, Alumni Professor of Mechanical Engineering at Auburn University, who is an Associate Editor of the *J. of Experimental Mechanics*, the flagship journal of SEM and an Associate Editor of the *International J. of Optics and Lasers in Engineering*; and Dr. Anand Asundi, Professor of Mechanical Engineering and Aerospace Engineering at Nanyang Technological University, Singapore, who for many years has been the Editor-in-Chief of the *International J. of Optics and Lasers in Engineering*, which Dr. Chiang edited many years ago.

**Dr. Imin Kao** served as a member of the Steering Committee of the National Science Foundation (NSF) International Workshop on Bio-inspired Sensing and Bio-inspired Actuation Technology, held in conjunction with the National Science Council (NSC, Taiwan) in Taipei, Taiwan, April 15-16, 2009. Dr. Kao was also invited to serve on the National Screening Committee of *The Fulbright International Science and Technology Award for Outstanding Foreign Students*, The Institute of International Education (IIE), US Department of State, September 2009.



# Mechanical Engineering



**Dr. Yu Zhou** is the PI of an NSF project (\$125,079) titled "Capstone Mechanical Engineering Senior Design Program at SUNY Stony Brook -- Aiding Children with Disabilities through Total Design", Program: CBET-RESEARCH TO AID THE DISABLED, September 2009 – August 2014. The Co-PIs of the project are **Dr. Jeffrey Ge** and Lisa Muratori. He is also the PI of the IBM (\$18,100), SensorCAT matching, project titled "Robotizing MMT Sensor Platform", October 2009- October 2010.

**Dr. Jeffrey Ge** is the Co-PI of the NSF (\$329,882) project titled "Collaborative Research: Variational Kinematic Geometry and Task Driven Mechanism Design in VR Environment," June 2009-May 2012.

**Dr. Jeffrey Ge** and **Dr. Anurag Purwar**, along with an ME Ph.D. student, **Jun Wu**, received the Best Paper MSC Software Simulation Award at 2009 ASME International Design Engineering Technical Conferences (IDETC) in San Diego. Paper Title: "Interactive Dimensional Synthesis and Motion Design of Planar 6R Closed Chains via Constraint Manifold Modification". This award is given biennially with a cash value of \$1000 and a plaque. MSC Software also gave five free licenses of their University Motion bundle valued at \$7,500 by MSC Software.

**Dr. Thomas Cubaud** is the PI of the NSF project (\$240,521) titled "Dynamics of Capillary Threads and High-Viscosity Droplets in Microfluidic Systems" for the period of September 2009-August 2012. Dr. Cubaud was the chair of the session "Fluidic Devices: Micro & Nano" at the 2009 March Meeting of the APS. He was also the recipient of the 2009 Annual Gallery of Fluid Motion Award. His work has been chosen for the cover of the Sept. 2009 issue of Physics of Fluids.

**Dr. Oscar Lopez-Pamies** received the Best Oral Presentation Prize by a Young Researcher (under age 35) out of 120 candidates in the seventh EUROMECH Solid Mechanics Conference held in Lisbon, Portugal for his recent work on the cavitation of hyperelastic solids.

## Student Achievements

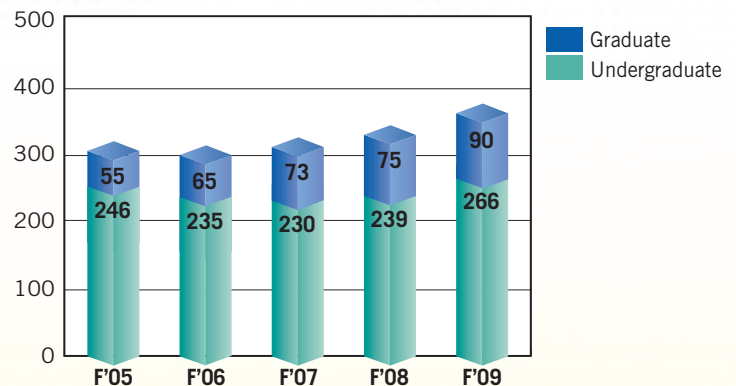
The **Stony Brook University Motorsports Team** took fifth place out of a field of 120 collegiate teams at the 2009 SAE Midwest Baja competition in Wisconsin. The team won

overall fifth place, the fifth place for design, and the fifth place in endurance. Graduate student, **Xiudong Tang**, won second place on Embedded Development in Microsoft Imagine Cup Student Competition. Undergraduate student, **Brian Scully**, won the Sigma XI Award for Excellence in Research. Undergraduate students, **Brian Scully** and **Jurgen Shestani**, won first place in the College of Engineering Senior Design Competition at URECA 2009.

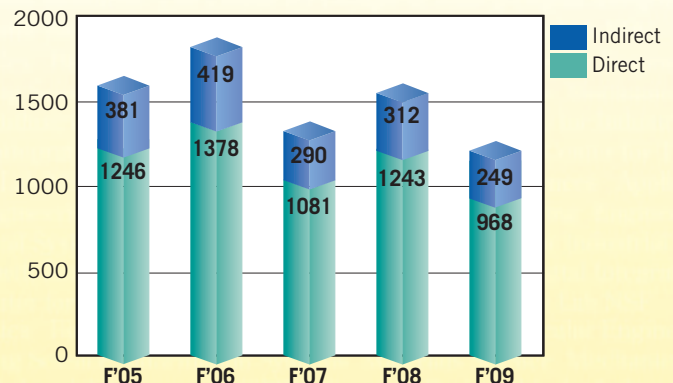


**Chun-huei Chung** received a scholarship to attend and present a paper in the 2009 ASME International Conference on Manufacturing Science and Engineering. **Dylan Tsai** was accepted to participate in the "IEEE-RAS/IFRR School of Robotics Science on Medical Robotics and Computer-Integrated Interventional Systems". **Kunbo Zhang** received a scholarship to attend and present a poster at the 2009 NSF Civil, Mechanical and Manufacturing Innovation Grantees and Research Conference. **Roosevelt Moreno Rodriguez** received a scholarship to attend and present a poster of his research in the "Campus of Excellence 2008."

Headcount Majors (FT/PT)

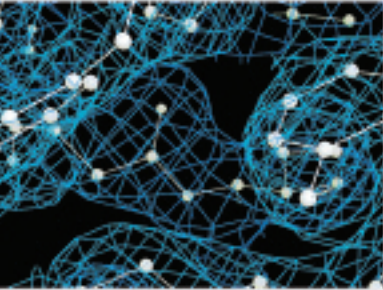


Research Expenditures (000)





## Overview



The Department of Technology and Society (DTS) offers the B.S. and M.S. degrees in Technological Systems Management (TSM) and the Ph.D. in Technology, Policy, and Innovation (TPI). In addition, the department offers an array of courses and programs aimed at engaging students, regardless of their career interests, in modern technologies and their impacts

on society. Through the addition of several new faculty members, the department has advanced its national and international prominence within its four-part mission:

- 1) Help all students learn to use technology, employ engineering approaches to problem solving, and understand the socio-technological interplay that demands a consideration of scientific, social, political, economic, behavioral, legal and ethical aspects of problems;
- 2) Foster professionals who will become leaders in the effective development, integration, management and assessment of technology for the purpose of improving education, business and industrial processes and systems, and the environment;
- 3) Conduct frontier research in energy, environmental studies, educational technology, STEM (science, technology, engineering and mathematics) education, technology innovation management, and public policy;
- 4) Establish projects that address current and emerging societal needs—greater participation of underrepresented groups in STEM, technology transfer, and readily available knowledge and tools to aid managers and policy makers.



## New Ph.D. Program

The Department of Technology and Society has established a new Ph.D. program in Technology, Policy, and Innovation (TPI). Applications are now being accepted for the second cohort of Ph.D. students who will enter the program in Fall, 2010. Students in the TPI Ph.D. program will work in one or more of three areas of faculty research strength:

- 1) energy and environmental systems;
- 2) educational technologies, and education in engineering and applied sciences; and
- 3) technology management, engineering entrepreneurship, and science and technology policy.

In addition to drawing on the expertise of faculty in the Department of Technology and Society, the Ph.D. program is supported by over 20 affiliated faculty members from throughout the Stony Brook campus.

Our Ph.D. program was developed with a four-part mission:

- To develop a cadre of scholars who will be engines of national leadership in gauging the prospects and charting the future course of technologies;
- To carry out policy and design/planning research in three interacting socio-technological areas: energy and environmental systems; educational technologies, and education in engineering and applied sciences; technology management, engineering entrepreneurship, and science and technology policy;
- To establish a new model for twenty-first century doctoral education that promotes highly intensive collaborations and uses advanced educational technologies in a fertile, diverse, and globally networked laboratory environment that transcends disciplinary boundaries; and
- To serve as an exemplary resource for industry and government, and for schools, colleges/universities, and other educational institutions in both implementing technological innovation and carrying out policy studies.

There are a limited number of programs in the world to which TPI is similar. The most successful ones include Engineering and Public Policy (EPP) at Carnegie Mellon University, the Technology and Policy Program (Ph.D. in Technology, Management, and Policy) at Massachusetts Institute of Technology (MIT), Department of Management Science and Engineering at Stanford University, and the Systems Engineering and Policy Analysis Program at the Delft University of Technology in the Netherlands. There are also a number of programs that focus on a specific technology area. Examples include the Energy Resource Group at the University of California, Berkeley, and the Technology, Environment, and Society Program at the University of Delaware.



# Technology and Society

## New Faculty



Two faculty members joined DTS within the last two years. **Dr. Karen Sobel-Lojeski** (Ph.D., Stevens Institute of Technology) joined the faculty in January, 2008. Her current research focus is the impact of technology on people, including how technology impacts educational and business performance as well as overall well-being at the cognitive and emotional levels. **Dr. Todd Pittinsky** (Ph.D., Harvard University) joined

DTS in January, 2009. His research investigates the well-known problems and underestimated potential of diverse communities, with a central focus on positive intergroup relations.

- Through NSF-funded projects, DTS offered over \$500K in undergraduate scholarships and graduate fellowships to Stony Brook University students over each of the last two years.
- **Dr. Todd Pittinsky** is the editor of a new book, published by Harvard Business Press (2009): *“Crossing the Divide—Intergroup Leadership in a World of Difference.”*
- **Dr. Karen Sobel-Lojeski** is co-author (with Richard R. Reilly) of *“Uniting the Virtual Workforce: Transforming Leadership and Innovation in the Globally Integrated Enterprise”*, published by John Wiley & Sons (2008) and part of the Microsoft Executive Leadership series. She is author of *“Leading the Virtual Workforce: How Great Leaders Transform Organizations in the 21st Century”*, published by John Wiley & Sons (2010).



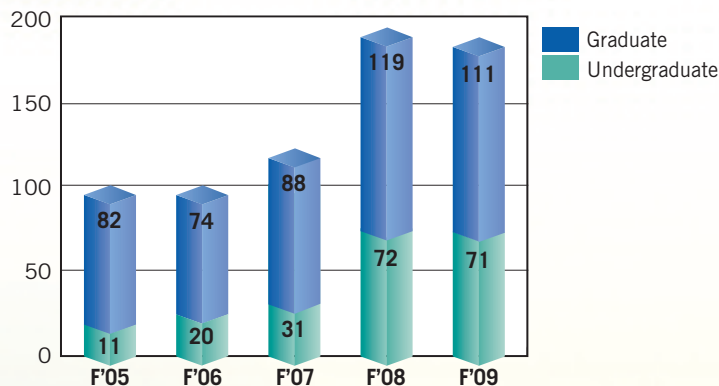
## Accomplishments

- DTS is now the academic home to Stony Brook’s Educational Leadership Program. **Dr. Todd Pittinsky** is Research Director. **Drs. Robert Moraghan** and **Robert Scheidet** are Program Director and Director for Field Placements, respectively. The School of Professional Development is the administrative home for the Educational Leadership Program.

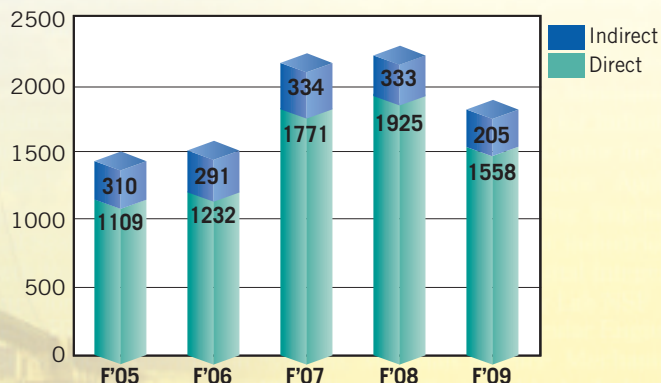


- DTS’s Overseas Program began in 2002 with 25 students and currently promotes 90 students. Students in the program live and work in Asia. The program is designed in a hybrid distance education format, combining face-to-face presentations with synchronous and asynchronous online components. In summer 2009, the program graduated 30 students with the M.S. in Technological Systems Management.
- DTS faculty members are major contributors in the in the Advanced Energy Research and Technology Center (AERTC) and the Center of Excellence in Wireless and Information Technologies (CEWIT). Faculty members are also a part of international energy research efforts.

Headcount Majors (FT/PT)



Research Expenditures (000)





# College Advancement



## Alumni Relations

### *Fostering a lifetime connection and involvement*

Many of the College of Engineering and Applied Sciences' (CEAS) 20,000 alumni are accomplished individuals who remain connected with the College and with each other through the CEAS Group on the social networking LinkedIn site <http://www.linkedin.com/e/gis/67549>. Our electronic newsletter is published and distributed each fall and spring, and the College's website <http://www.ceas.sunysb.edu/> is a resource for students, faculty, alumni, and friends to be informed of College initiatives.

We take pride in our alumni who have advanced in their careers and contributed to their communities. For over 25 years, Stony Brook's Alumni Association has formally recognized alumni for their distinction and service by bestowing the honor of "Distinguished Alumnus." Some CEAS Alumni who received this honor include:

- **Mr. Richard Bravman** ('78 B.S. CompSci),  
*Executive Chairman, Intellex*
- **Dr. Stephen Director** ('65 B.E. MechE),  
*Provost, Northeastern University*
- **Dr. Robert Frey** ('80 B.S., '87 Ph.D. Applied Math),  
*CEO, Harbor Financial Management*
- **Dr. Kedar Gupta** ('71 M.S., '73 Ph.D. MatSci),  
*Founder and CEO, ARC Energy*
- **Dr. John Hennessy** ('75 M.S., '77 Ph.D. CompSci),  
*President, Stanford University*
- **Mr. Wai Lam** ('82 B.E. EE),  
*Co-Founder and Vice President, Falconstor Software*
- **Mr. Frank Otto** ('72 B.E. EngSci, '74 M.S. MechE),  
*Sr.VP, Comtechtel Communications*

Annually, scores of CEAS alumni and friends actively serve on College advisory boards, committees, and fundraising councils. Others volunteer by mentoring students, providing guest lectures, and recruiting interns and graduates to their companies.

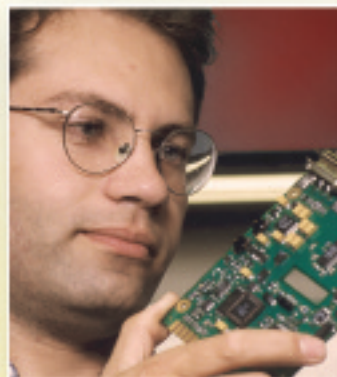
## Corporate Relations

### *Building win-win relationships*

We've formed comprehensive and mutually beneficial working relationships with over 80 corporations. The College's corporate relations efforts create and foster:

- Intern and new-hire talent pipelines
- Professional development opportunities
- Research collaborations with faculty
- Technology licensing
- Student senior design projects
- Annual Biotechnology, Energy, and Information Technology conferences

Here's a partial list of our longstanding corporate partners:





# Alumni Relations

## Philanthropy

*Promoting excellence in research and education*

Overall annual giving from CEAS alumni, friends, corporations, and foundations averaged \$1.4M for the past 5 years. The College endowment currently stands at \$3.5M. Private philanthropic support for the College allows us to attract top students, and to sustain the high level of teaching and scholarship that the College has delivered for more than five decades.



**Faculty Support.** Along with providing a stable financial structure for students, continuously improving the excellence of our faculty remains one of the highest University priorities. Our commitment to quality demands that faculty deliver first-rate education in their fields. Accomplishing this takes special individuals – master teachers and researchers. The task of recruiting and retaining the best faculty is daunting in a competitive hiring environment.

Endowed professorships enable Stony Brook to hire scholars with national and international reputations. Through a generous gift from Alumnus **Dr. Robert Frey**, our Applied Math and Statistics Department recently embarked upon recruiting the College's first endowed professor. Our goal is to partner with our alumni and friends to add 6 additional endowed professorships (one for each department) in the next 5 years.

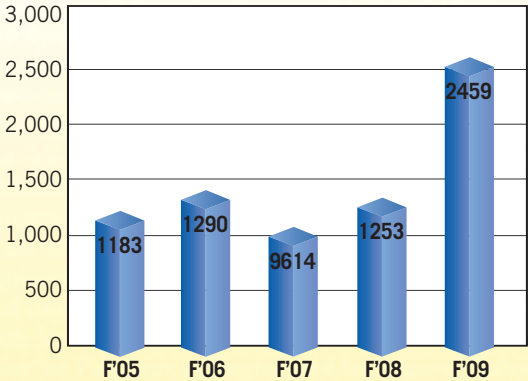


**Student Support.** Among our national peer group of leading public research universities, Stony Brook enrolls the second highest number of students whose household income qualifies them for financial aid. Yet our peers generate double the amount of private scholarship support per student than we do. Even with federal and state assistance, our typical undergraduate student has an average of \$4,300/year in unmet financial need. We ask you to consider supporting our students by contributing to College's general scholarship fund through the Stony Brook Foundation. Each outstanding student currently requires at least \$7,500 annually (\$30,000 over four years) in tuition and fees (not including room and board) to attend Stony Brook.



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**CEAS Philanthropy By Fiscal Year (000)**





# Advanced Energy Research



The **Advanced Energy Research and Technology Center (AERTC)** is a true partnership of academic institutions, research institutions, energy providers and industrial corporations. Its mission is to become a global leader in innovative energy research, education and technology deployment with a focus on efficiency, conservation, renewable energy and nanotechnology applications for new and novel sources of energy.

- Power distribution/SmartGRID technology
- Hydrogen fuels
- Advanced battery research
- Fuel cells
- Renewable sources
- Optimization of traditional fuels
- CO<sub>2</sub> sequestration
- Environmental impact
- Nanotechnologies
- Biofuels
- Combustion
- Energy education / outreach

Cheaper, cleaner energy is translating into an economic resurgence for New York State, encouraging new investments and increasing the tax base. This is a long term impact that will translate into sustained growth, billions of dollars and thousands of new jobs.

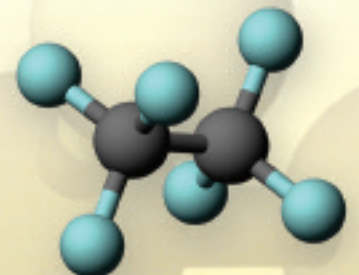


## Goals

- Establish a broad based interdisciplinary research program which integrates fundamental science, nanotechnology, and engineering to design the next generation of advanced energy systems. This involves exploring renewable energy sources, enhancing the performance of traditional fuels through molecular engineering, and employing cutting edge solid state and polymeric polyelectrolyte fuel cell technology.
- Build a state-of-the-art laboratory to model power generation that can test new technologies, such as biomass, hydrogen fuels, fuel cells, carbon sequestration, and power cogeneration. This facility will be able to quantitatively evaluate the economic factors of zero emissions power generation and will enable the Center to be a national leader in establishing universal standards for safety and environmental impact for the energy industry.



- Engineer full scale demonstration and testing facilities to accurately simulate the power generation grid and which will optimize the distribution network, provide alternatives in case of local failures, and provide early warning of sabotage, leaks, or terrorist infringements.
- Design a program of public outreach to the community in order to explain energy policy and emerging technologies. This includes: a) sponsorship of national and international conferences for leaders in energy research; b) organizing workshops to inform the public of energy policies; and c) outreach to schools through special programs designed for K-12 teachers and their students.





# and Technology Center

## Projects

Stony Brook University scientists have embarked on a variety of cutting edge, energy-related research, including alternative clean energy sources, enhanced production from renewable sources, improved efficiency of energy use in the residential, commercial, manufacturing and transportation sectors, emerging technology trends such as nanomaterials for reduced wear and improved thermal insulation, more efficient manufacturing methods, and environmental protection. AERTC research includes work on hydrogen fuel cell/batteries, photovoltaic cells, new polymeric materials, improved and highly efficient combustion processes, efficiencies of conventional energy, monitoring of gases and pollutants energy policy, and other energy related programs.



Recent AERTC-funded projects:

- Ultra Deep Sulfur Removal and Biomass-derived Transportation Fuels: The next generation nanocatalyst based technology;
- Biofuels and nanotechnology for improvement of Oil Heat Combustion Systems;
- Point of Use Generation of Biohydrogen in a Catalytic Fuel Cell for Transportation;
- Manufacturing and testing of one kW Hydrogen PEM Fuel Cell Utilizing Bipolar Plate Technology;
- Solar Water splitting: quantum theory of photocatalytic process of water/semiconductor interface;
- Intelligent Energy Choices.

## Outreach

**Advanced Energy 2009.** The recent slowdown of the global economy serves to underscore the critical importance of energy conservation and research into sustainable, alternative energy sources. Accelerating the development of emerging technologies through the sharing of ideas and innovative concepts is the goal of *Advanced Energy 2009*. In just three years *Advanced Energy* has become the premier conference of its kind in the northeast. With nearly 1,000 attendees and more than 70 exhibitors, *Advanced Energy 2009* attracted experts from around the world and across every sector of the energy industry.

**Seminars.** In partnership with local and regional associations, the Center hosts seminars and workshops on a wealth of energy issues. Recent seminars include: *The Business of Clean Technology*, and *Advanced Energy Data Solutions*, both aimed at increasing New York state and the northeast region's energy marketability.

**Education.** The AERTC Distinguished Lecture Series is designed to showcase the forefront of research in the energy sciences, as well as promote collaboration between the AERTC and world-renowned scientists. The series will address problems and highlight solutions in the global energy community. In partnership with the US Green Building Council-LI Chapter and SB's Corporate Education and Training, the Center offers a LEEDS Accreditation Study Group Program designed to prepare participants for the rigors of the LEEDS Green Associate accreditation exam. LEED Certification is the nationally accepted benchmark for the design, construction and operation of high performance green buildings. Additional consumer-based classes are offered in a variety of 'green' living topics, such as solar powered living, organic and green gardening and non-toxic building materials for homeowners and construction.





# Center of Excellence in Wireless



Stony Brook's Center of Excellence will establish New York State as the national leader in wireless and information technologies. In support of this vision, the state has completed the construction of the CEWIT building, a \$50M state-of-the-art facility for advanced research and technology development. Guided by

the partnerships with industry leaders and other research and academic institutions, CEWIT will not only address science and technology issues, but will culminate in transferring technologies to commercial applications.

## Objectives

CEWIT's mission is to conduct first-class interdisciplinary research in emerging technologies, become recognized as world leader in wireless and IT, foster new enterprise development, and address skilled technology worker shortage.

The Long Island region has an IT and R&D infrastructure that is among the best in the world including major business and technology development centers, worldwide leaders of industry, two world renowned research laboratories, over 1,000 small and medium sized software companies and a highly skilled workforce. Since the inception of CEWIT, our staff, affiliated faculty and students have been working on the development and commercialization of cutting-edge technologies, obtaining federal, state and private funding for interdisciplinary R&D programs and collaborative projects, helping companies create and retain high quality jobs, and assisting the development of high technology startups. CEWIT also has access to unparalleled resources including Brookhaven National Laboratory, Cold Spring Harbor Laboratory, the New York Center for Computational Science, three National Science Foundation Centers, two New York State Centers for Advanced Technology, three High Technology Incubators, the Strategic Partnership for Industrial Resurgence (SPIR) and the Small Business Development Center (SBDC).

## Research & Development

Extensive research & development is under way in five divisions: Network Technologies, Medical Technologies, Software Systems, Communication & Devices, and Systems & Infrastructure.

The **Network Technologies** division focuses on research, development and commercialization of next generation wireless networks, multi-media mobile devices and advanced solutions and services. Its research spans wireless LAN, ad hoc and mesh networks, wireless sensor networks, media networking, and peer to peer networking, to name just a few.



The goal of the **Medical Technologies** division is to conduct research leading to the development of medical products, devices and technologies that support patient and clinical care providers. It combines related programs, which are being researched and investigated on the campuses of the SUNY system and its medical centers. Concentrated effort is invested in advanced medical imaging, image processing for computer-aided diagnosis, and optimized storage and communication of medical imaging data. Its medical diagnostics and health monitoring teams apply advanced technologies to develop new solutions for telemedicine, remote patient monitoring, computer augmented rehabilitation, non-invasive diagnostics and wireless medical communications.

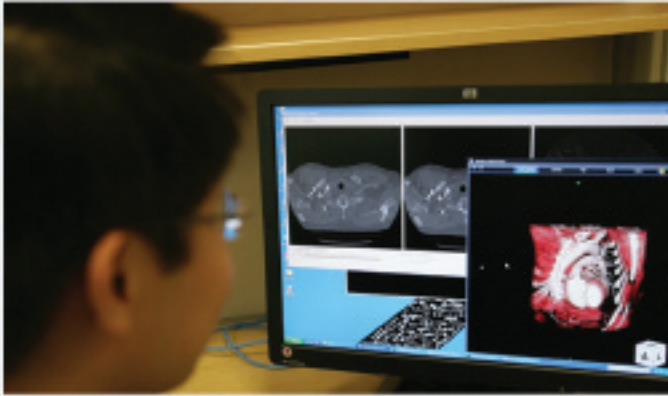


**CENTER OF EXCELLENCE**  
WIRELESS AND INFORMATION TECHNOLOGY

[www.cewit.org](http://www.cewit.org)



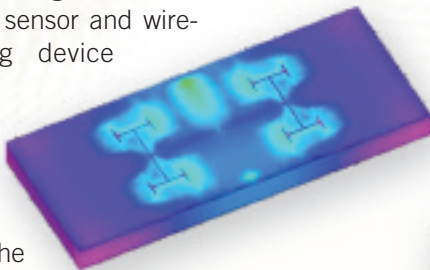
# and Information Technology



The **Software Systems** division develops new technologies and solutions in visual computing, advanced medical imaging, virtual and augmented reality, intelligent information systems, natural language processing, semantic web, system and data security, concurrent and distributed systems, statistical analysis and modeling, biostatistics, computational biology, and medical informatics.

The **Communications & Devices** division focuses on circuit design and testing, fabrication and prototyping, microwave sensor and wireless/mobile computing device design and testing.

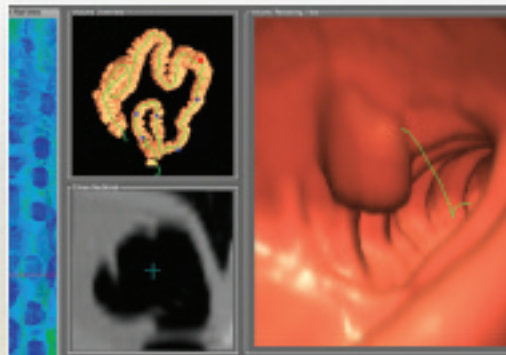
The **Infrastructure & Systems** division looks to develop integrated applications based on the research conducted in the other divisions.



## Accomplishments

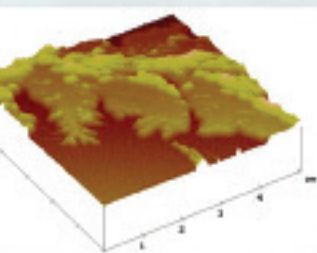
CEWIT's technology commercialization activities are designed to help drive the economic growth of New York State and the United States by moving technologies from research labs to the marketplace. Under the guidance of our industrial advisory board, medical advisory board, scientific council and technology council, CEWIT will continue to generate new technology innovations to fuel the formation and expansion of cutting edge industry clusters, such as healthcare information technologies, cloud computing and smart grid.

Since the establishment of CEWIT, industry commitments and federal grants awarded to CEWIT's R&D programs now exceed \$160 million. More than 320 projects have been completed with industry partners and more than 210 projects with federal and state agencies. CEWIT faculty and R&D staff have authored more than 420 research publications. 123 invention disclosures have been filed. 36 US patents have been issued and 12 have been licensed by the industry. Four new startup companies have been created based on innovations developed at CEWIT.





## Garcia Center for Polymers at Engineered Interfaces



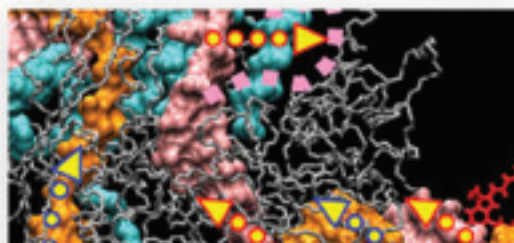
The focus of the **Garcia Center** is the design of polymer thin film properties through precise control of interfacial structure. The uniqueness of the investigations is the synthesis and study of engineered interfaces. At these interfaces, molecular-level control of surface energy via chemical functionalities, symmetry, and order is accomplished. This is a significant departure from existing experiments on

semiconductor, metal and metal oxide surfaces, with little or no control of surface interactions.

### Research

- 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 (SAMs);
- Nanoscale surface patterning with block copolymers;
- Surface adsorbed polyelectrolytes;
- Capillary electrophoresis and MRI contrasting agents; and
- Explore new directions in the development of engineered surfaces for cellular adhesion and protein adsorption.

The properties of a polymer thin film at a surface depend, in a complex manner, on the inter-

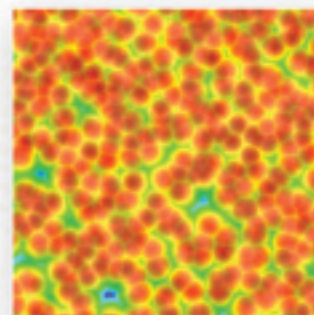


facial interactions that determine the chain reactivity, conformation, and dynamics at the interface. Designing polymer thin films with specific surface properties requires a detailed understanding of the underlying physical principles and the ability to control interfacial interaction parameters. These issues are also pertinent to biopolymers, where the alteration of substrate surface energy has dramatic effects on protein and DNA adsorption, and on cell adhesion. Designing a novel polymer interface requires state-of-the-art synthesis, characterization and imaging instrumentation capable of observing chemical and morphological variation on the scale of nanometers.

### Highlights

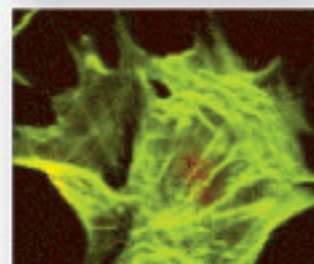
#### • Toxicity of Citrate/Gold Nanoparticles on Human Dermal Fibro-blasts

The nanoscale engineering is one of the most dynamic domains at the interface between electronics, physics, biology and medicine. As there is no regulation yet, concern about future health problems is raising. We have investigated the cytotoxicity of Citrate/Gold nanoparticles at different concentrations and times. Major effects on cells appeared as a result of the internalization of nanoparticles, such as disruption of the actin cytoskeleton, loss of spreading and growth, as well as protein synthesis, and reduction of phagocytosis of bacteria. These factors can have serious consequences and impair wound healing, immunological response, and nervous junctions.



#### • Bioengineered scaffold to accelerate wound healing

An outstanding accomplishment has been the development of an acellular synthetic scaffold for the treatment of acute and chronic wounds. Through mechanotransduction, this scaffold provides optimal mechanical and biochemical signaling to stimulate cell functional responses critical for wound repair (manuscript in preparation). When implanted in porcine cutaneous wounds, this scaffold produced a significantly greater healing response ( $p < 0.001$ )\* as compared to that observed in the no-treatment control wounds.



### Outreach and Education

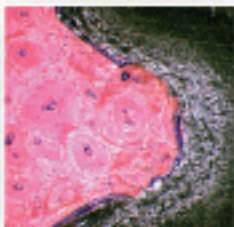
The Center offers outreach programs for high school students and teachers, undergraduate and graduate students. These programs are designed to provide hands-on experiences for student collaborators at all levels, exposing them to state-of-the-art equipment and enabling them to learn current techniques.



## Center for Thermal Spray Research



The **Center for Thermal Spray Research** (CTSR) at Stony Brook University was established in 1996 through the NSF Materials Research Science and Engineering Centers program. Since inception, CTSR has been at the heart of a number of exciting fundamental science and applied engineering initiatives to enhance the scientific base of thermal spray (TS) coating technology. TS technology continues to grow and services a broad industrial community; coatings are ubiquitous in gas turbine engines (propulsion and energy), automotive, pulp/paper and infrastructure maintenance. Emerging applications include coatings for orthopedic and dental implants, solid oxide fuel cells, and functional sensors for harsh environments.



CTSR's research philosophy is based on an integrated and interdisciplinary approach to thermal spray process and materials R&D, along with multi-level education, addressing problems that are both of fundamental and practical engineering importance. The Center seeks to link research to practice so as to enable: implementation of thermal spray coatings into the design cycle, utilization of robust processing methodologies and simple, yet scientifically based, characterization and property measurement tooling.

Key research activities of the CTSR include:

- Integrated approach to process-materials-properties through modeling/experiments
- Exploration of the fundamental physics underlying splat-splat and splat-substrate interfaces
- Advanced process maps (models /experiments)
- In-situ and ex-situ sensing for property evaluations and microstructural control
- Advanced neutron and synchrotron-based characterization methodologies
- Developing new methods of coating characterization

### *Industrial Outreach*

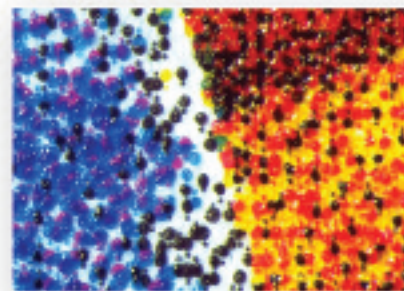
The Consortium on Thermal Spray Technology continues to thrive and grow. Presently there are some 26 member companies. The consortium meets twice a year with approximately 40-50 industrial participants allowing for dissemination of research efforts at CTSR and collaborative discussions among the consortium members.

Each company contributes \$12.5K year through membership fees which partially supports the research and knowledge transfer activities. Complementary funding to the tune of \$1.7M has been received from NSF and DoD to support CTSR/Consortium research activities.

In October 2009, CTSR team had four successful field trips to Europe to conduct research and characterization of coatings using in-booth diagnostic sensors and coating property measurements.

### *Educational Outreach*

CTSR has carried out a number of educational outreach initiatives, for undergraduates from Stony Brook and other regional universities, as well as local K-12 teachers and students. Our Research Experience for Undergraduates (REU) and International Research Experience for Undergraduates (IREU) programs have allowed students to work closely with CTSR and affiliated faculty mentors on focused, scientifically and industrially relevant problems for 10 summer weeks, on Stony Brook's campus or other locations, for example, at UCSB or the Czech Technical Institute in Prague.



Through the new NSF program, we have formalized our outreach mechanism through the establishment of a dedicated outreach facility to expose a large of number students to materials, thermal spray and engineering systems. Named SPLAT Center (for Spraying, Learning and Teaching), a specially designed, "kid-friendly" interactive research laboratory has been developed. Demonstrations and hands-on experiments will be part of the immersive nature of the lab.



# New York State Centers

## Biotechnology

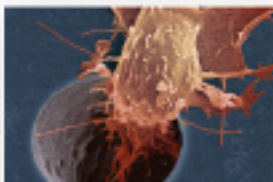


Established in 1983, Stony Brook University's Center for Biotechnology (CFB) is a cooperative research and development partnership between universities, private industry and New York State. It is involved in the discovery and early stage development of commercially promising technologies resulting from academic research, and the creation of strategic infrastructure that promotes the growth of the life sciences industry.

- On September 22, 2009, the Center for Biotechnology (CFB) celebrated the opening of the **Center for Biomolecular Diagnostics and Therapeutics** at Stony Brook. This world class research center, constructed with support from a \$15 million grant from NYSTAR will serve as an epicenter for applied biomedical research.

### Technology Development

- In collaboration with Ortek Therapeutics Inc. and **Dr. Israel Kleinberg**, the CFB aided in the development of a cavity fighting candy incorporating CaviStat® which has been proven to be significantly more effective than fluoride.
- Cornerstone Pharmaceuticals, a company developed in partnership with the CFB, raised \$6M and announced clinical trials for it's first-in-class compound that targets metabolic changes found in multiple types of cancer. The technology was developed by **Drs. Paul Bingham** and **Zuzana Zachar**, and exploits biochemical alterations in the conversion of glucose to energy that occurs in many types of cancer cells.

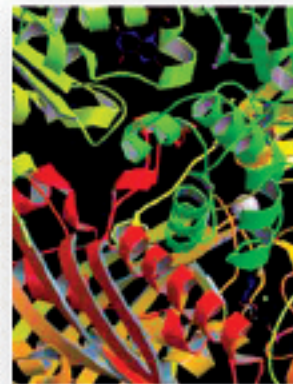


- Biospecifics Technologies Corp. announced that it's partner Auxilium Pharmaceuticals signed a license agreement with Pfizer to market XIAFLEX, a product based on the technology developed in part with support from the CFB in the laboratory of **Drs. Lawrence Hurst** and **Marie Badalamente**. The technology is expected to receive FDA approval for *Dupuytren's Disease*. The deal included a \$75M upfront payment to Auxilium with an additional \$410M tied to milestones.

### Economic Impact

- The CFB has worked closely with **Dr. Richard Clark**, over the last several years to help develop novel peptides to inhibit burn injury, enhance wound healing, and improve cosmetics. The technology was the focus of a successful \$100,000 NIH Phase I, STTR award, and more recently a \$1.65M NIH award, in collaboration with **Dr. Adam Singer**, to inhibit burn injury progression.

- Since 1998, CFB related funding has contributed to the development of technologies that have generated \$131M in royalties back to the University. CFB funding can be linked to 97% of all royalties received by Stony Brook University during this time, and CFB research investments have contributed to the development of more than a dozen commercially available products with cumulative sales approaching \$1B.



- Since 2001, CFB programs have contributed to the creation of 675 new jobs, generated \$15.5M in corporate savings, and leveraged \$169M in federal and private funding for translational research. Total economic impact related to the State's \$7M investment in the CFB for this seven year period is approximately \$650M.

- The CFB has held BioStrategy sessions with over 14 early-stage bioscience companies in New York State in fiscal year 2008-09. As a result of this interaction, two of these companies have presented to the Long Island Angel Network.

- Since 2008, the CFB has initiated over 15 **Technology Commercialization Clinic (TCC)** projects that answer critical business questions to support company efforts to attract capital and accelerate corporate growth.

- The CFB's **Fundamentals of the Bioscience Industry Program** boasts over 200 graduates since it's inception in 2004. The program targets graduate students and post docs who are interested in working collaboratively with industry.





## Sensor Systems (Sensor CAT)



**The Center for Advanced Technologies in Sensor Systems** (Sensor CAT) is one of 16 New York Centers for Advanced Technologies. It is designated by NYS Office of Science, Technology, and Academic Research (NYSTAR), supported

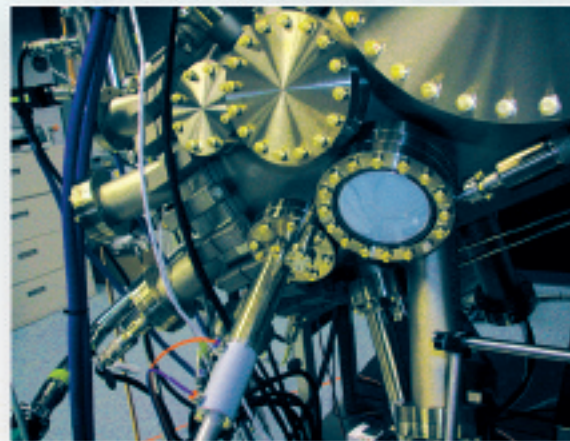
by an annual grant of \$1M, hosted by Stony Brook University, and charged with the mission to help create and retain sensor-related jobs and businesses in New York State by facilitating industry-university cooperation. In furthering its mission, the Center has enlisted participation of more than 35 academic and research faculty members.

### *R&D Supported by the Sensor CAT*

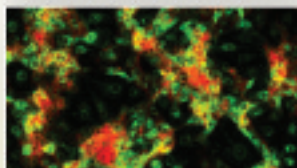
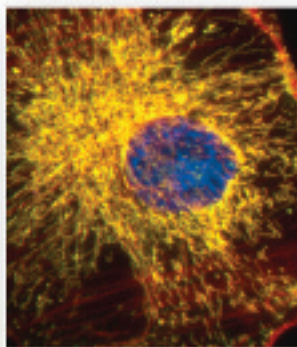
Research groups, which are actively working with the CA in cooperation with industry, hold prominent positions in:

- **Fluorescent detection technology, sensors, and imaging.** We have two world-class groups (one headed by **Dr. Vera Gorfinkel**, the other by **Dr. Serge Luryi** and **Dr. Mikhail Gouzman**) with well-equipped labs. Among applications of the technology are novel DNA sequencing instruments and biomedical fluorescent imaging, as well as fluorescent-based chemical sensors.
- **Fiber-powered sensors.** The Sensor CAT has pioneered a unique technology that enables both power delivery to the sensors and information exchange with them via optical fibers. **Dr. Mikhail Gouzman's** Fiber Optic Sensors Laboratory develops optically powered sensor networks, which may connect various electronic and optical sensors. The Lab also develops various sensors based on fluorescence
- **Novel semiconductor radiation detectors.** The Sensor CAT Director, **Dr. Serge Luryi**, has received Federal grants totaling \$6M for the development of a semiconductor detector for gamma radiation, capable of detecting not only the energy of gamma-photon but also the direction from where they come. This new device would find numerous applications, in particular, in homeland security industry.

- **Uncooled mid-infrared lasers.** The Optoelectronics Group, headed by **Dr. Gregor Belenky**, is developing the world's most advanced technology in high-power mid-IR lasers and their applications (telecom, defense, sensors, homeland security). Its facilities include a practically complete semiconductor laser fabrication line of equipment and a world-class optoelectronics laboratory. The group has outstanding expertise and facilities in other areas of physics, characterization, and development of optoelectronic devices and systems.



### *Industry Cooperation and Economic Impact*



Assisting New York industry is at the core of the CAT mission. The Sensor CAT actively communicates with close to 200 New York State companies, with 20-30 being involved in joint R&D each year. The positive economic impact on those companies from this cooperation manifests itself in the growth of employment, company revenues, new financing, etc. The cumulative economic impact for 10 full years since the CAT designation is more than \$200M.





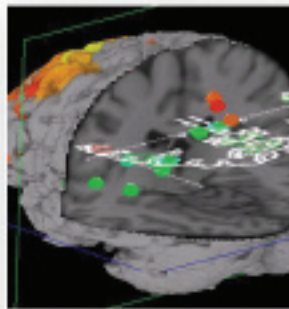
## Strategic Partnership for Industrial Resurgence (SPIR)



Since its inception in 1994, Stony Brook's SPIR program has worked with more than 410 New York State companies on 2,343 early stage projects, potentially creating/retaining, according to our industrial partners, more than 12,000 jobs. During the past 15 years, SPIR has

helped our industrial partners to win in excess of \$104 million in federal funding.

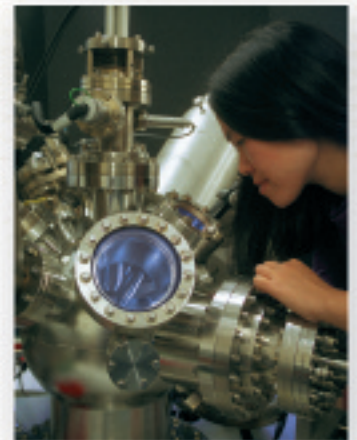
This success strongly indicates the maturity and depth of commitment of the university-industry partnership that has developed at Stony Brook University following the establishment of the New York SPIR program. Finally, a major outcome of the SPIR program has been the very high retention rate of our students by companies who often offer permanent employment opportunities in our region following graduation. SPIR creates high quality student internships with small, high technology companies. Internship opportunities are also provided by the College of Engineering and Applied Science (CEAS) that houses the SPIR program.



### Outreach to Industry

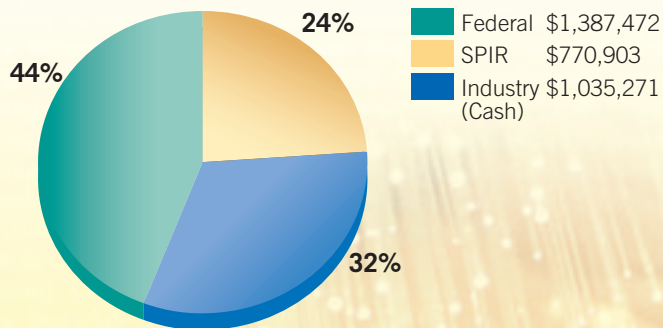
Highlights of our past successes include continued support of the rapid prototyping facility, technical support on federal proposals to help companies win \$17.8 million in SBIR/STTR funding since 2001, active participation in licensing and commercialization of products, support for incubator companies, and assistance in providing high quality technical jobs for our graduates. In the last fiscal year alone, SPIR has worked with 67 companies on 147 projects, with a direct impact on the local economy; 269 jobs created and 71 jobs retained.

SPIR supports all areas of engineering including: software and IT, electronics, microprocessor design, medical devices and instrumentation, mechanical design, rapid prototyping, materials development and evaluation, biomedical engineering and more.



We continue to provide a record level of support to our incubator companies and local start-ups to assist them in developing their technologies. The program is also instrumental in assisting our graduates to find jobs. Many of the SPIR students are hired as full-time employees upon graduation after completion of their projects.

**SPIR Funding Distribution 2008-2009**





## Corporate Education and Training



Stony Brook University Corporate Education and Training (CET) within the office of the Vice President for Economic Development, is a core partner in an Economic Development Network, both internally and externally.

CET is the specialized arm of the University created to help Long Island businesses. The mission of CET is to foster educational partnerships, provide comprehensive workforce training, leverage cost through funding and facilitate and promote innovative regional workforce initiatives emerging from our research and development centers. CET is primarily driven by incumbent professional training needs that are industry directed.

Working in alignment with its mission statement and recognizing the economic crises in the Fall of 2008, CET reached out to the Suffolk and Nassau County Workforce Boards to reinstate dislocated worker funding for professional level training. Based on their successful experience training incumbent workers in the areas of Project Management and Business Analysis, CET designed certificate and training programs to help people get re-employed. The Project Management (PMP)/Business Analysis Certification was a natural choice as CET had been offering this training to corporate professionals including Estee Lauder Co. who sponsored over 300 employees in seven countries. The growing demand for certified PMPs across all industry sectors made this training relevant for those in transition.



Leadership in Energy and Environmental Design (LEED) training was another natural choice given the demand for “green” initiatives. While certificate programs can give unemployed individuals a competitive edge, these individuals would need much more. Stony Brook CET was uniquely positioned to offer a valuable educational experience; a break from isolation; hope and opportunity by providing connectivity to university resources; facilitating a supportive environment where training and job resources are integrated and by fostering an environment where participants functioned as mentors and a support network to each other. Certificate programs were re-designed to include career transition workshops, and a network of professional industry leaders to act as a Round Table Advisory Board.

CET established a core partnership with the SBU Career Center. The Career Center worked with CET to create an SBU CET Professional Website portal specifically and exclusively for CET professionals to post their resumes and for CET Advisory Board companies to list job openings for experienced professionals. This unique program illustrates how one university greatly broadened their outreach and connectivity with the engagement of key resources on and off campus to assist professionals in enhancing skills and certifications, to redefine their career options and objectives in a new economy and displaying the importance of partnerships. The CET office motto is “Everyone must be part of the process and the solutions.”

As of December, 2009, over 300 people have participated in the Project Management and/or Business Analysis Certificate program. Over 130 people have participated in the LEED New Construction or LEED Green Associate study group program.



With new state of art training facilities in the Stony Brook Research and Development Part, CET is poised to expand and build upon these successful programs and continues to greatly broaden their outreach and connectivity with the engagement of key resources on and off campus. A sampling of the additional programs planned includes:

- Net series programming (csharp.net, ASP.net, XML)
- ANSYS
- CATIA
- Object Oriented Design and Analysis
- Manufacturing Excellence programs
- Quality Management
  - ISO training
  - LEAN Manufacturing
- Green Programs for the Consumer and the Professional (in collaboration with Long Island Green Institute)
- Communications
  - Executive Level Presentation Coaching and Training
  - Technical Writing





# Women in Science and

## Overview

The **Women in Science and Engineering Program (WISE)** at Stony Brook University has built and fosters a community of high achieving women pursuing degrees in the areas of science, math and engineering. By providing support to each student through scholarship, early access to research, a model of mentoring, close academic advising, enrichment activities, and availability of housing in one residential hall, WISE ensures success.



Stony Brook, with its state of the art facilities, is one of just ten universities nationwide to be selected for a National Science Foundation Recognition Award for its undergraduate science education. Additionally, WISE has been selected as a national model program by the National Science Foundation for its outstanding success.

Students apply through a highly selective admission process for entry into the program from high school. More than one thousand applications were received for the 2009 class. This year's incoming class had a total of 56 students, with an average high school GPA of 94.4, and average SAT Math score of 688 and SAT Verbal score of 639. 203 total students are currently enrolled in the program. WISE students are diverse and come from far and wide, with home towns ranging from Mill Valley, California, to Dallas, Texas and South Charleston, West Virginia, to Sterling, Massachusetts. Yet from the moment the student arrives to campus, she is never far from other like-minded women such as herself. During Opening Weekend, all first year WISE students are assigned to their mentors and meet their fellow mentees during a welcome reception. The mentor groups form the backbone of support WISE women enjoy. Mentor groups are based on the students' schedules and chosen majors, so everyone in the group studies and works together during regular mentoring sessions. Their mentor is an upper division WISE student who has taken many of the same classes, and has the role of tutor and friend.



WISE mentors assisting TechPREP middle school girls.

As students form close ties through their mentoring groups, they also have the chance to work with one another in their Introduction to Stony Brook courses, ITS 101. Four sections of this course are reserved exclusively for WISE students, and these courses emphasize research and internship opportunities for women in science, math and engineering. In the second semester of their first year, WISE students are given hands-on research experience, a prized opportunity for first year students. Unlike their peers, who may only get the chance to do research as a junior or senior, WISE freshmen perform research in a variety of disciplines, in labs ranging from engineering and physics, to mathematics and biology.

## Academic Advising

Students in the WISE program enjoy personalized academic advising. WISE organizes academic advising events for students to gain access to faculty who can advise on matters of major and courses and schedules. WISE brings everyone together to one location, so students can get all their questions answered at one time. Additionally, WISE students are given priority registration, a chance to register earlier than their non-WISE peers. One on one advising is available at any time by appointment by trained WISE staff.



WISE support does not stop at the academic level. WISE provides enrichment programs to offer insight and perspective into career and internship opportunities Programs by speakers focusing on topics relevant to women in science

and engineering are presented at luncheons and dinners. Panel discussions are presented by women in research and in business to enlighten students on the wide ranging possibilities in science, math and engineering. Workshops are held on resume preparation and scholarship applications.

On the social level, the WISE Student Leadership Council (SLC) aims to bring community-building activities to the students. The WISE Student Leadership Council is a group of upper-division WISE students who work closely with the WISE Program Office to offer special programming to strengthen the WISE community.



# Engineering (WISE)



## Scholarships

Students receive scholarship opportunities throughout their academic career at Stony Brook. All students receive scholarship upon entrance into the program, based on academic

merit. Continuing WISE students have the chance to apply to scholarships offered exclusively to WISE students, such as the Citigroup Scholarship, Anne Sayre Prize, and Battelle Summer Research Award. Pall Corporation recently committed to 'Adopt a WISE Student' by providing a \$15,000 scholarship, the equivalent of tuition and fees for two years.



In addition, WISE students have the chance to earn credit or stipend through internship opportunities. The WISE Citigroup Winter Internship Program offers a paid internship during the winter term to students who want to work in New York City in one of Citigroup's financial or technical offices. ITT Corporation recently committed two paid

summer internship positions for WISE students in their Long Island or Clifton NJ offices.

WISE belongs to the Undergraduate College of Information and Technology Studies (ITS), home to a newly created community gathering space which will host guest lecturers and seminar speakers, in Mendelsohn Quad. The WISE residential hall, Gray College, is outfitted with a WISE computer lab, available exclusively to WISE students. The community of women working and living together allows students to support one another as they pursue their goals within science, math and engineering.

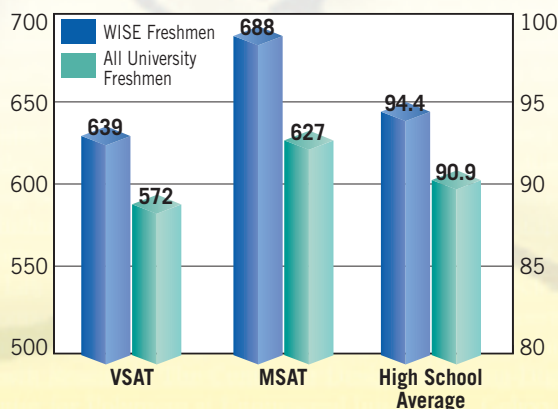


Beyond the first year, students continue their regular academic study within their majors and include special WISE and other related courses. WSE 242, Society and Gender in Science and Engineering, explores important topics relevant to women in science and engineering. WSE 487 and WSE 488 are for research and internship experiences. Students also take an advanced math or computer science course. Students present their work at URECA, the Undergraduate Research Celebration or write an honors thesis through their major. Students are well prepared for their future endeavors in science, math and engineering.

WISE students are part of a supportive community of students, faculty and staff who are committed to helping women pursue their interests in science, math and engineering. By being a part of WISE, each student will gain the experience and confidence to be successful in her chosen field. WISE students pursue their regular academic program along with special WISE courses and extra-curricular activities, benefiting them with early research opportunities, personalized academic advising, small study groups, and advanced priority registration.



2009 Comparison of SAT Scores and High School GPA







Applied Mathematics and Statistics graduate student, **Trent Balius** received a prestigious *NIH National Research Service Award Fellowship* from the National Cancer Institute. The primary goals of Trent's project are to develop computational structural models to

characterize the mechanism by which cancer-causing mutations and subsequently acquired drug resistance mutations affect binding of ligands (drugs) to the Epidermal Growth Factor Receptor (EGFR).

A fellow student in our Department of Applied Mathematics and Statistics, **Steven Welsh**, was presented with the *President's Award for Excellence in Teaching by a Graduate Student*.

Freshmen and Biomedical Engineering major, **Debapria Das**, has become the first student to earn the honor of *Engineering Scholar for Medicine*. This new collaboration between our College and Stony Brook University's School of Medicine guarantees select exceptional students entry into medical school upon graduating with their Bachelor's of Engineering degree.



Each year the State University of New York (SUNY) Chancellor's Office honors students who have best demonstrated and been recognized for their integration of academic excellence with other aspects of their student experiences, including leadership, athletics, career achievement, community service or creative and performing arts. Since our last report, several of our CEAS students have won the *Chancellor's Award*: **Alexander Bruno**, Biomedical Engineering major; **Sarah Kantharia**, Biomedical Engineering major; **Milan Karunaratne**, Mechanical Engineering major; **Jessica Newman**, Mechanical Engineering major; **Ka Ho Poon**, Electrical Engineering major, Mechanical Engineering and Physics minor; **Suraj Rambhia**, Biomedical Engineering major; and **Ujas Shah**, Biomedical Engineering major.



**Suraj Rambhia** was also granted a Honorable Mention in the 2008 *Goldwater Scholars* competition. Scholars were selected on the basis of academic merit from a field of 1,035 mathematics, science, and engineering students who were nominated by the faculties of colleges and universities nationwide.



Electrical Engineering major **Kshitij Tyagi** was presented a *Certificate of Special Recognition* by Congressman Tim Bishop and a proclamation by Suffolk County Executive Steve Levy for his outstanding academic achievements and service to the community during the Diwali Festival of Lights Celebration. In addition to his impeccable academic record, Kshitij has been a prolific tutor in our College's tutoring program and lead guitarist of the Night Shift who rocked our campus at last year's Earthstock festival.

Mechanical Engineering graduate student and former President of Stony Brook University's Motorsports Team, **Jean Christian Brutus**, was chosen as one of twenty-five Society of Automotive Engineers (SAE) International student leaders to participate in the annual Leadership Development Program. The program recognizes some of the most promising students, who have exhibited outstanding leadership skills through SAE activities on campus.



**Polly Lo**, a Mechanical Engineering major, traveled to Kanpur India last summer to perform research on composite materials at the Indian Institute of Technology in Kanpur as part of an International Research and Education in Engineering (IREE) award from the National Science Foundation that her undergraduate research advisor, **Dr. Chad Korach** in our Department of Mechanical Engineering received. The NSF-IREE program is designed to provide early career researchers exposure to research methods and practices in engineering at locations outside of the United States as part of training a global engineering workforce for the 21st century. Only 5% of all U.S. engineering students take part in overseas study during their academic career. Over 100 IREE awards were made for the 2007-2008 fiscal year and application to the program is limited to current NSF award PI's.





## CEAS Students



The newly re-established **Stony Brook Solar Boat Team** has successfully competed in the 2009 Solar Splash Competition at Lake Fayetteville Arkansas. This was the team's first competition in nearly a decade and they have already attracted funding from several donors including Arkwin Industries, IEEE, ASME, AERTC, Eastern Energy Systems and Fairchild Semiconductors.

Two students in our Chemical and Molecular Engineering major placed first in the 2008 American Institute of Chemical Engineers AiCHE Conference research paper competition. CME students **Courteney Cannon** (pictured) and **Anna Gromadzka**, along with **Lenny Slutsky**, and **Lourdes Collazo** won the honors for their paper on *Designing Scaffolds with Optimal Chemical and Physical Properties for Tissue Engineering*.



**Christina Kalarickal**, a major in Chemical and Molecular Engineering mentored three high school students whose projects were selected from among 1200 other projects as Mid Atlantic finalists in the *SIEMENS Westinghouse competition*. Christina and her students researched the factors which affect formation of methane hydrate in the ocean bottom. Christina will continue this project for her senior thesis.

Computer Engineering major **Miguel Lopez** recently became a co-author with his mentor, **Dr. Daniel Knopf** of the School of Marine & Atmospheric Sciences (SoMAS), on a Physical Chemistry Chemical Physics publication entitled *Homogeneous ice freezing temperatures and ice nucleation rates of aqueous ammonium sulfate and aqueous levoglucosan particles for relevant atmospheric conditions*.

Seven students from CEAS were chosen to attend the 2008 *Campus de Excelencia* at the University of Las Palmas de Gran Canaria in the Grand Canary Islands, Spain. The Campus provides a forum for young innovators to interact with established scholars, researchers, heads of state, Nobel laureates and other international leaders. The goal of the Campus is to forward international scientific knowledge, cultural, political, economic and entrepreneurial development, thereby responding to the challenges, as a global community, we currently face. The students attending with **Dean Yacov Shamash** were **Kimberly Bunchuck** and **Marc Niola** in Technology and Society, **Jacob Levine** in Biomedical Engineering, **Noah Machtay** and **Roosevelt Moreno Rodriguez** in Mechanical Engineering, **Vibha Mane** in Electrical Engineering, and **Ning Zhang** in Materials Science and Engineering.

Pictured from left to right, Associate Dean Imin Kao, Students N. Machtay, R. Moreno Rodriguez, K. Bunchuck, J. Levine, V. Mane and Dean Yacov Shamash



Our Society for Hispanic Professional Engineers has established a junior chapter in Brentwood High School, Long Island. The SHPE members provide mentoring to high school students interested in the STEM fields. With the guidance of CEAS academic advisor **Jennifer Dellaposta**, the students have also hosted a *Night of the Sciences*, bilingual information sessions on college applications and financial aid for students and parents, and have created a scholarship fund to help motivated high school seniors make their college aspirations come true.





# The College of Engineering

## Scholarships



Congratulations to the following CEAS students who have won continuing scholarships since our last report. Recipients of these scholarships must demonstrate exceptional academic achievement as well as demonstrate innovative research, dedicated community service or extraordinary leadership to qualify for specific awards. The College of Engineering & Applied Sciences also thanks our generous donors who make these scholarships possible!

**Placido Acevedo**, Computer Engineering  
*The Kenneth Short Computer Engineering Scholarship (2008)*

**Jean Clifford Brutus**, Mechanical Engineering  
*The Arkwin Industries, Inc. Scholarship (2009)*  
*The Rahsaan T. Jackson Memorial Scholarship for Extraordinary Achievement (2009)*

**Kuen Cheng**, Applied Mathematics & Statistics  
*The Srivastav, Tucker & Weitzman Undergraduate Scholarship in Applied Mathematics & Statistics (2008)*

**Nizar Chrabek**, Applied Mathematics & Statistics  
*The Applied Mathematics & Statistics Memorial Scholarship (2009)*

**Abhishek Das**, Computer Engineering  
*The Kenneth Short Computer Engineering Scholarship (2009)*

**Wenyi Dong**, Applied Mathematics & Statistics  
*The Srivastav, Tucker & Weitzman Undergraduate Scholarship in Applied Mathematics & Statistics (2009)*

**Michael Espinoza**, Mechanical Engineering  
*The Arkwin Industries, Inc. Scholarship (2009)*

**Anna Gromadzka**, Chemical & Molecular Engineering  
*The Curtiss-Wright Centennial of Flight Scholarship (2008)* & *the Rahsaan T. Jackson Memorial Scholarship for Extraordinary Achievement (2008)*

**Philip Haasnoot**, Mechanical Engineering  
*The Joan Kenny Memorial Scholarship (2008)*  
*The Arkwin Industries, Inc. Scholarship (2008, 2009)*

**Arieh Hammer**, Mechanical Engineering  
*The Northrup Grumman Scholarship (2008)*  
*The Rahsaan T. Jackson Memorial Scholarship for Extraordinary Achievement (2008)*

**Nina Han**, Applied Mathematics & Statistics  
*The Weinig Foundation Scholarship (2009)*

**Ibtisam Haque**, Computer Science & Applied Mathematics & Statistics  
*The Weinig Foundation Scholarship (2008)*  
*The Cascade Water Service Scholarship (2009)*

**Andre Hinds**, Electrical Engineering  
*The Weinig Foundation Scholarship (2008)*

**Medhi Itratni**, Mechanical Engineering  
*The Society of Flight Test Engineers Scholarship (2009)*  
*and the Weinig Foundation Scholarship (2009)*

**Humera Khan**, Chemical & Molecular Engineering  
*The Weinig Foundation Scholarship (2009)*

**Russell Kraner**, Computer Science  
*The Metropolitan Club, Association of Old Crows Scholarship (2009)*

**Bret Kugelmass**, Applied Mathematics & Statistics  
*The Applied Mathematics & Statistics Memorial Scholarship (2008)*

**Laurent Lamothe**, Engineering Science  
*The Aeroflex Laboratories Scholarship (2009)*

**Ruiyao Li**, Applied Mathematics & Statistics  
*The Weinig Foundation Scholarship (2008)*

**Zhe Li**, Computer Engineering  
*The Kenneth Short Computer Engineering Scholarship (2009)*

**Jason Lolong**, Computer Engineering  
*The Kenneth Short Computer Engineering Scholarship (2008)*

**Crage Lu**, Applied Mathematics & Statistics  
*The Srivastav, Tucker & Weitzman Undergraduate Scholarship in Applied Mathematics & Statistics (2009)* & *the Weinig Foundation Scholarship (2009)*

**Jhonatan Matos**, Computer Science  
*The Data Device Corporation Scholarship (2009)*

**Glenn Melendez**, Mechanical Engineering & Technological Systems Management  
*The Arkwin Industries, Inc. Scholarship (2009)*

**John Meyer**, Mechanical Engineering  
*The Arkwin Industries, Inc. Scholarship (2008)*

**Margaret Miller**, Mechanical Engineering  
*The Arkwin Industries, Inc. Scholarship (2009)*

**Ashish Mody**, Applied Mathematics & Statistics  
*The Omnicon Group, Inc. Scholarship (2008)*

**Jon O'Rourke**, Information Systems  
*The Paine Webber Scholarship (2009)*

**Lemeng Pan**, Applied Mathematics & Statistics  
*The Robert J. & Kathryn B. Frey Applied Mathematics & Statistics Scholarship (2008)*

**Yifan Peng**, Computer Engineering  
*The Metropolitan Club, Association of Old Crows Scholarship (2009)*

**Michael Petroglia**, Mechanical Engineering  
*The Arkwin Industries, Inc. Scholarship (2008)*

**Randy Samaroo**, Mechanical Engineering  
*The Society of Flight Test Engineers Scholarship (2008)*

**Christopher Serano**, Mechanical Engineering  
*The Arkwin Industries, Inc. Scholarship (2008)*, *the Dayton T. Brown Scholarship (2009)*, *the Thomas Irvine Undergraduate Scholarship (2009)* & *the Weinig Foundation Scholarship (2009)*

**Manushi Shah**, Biomedical Engineering  
Engineering & Computer Science  
*The Omnicon Group, Inc. Scholarship (2008)*,  
*the Curtiss-Wright Centennial of Flight Scholarship (2009)* & *the Omnicon Group, Inc. Scholarship (2009)*

**Jun Jian Situ**, Applied Mathematics & Statistics  
*The Srivastav, Tucker & Weitzman Undergraduate Scholarship in Applied Mathematics & Statistics (2009)*

**Zaid Taleb**, Electrical Engineering  
*The Omnicon Group, Inc. Scholarship (2009)*

**Chaomin Tang**, Mechanical Engineering  
*The Arkwin Industries, Inc. Scholarship (2008)*

**Kshitij Tyagi**, Electrical Engineering  
*The Cascade Water Service Scholarship (2009)*, *the Frances & Velio Marsocii Scholarship (2009)* & *the Joan Kenny Memorial Scholarship (2009)*

**Gennaro Voccia**, Applied Mathematics & Statistics  
*The Robert J. & Kathryn B. Frey Applied Mathematics & Statistics Scholarship (2009)*

**WenLi Wang**, Applied Mathematics & Statistics  
*The Weinig Foundation Scholarship (2008)*

**Eric Yang**, Electrical Engineering  
*The Data Device Corporation Scholarship (2008)*

**Vivek Zilpewar**, Mechanical Engineering  
*The Dayton T. Brown Scholarship (2008)*,  
*The Thomas Irvine Undergraduate Scholarship (2008)*, & *the Weinig Foundation Scholarship (2008)*

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The Computer Science Honors Program has also recently received generous donations to establish multi-year scholarships from SBU alumni Dr. Cristian Mata, Applied Visions, Inc. and the Swartz Foundation. This year's recipients are **Jonathan Toohill**, **Christopher Weber**, and **Louis Sanchez** (respectively).

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In addition, we are grateful to add a new scholarship to our students next year through a generous donation from the Pall Corporation in support of an outstanding student in the Biomedical Engineering major and the Women in Science and Engineering program.

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# and Applied Sciences

## Programs and Disciplines

All of our Engineering and Computer Science programs are accredited by the Accrediting Board for Engineering technology (ABET). Each of our departments offer combined bachelors and masters degrees where students can earn both in an accelerated format.

### **Applied Mathematics and Statistics**

B.S. in Applied Mathematics and Statistics  
M.S. in Applied Mathematics and Statistics  
Ph.D. in Applied Mathematics and Statistics  
A.G.C. in Operations Research  
[www.ams.sunysb.edu](http://www.ams.sunysb.edu)

### **Biomedical Engineering**

B.E. in Biomedical Engineering  
M.S. in Biomedical Engineering  
Ph.D. in Biomedical Engineering  
A.G.C. in Biomedical Engineering  
[www.bme.sunysb.edu](http://www.bme.sunysb.edu)

### **Computer Science**

B.S. in Computer Science  
B.S. in Information Systems  
M.S. in Computer Science  
M.S. in Information Systems  
Ph.D. in Computer Science  
[www.cs.sunysb.edu](http://www.cs.sunysb.edu)

### **Electrical and Computer Engineering**

B.E. in Electrical Engineering  
B.E. in Computer Engineering  
M.S. in Electrical Engineering  
M.S. in Computer Engineering  
Ph.D. in Electrical Engineering  
Ph.D. in Computer Engineering  
[www.ece.sunysb.edu](http://www.ece.sunysb.edu)

### **Materials Science and Engineering**

B.E. in Engineering Science  
B.E. in Chemical and Molecular Engineering  
M.S. in Materials Science and Engineering  
Ph.D. in Materials Science and Engineering  
Industrial Cooperative Ph.D. Program  
[www.matscieng.sunysb.edu](http://www.matscieng.sunysb.edu)

### **Mechanical Engineering**

B.E. in Mechanical Engineering  
M.S. in Mechanical Engineering  
Ph.D. in Mechanical Engineering  
A.G.C. in Computer-Integrated Engineering  
[me.eng.sunysb.edu](http://me.eng.sunysb.edu)

### **Technology and Society**

B.S. in Technological Systems Management  
M.S. in Technological Systems Management  
Ph.D. in Technology, Policy, and Innovation (TPI)  
A.G.C. in Educational Computing  
[www.sunysb.edu/est](http://www.sunysb.edu/est)

### **Multidisciplinary Programs**

M.S. in Optoelectromechanical Systems Engineering (OEMS)  
M.S. in Systems Engineering

### **Stony Brook University**

[www.sunysb.edu](http://www.sunysb.edu)

### **College of Engineering and Applied Sciences (CEAS)**

[www.ceas.sunysb.edu](http://www.ceas.sunysb.edu)

### **Stony Brook University Corporate Education and Training**

[www.licet.org](http://www.licet.org)

### **Center of Excellence in Wireless Information Technology**

[www.cewit.org](http://www.cewit.org)

### **Advanced Energy Research and Technology Center**

[www.aertc.org](http://www.aertc.org)

### **Strategic Partnership for Industrial Resurgence**

[www.spir.sunysb.edu](http://www.spir.sunysb.edu)

### **Center for Thermal Spray Research**

[www.sunysb.edu/ctsr](http://www.sunysb.edu/ctsr)

### **NSF Garcia Center for Polymers at Engineered Interfaces**

[polymer.matscieng.sunysb.edu/](http://polymer.matscieng.sunysb.edu/)

### **New York State Center for Advanced Technology in Biotechnology**

[info.bio.sunysb.edu/biotech/](http://info.bio.sunysb.edu/biotech/)

### **New York State Center for Advanced Technology in Sensor Systems**

[www.sensorcat.sunysb.edu](http://www.sensorcat.sunysb.edu)

### **Women in Science and Engineering (WISE)**

[www.wise.sunysb.edu](http://www.wise.sunysb.edu)

### **CEAS Alumni**

[www.ceas.sunysb.edu/alumni\\_home.asp](http://www.ceas.sunysb.edu/alumni_home.asp)

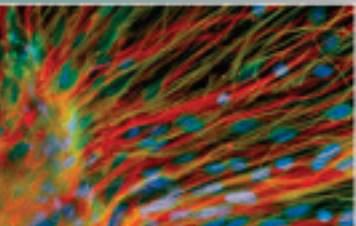
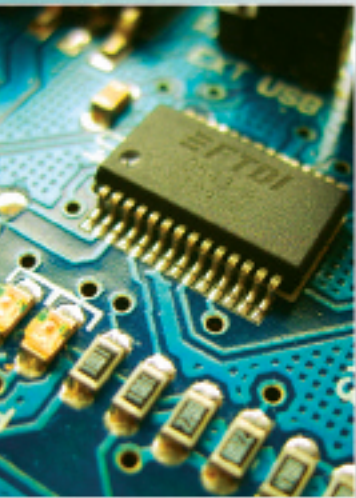


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### *CEAS Mission*

The mission of the College of Engineering and Applied Sciences is to provide: Comprehensive high quality undergraduate education; Advanced graduate education and research opportunities for graduate students and practicing professionals; Leading edge research programs that probe the frontiers of knowledge and contribute to the development of globally competitive economies, both regionally and nationally; Technology transfer that promotes industrial development, with particular emphasis on the needs of Long Island industry.

### *CEAS History*

Founded in 1960, the College of Engineering and Applied Sciences is home to seven academic departments: Applied Mathematics and Statistics, Biomedical Engineering, Computer Science, Electrical and Computer Engineering, Materials Science and Engineering, Mechanical Engineering and Technology and Society. The College aims to provide students with a solid foundation that prepares them to adapt successfully throughout their careers to advances in technology. Hands-on laboratory courses, the undergraduate internship program, and the senior design project provide practical experience in engineering that complements theoretical training. As of 2009, the college is home to about 2,000 undergraduate students, 1,000 graduate students, and a faculty of 148 engineers and applied scientists. It boasts more than 20,000 alumni.