Graduate Studies

Computer Science

STONY BROOK
STATE UNIVERSITY OF NEW YORK

Chair's and Directors' Message

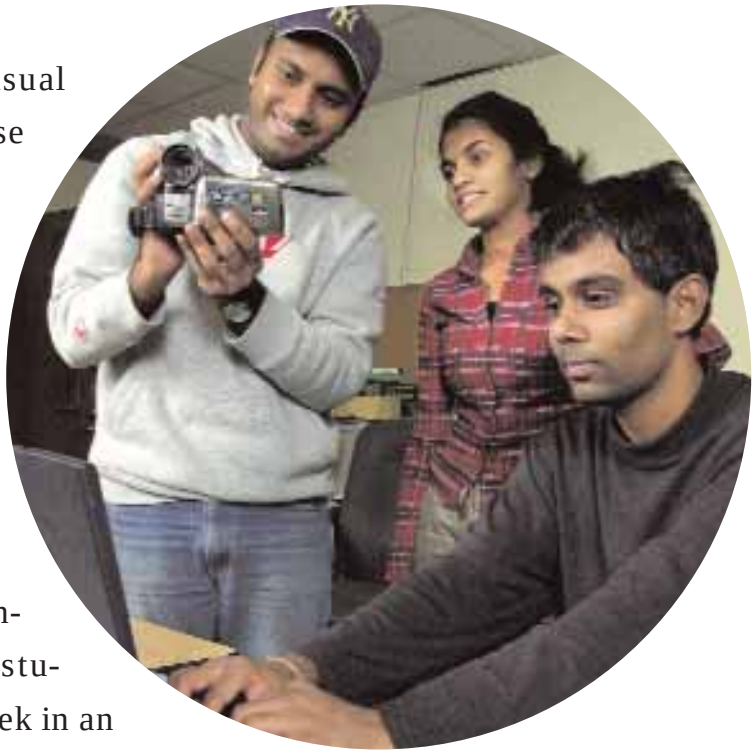
Arie E. Kaufman, Department Chair; Michael Kifer and I.V. Ramakrishnan, Graduate Program Directors; Samir R. Das, Graduate Academic Director

With recent rapid advances in hardware, software, and Internet technologies, Computer Science has become one of the most exciting and dynamic research areas, one that seems ready to affect the lives of everyone. The Department of Computer Science at Stony Brook University is one of the forces helping to advance the future of these technologies. Our graduate program is consistently ranked in the top quarter of research departments in the United States. The program has a faculty of more than 40 and has grown significantly in the past few years. Our annual research expenditure is several million dollars annually and increasing rapidly. The department graduates several hundred students per year, including more than 80 graduate students. Our graduates hold prominent professorships in such institutions as Cornell University, Georgia Tech, Harvard University, Stanford University, University of Illinois at Urbana-Champaign, and Yale University. Many graduates continue into industry, and hold prominent positions with the research laboratories of Alcatel-Lucent, AT&T, Google, HP, IBM, JPL-Cal Tech, MERL, Microsoft, Motorola, NEC, Siemens, and Sony. Some have become leaders of professional societies, presidents of universities, department heads, and CEOs of successful companies.

FACULTY PROFILES, PAGE 9
Professor I.V. Ramakrishnan confers with graduate students in the Applied Logic Lab.

The department's approach is to build a "critical mass" in many important research areas, thereby ensuring the positive effects of research results obtained through collaboration with colleagues. The most significant of these areas include Algorithms and Complexity, Applied Logic and Information Systems, Concurrency and Verification, Computer Systems and

Networks, Security, and Visual Computing. The faculty in each of these areas has been recognized internationally for their contributions to their respective fields.



PROGRAM DESCRIPTION, PAGE 2
Doctoral students test a wireless video network in the Experimental Computer System Lab.

Naturally, there is much overlap between areas, and these research groups are largely informal. The collegial atmosphere and the culture of the department have always encouraged interaction and an open-door policy. In particular, faculty and students all gather at the end of every week in an informal social hour in the main hall of the office area. With plenty of physical space to grow in the new facility of the Center of Excellence in Wireless and Information Technology (CEWIT) and in the planned new Computer Science building, we always welcome new talent to work with us.

We also foster collaboration with other departments at the University and with other Long Island research institutions, such as Brookhaven National Laboratory and Cold Spring Harbor Laboratory. We regularly host seminars featuring prominent national researchers through our very popular Distinguished Lecture Series. The graduate program in Computer Science at Stony Brook provides an outstanding environment to pursue graduate studies and research.

To learn more about us, read through this brochure, and then visit *www.cs.stonybrook.edu.*

RESEARCH FACILITIES, PAGE 4
The planned new Computer Science building will add laboratory and office space for continued growth.

Program Description

The program gives students a rigorous and thorough knowledge of a broad range of theoretical and practical research subject areas, and develops their ability to recognize and pursue significant research in computer science.

The department offers graduate programs leading to the M.S. and Ph.D. degrees in Computer Science. The M.S. program is designed primarily to train students with professional goals in business, industry, or government. The program concentrates primarily on applied computer science, emphasizing software development, programming, computer systems, and applications. With either the thesis or the project option, each student is given the opportunity to work on a large-scale software or system development project involving analysis, design, evaluation, and implementation. While most M.S. students do not receive financial support from the department, many of them find jobs and internships around the University. Some students with special qualifications are indeed appointed as teaching or research assistants in the department.

The Ph.D. program is for students interested in obtaining academic or research positions in universities or in government or industrial research laboratories. The program gives students a rigorous and thorough knowledge of a broad range of theoretical and practical research subject areas, and develops their ability to recognize and pursue significant research in computer science. Nearly all students in the Ph.D. program are supported as teaching assistants in the first year, typically followed by a research assistantship on funded projects thereafter. The distinction between the M.S. and the Ph.D. programs is not necessarily hard and fast; students enrolled in the M.S. program can and often do apply for admission to the Ph.D. program.

Professor George Hart creates computer-aided sculptures by novel 3-D modeling computational geometry, algorithims, and advanced manufacturing technologies.

RESEARCH AREAS

Algorithms and Complexity

This group does research in algorithms and data structures, computational biology, computational complexity, computational geometry, game theory, computational finance, complexity theory, string processing, graph and network algorithms. In addition to our theoretical contributions, we have a strong record of developing widely used systems for combinatorial computing, computer graphics optimization, and parallel-processor scheduling. This group includes Arkin, Bender, Gao, Hart, Ko, Kuszmaul, Mitchell, Ortiz, and Skiena.

Applied Logic and Information Systems

This research group spans the areas of databases, data mining, logic programming, programming languages, Web information systems, medical informatics and deductive systems. The group includes one of the largest and finest applied logic groups in the world, which attracts international visitors. XSB, developed by the group, is a widely used deductive database/Prolog engine. FLORA-2, a deductive engine for the Semantic Web, is another popular project. Other important work includes tools for creating intelligent Web agents and automation of inference systems. Deductive calculi proposed by members of the group have been adopted in many state-of-the-art theorem-proving systems and were a key in the automated proof of the Robbins conjecture, a long-standing open mathematical problem. Faculty members in this group are professors Bachmair, Gupta, Kelly, Kifer, Liu, Ortiz, C.R. Ramakrishnan, I.V. Ramakrishnan, Warren, Wasilewska, Zhao, and Zhu.

Concurrency and Verification

The Concurrency and Verification group investigates methods for constructing reliable, robust, and secure concurrent and distributed systems. These methods are being used to verify

Professor Amanda Stent and a graduate student evaluate a speech recognition application in the Natural Language Processing Lab.

the correctness of a number of safety-critical systems, communication protocols, and e-commerce protocols, as well as security properties of distributed systems. Primary industrial partners include ADEMCO, Computer Associates, Northrop Grumman, and Reuters International. Faculty members in this group are Bernstein, Grosu, Lewis, C.R. Ramakrishnan, I.V. Ramakrishnan, Smolka, Stark, Stoller, and Warren.

Computer Systems and Networks

The Computer Systems and Networks faculty work on many aspects of computer systems and networks. Current areas of interest include: parallel computing, computer architecture, network protocols, wireless networks and mobile computing, sensor networks and embedded systems, file systems and storage, distributed systems, large-scale data management, databases, multimedia systems, interconnection networks, program analysis and optimization, compilers, software testing and verification, fault tolerance, and more. The Computer Systems and Networks faculty includes Badr, Chiueh, Das, Gao, Gupta, Jiao, Kuszmaul, Sekar, Sion, Smith, Stoller, Wittie, Wang, Wong, Yang and Zadok.

Security

The Security group at Stony Brook is recognized as one of the leading groups in computer systems and network security research nationally and internationally, and attracts visiting researchers from around the world. The group's research areas include: language-based security, detection and mitigation of software vulnerabilities, trust management, formal methods for security assurance and vulnerability analysis, intrusion detection, storage security, privacy-preserving data warehousing, security monitoring and regulatory compliance, and authentication and access control techniques for multimedia and next generation web technologies. Research on these problems emphasizes a cross-disciplinary approach that draws on expertise in compilers, operating systems, networks, databases, programming languages, formal methods, fault-tolerance, algorithms, and cryptography. The group members include Professors Chiueh, Johnson, Liu, C.R. Ramakrishnan, Sekar, Sion, Stoller, and Zadok.

Visual Computing

The Center for Visual Computing is an internationally recognized center dedicated to research, industrial interaction, and education in the technology of and applications for digital images and computer-human interaction. Recent software tools developed by the Center include: VolVis for volume visualization (disseminated to more than 3,500 sites), and Virtual Colonoscopy for navigating in a reconstructed 3-D model of the colon for cancer screening, BrainMiner for visual data exploration of the brain, and RapidCT for real-time Computed Tomography using graphics hardware (GPUs). The Center pioneered several architectures; the most recent has been the Cube-4 for real-time high-resolution volume rendering, which has been commercialized by Mitsubishi Electric as the VolumePro board—the first such hardware for the PC. Faculty in this group includes Berg, Brennan, Chiueh, Gu, Hart, Jiao, Kaufman, Liang, Mitchell, Mueller, Pavlidis, Qin, Samaras, Scarlatos, Stent, Vasilescu, Zelinsky, and Zhu.

Computer Science Education

Apart from research, furthering computer science education is another important part of the departmental agenda. Many faculty members have written books and developed educational software and Web-based material that is in use in hundreds of classrooms around the world. This group of distinguished faculty includes professors Bachmair, Bernstein, Ferguson, Grosu, Kaufman, Kelly, Kifer, Ko, Lewis, Pavlidis, C.R. Ramakrishnan, Skiena, Smolka, Smith, Warren, and Zadok.

Students working in the Visualization Lab.

Research Facilities

The Center for Excellence in Wireless and Information Technology (CEWIT) building.

The Computer Science laboratories and department offices are headquartered in the Computer Science Building, which has more than 20,000 square feet of lab space. In addition, plans are being drawn for a new state-of-the-art Computer Science building extension. A separate building for the Center of Excellence in Wireless and Information Technology (CEWIT) with about 100,000 square feet of laboratory space has recently opened. Many computer science research projects have significant laboratory space in this building.

The department's main backbone network runs on Gigabit Ethernet with a backbone bandwidth of 2.6GB/sec, and is connected to the Internet via a 100Mbps network connection. Stony Brook has dual OC12 connections to the Internet and connectivity to Internet 2. We provide secure WiFi (802.11n) wireless network access in the department. Public facilities include desktop workstations in student offices, a lab where students may connect their personal laptop to the Internet and two public labs with workstations. Graduate students have access to a dedicated lounge, study room, and a game room. Ph.D. student offices contain a workstation on every desk. Students can access several printers (color and black/white), copier machines, scanners, and fax machines.

The department includes a computer cluster for CPU-intensive jobs, as well as many dedicated servers: an application server, Web server, Database server, FTP server, e-mail, virus detection/Antispam, software distribution, backup and more. The public facilities provide access to hundreds of software packages (Unix and Windows), many of which are commercial. We have three major research centers and a number of well equipped research labs, described later in this section. Student members of these labs each have a dedicated workstation on their desk. The labs cumulatively provide the following: thousands of software packages running on more than a dozen operating systems, including Linux, Windows, Mac OS-X, Solaris, BSD, and more; over 200 Terabytes of disk space; wireless and Gigabit networks; and hundreds of machines from various architectures, ranging from small wireless handhelds and laptops, and desktops to server-class systems and a super-computer class system. Researchers have access to a 36864-processor IBM Blue Gene/L massively parallel supercomputer of the New York Center for Computational Sciences (NYCCS). The facilities are almost continuously updated as new systems come out and research thrusts evolve. Visit *www.cs.stonybrook.edu/facilities/research* for specific details concerning our facilities.

A student creating a MIDI beat track in the Multimedia Lab.

Research Centers

The **Center of Excellence in Wireless and Information Technology's** (CEWIT) mission is to keep the New York area in the forefront in wireless and information technologies by conducting innovative research and development and by fostering public-private partnerships, regional enterprises, and commercialization. Since its inception several years back, the center has been engaged in several ground breaking projects, many in partnerships with local industry. The center's activities include, for example, wireless networking, sensor networks, pervasive and ubiquitous computing, cyber-security, homeland security, graphics and visualization, simulations, data mining, e-commerce, software for healthcare, telemedicine, biomedical computing, computational neuroscience. This center has more than $200 million of funding, with $50 million coming from New York State for capital facilities, including a building with state-of-the-art laboratories. While CEWIT is a central research and development enterprise to the university, the faculty and students in the Computer Science Department are significantly engaged in the center's activity.

The mission of the **Center for Cyber Security** (CCS) is to advance research and education in computer, network, and information security and assurance. Research at the Center is carried out by over a half-dozen faculty and about 40 graduate students. Current research areas include: language-based security, detection and mitigation of software vulnerabilities, trust management, formal methods for security assurance and vulnerability analysis, intrusion detection, storage security, privacy-preserving data warehousing, security monitoring and regulatory compliance, and authentication and access control techniques for multimedia and next generation web technologies. Research on these problems emphasizes cross-disciplinary approaches founded on principles from compilers, operating systems, networks, databases, programming languages, formal methods, fault-tolerance, algorithms, and cryptography. CCS is an NSF-designated Center for Industry/ University Collaborative Research, and has been an NSA-designated Center of Excellence since 2002. Notable educational programs at the Center include academic specializations in information assurance at the graduate and undergraduate levels, and an NSF-sponsored scholarship program to support domestic students in cyber security.

The **Center for Visual Computing** (CVC) advances visual computing studies and computer-human interaction at Stony Brook, promotes research and education in visual computing, collaborates with industry, and fosters interdisciplinary interaction. Visual computing research activities include: visualization, computer graphics, image processing, computer vision, medical imaging, virtual reality, user interfaces, visual perception, visual analytics, geometric modeling, computer-supported collaborative work, computer-aided design, multimedia, and computational geometry. Research at the center is conducted by about a dozen faculty and more than 40 graduate students and post-docs.

The department is also affiliated with two new centers:

The **New York Center for Computational Sciences** (NYCCS) is a joint venture of Stony Brook University and Brookhaven National Laboratory (BNL). The Center was formed to foster high-performance massively parallel computing on a whole range of science and technology topics. Its hardware consists of an 18-rack IBM Blue Gene/L supercomputer with a total of 36,864 processors and 18.4 TB of memory and a peak performance of 103.22 teraflops. The machine, named New York Blue, was in fifth place on the June 2007 Top 500 supercomputing rankings.

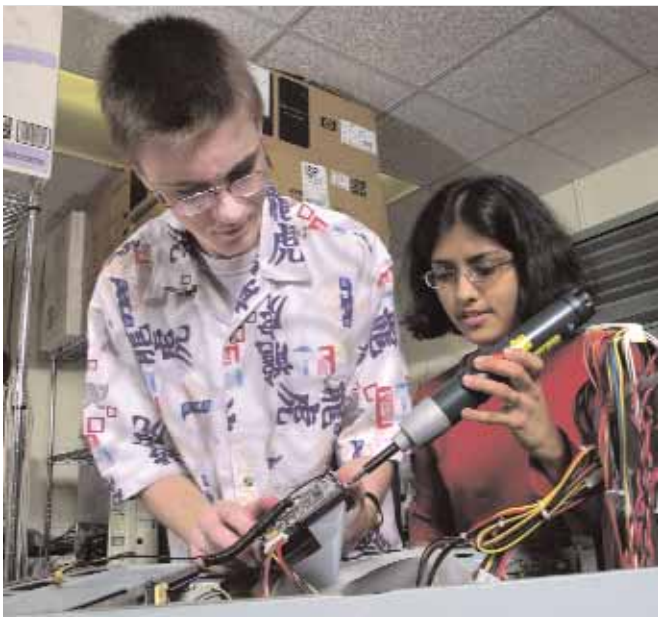
The **Consortium for Digital Arts, Culture, and Technology** (cDACT) is a joint venture of the departments of Computer Science, Art, Music, Comparative Literary and Cultural Studies and Performing Arts to promote digital media education, research, and creativity.

Research Laboratories

The research laboratories are run by individual faculty members or small groups of faculty members to support their respective research areas.

Professor Steve Skiena working with students in the Applied Algorithms Lab.

Applied Algorithms Lab conducts both theoretical and experimental research in string, graph, combinatorial, and geometric algorithms. Application areas include computational biology, finance, text processing, scheduling, and manufacturing. Recent projects include news/blog processing (*www.textmap.com*), DNA sequence assembly, synthetic virus



Graduate students work on a server upgrade in the File Systems and Storage Lab.

design for vaccines, multiprocessor scheduling, and cache-oblivious data structures.

Applied Logic Lab studies the principles and applications of logic-based methods in databases, verification of concurrent systems, data mining, agent-based systems, and Web information systems. Members of the Lab are engaged in three major projects: FLORA, a declarative object-oriented language for programming knowledge-intensive applications; The LMC (Logic Programming-Based Model Checking); and XSB, a high-performance logic programming and deductive database system.

Concurrency and Verification Lab conducts research in, and creates integrated toolsets for, the specification, simulation, verification, and implementation of concurrent systems such as communication protocols and process control systems. Past accomplishments include the development of the Concurrency Factory, Concurrency Workbench; and PIOATool suites; and the modeling and verification of real-life applications such as the Rether real-time Ethernet protocol and the Java virtual machine meta-locking algorithm.

Design and Analysis Research Lab (DAR) develops methods and tools for constructing reliable and efficient computer systems. The lab has projects in modeling and specification, analysis and verification, design and optimization, code generation, and testing. These projects are for computer security, reactive systems, embedded systems, database applications, and Web information retrieval.

Experimental Computer Systems Lab performs research in computer systems areas including networking, media processing, distributed systems, operating systems, computer and network architectures, and database. Among the projects are: Rether, a real-time protocol; Ethereal, a real-time Ethernet switch; and the Stony Brook Video Server (SBVS), an Ethernet-based distributed video server that can function over a LAN.

File-Systems and Storage Lab performs research in operating systems including file systems and storage, security, and networking. An emphasis is placed on balancing system security, performance, and usability; improving portability of operating system code; improving programmer and system administrator productivity; and compiler-based techniques to improve the software engineering of operating systems. Past projects include FiST, a comprehensive portable stackable file system; a cryptographic file system; versioning file system; a unification file system (Unionfs); a virus-detection file system; a tracing and replaying file system; and more. Additional projects include an assortment of GCC plugins for static and dynamic analysis.

Geometric and Graphical Modeling Lab shares the computing infrastructure and desktop equipment of the Center of Visual Computing. Current research topics span CAGD, CAD/CAM, geometric algorithms, graphical and visual modeling, physics-based simulation and animation, shape deformation and reconstruction, finite element simulation and analysis, haptic interface, reverse engineering, medical imaging, and other applications in graphics, vision, and scientific visualization.

Graphics Hardware Lab provides a workspace and the tools necessary for the assembly of processors and graphics emulators designed by the Center for Visual Computing to further the Center's research. Examples of such emulators are the ones used in the Cube project, the vg500 rendering engine, and eye tracking device.

Human-Computer Interaction Lab is dedicated to experimental research in human-computer interaction, including evaluations of the systems emerging from the Natural Language Processing and Applied Logic Labs.

Image Analysis Lab focuses on 3D computer vision problems such as shape reconstruction; illumination and reflectance estimation and representation; deformable models; 3D tracking, object recognition; and image-based modeling. Application areas include human-computer interaction (face recognition and face and hand tracking) and biomedical applications, such as 3D brain sequence analysis. The lab, which shares the Center of Visual Computing (CVC) infrastructure, has a dynamic (30Hz) 3D face scanner, and shares a Cyberware 3D scanner, a high-speed (1000Hz) camera, a number of high-end Pentium PCs and state-of-the-art conventional and stereo CCD cameras.

Information Systems Lab develops tools and techniques to improve the use and analysis of data in clinical settings. One current project is a system to apply rules to identify previously undetected clinical findings and candidates for clinical trials, prior to patient discharge in the Emergency Department. Other projects include the Universal Medical Monitor, a software interface to medical monitors, and the Anesthesia Record Keeper, a system to record and analyze clinical data associated with operating room cases.

Natural Language Processing Lab performs research in natural language processing, including spoken and multimodal dialog systems, natural language generation, corpus linguistics, reference resolution, and automatic question answering. Systems coming out of the lab include the Stony Brook Rate-a-Course system, the Stony Brook Raven Calendar system, and the SBU-QA system. Members of the NLP lab work with the Applied Logic Lab and the Algorithms Lab.

NET Lab conducts research on massively parallel computing networks; simulation of ultra-fast (PetaByte/sec) computer networks and massively parallel computer data exchanges; memory latency reduction in parallel RSFQ superconducting computers; grid computing; super compilation of Java programs; and extraction of gene expression cascade trigger events.

Professor Rob Johnson leads a discussion with students in the Security, Programming Languages, and Theory (SPLAT) Lab.

Network Security and Applied Cryptography Lab (NSAC) builds systems and develops strongly secure information assurance mechanisms to make the world a better place. NSAC is interested in real, practical problems for which efficient solutions can be provided. Instances of research areas include regulatory-compliant systems, secure data outsourcing, security in wireless and sensor networks, queries/searches over encrypted data, secure networked storage with privacy, security policies in computation/data grids, and digital rights management. NSAC is affiliated with the Center for Cyber Security.

Secure Systems Laboratory conducts research aimed at advancing the security and resilience of practical, large-scale software systems and networks. Ongoing research involves source- and binary-code analysis; instrumentation and transformation techniques for software vulnerability remediation; safe execution of untrusted software; proactive and comprehensive malware defense using OS-, network- and application-layer techniques; new models, algorithms and learning techniques for automated detection, signature generation and filtering of attacks in high-speed networks; and virtual networks for safe, large-scale security experiments.

Security, Programming Languages, and Theory Lab (SPLAT) explores new security attack and defense technologies, program analysis and transformation techniques, and other algorithmic and theoretical problems. Projects include new technologies for protecting blogger privacy, tools for automatically finding bugs in software, a distributed worm defense system, methods for authenticating digital photographs, and cryptographic attacks on Digital Rights Management systems.

Trusted Hardware Lab (THL) constitutes a central academic expertise and research knowledge repository on secure hardware, a nationwide first of its kind. It will support community-wide educational and research activities, and provide direct hands-on or networked access to remote or visiting research community members. The lab is sponsored by NSF, IBM Research, the IBM Cryptography Software Group and others. THL is affiliated with the Network Security and Applied Cryptography Lab as well as with the Center for Cyber Security.

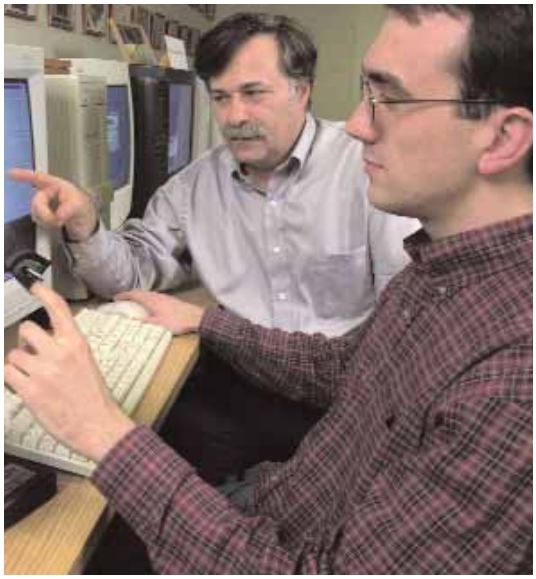
The mission of the **Virtual Reality Lab** is to develop virtual reality systems for various design and testing applications such as mechanical CAD fly-throughs, architectural walk-throughs, medical diagnosis, and biomolecular drug design. The lab provides access to unique hardware such as 5-wall immersive room, immersive workbench, haptic feedback, 3D audio, head-mounted displays, 6D spaceball, VPL data glove, flying mouse, Isotracks, and a Wacom digitizing tablet.

The **Visualization Lab** develops rendering techniques for use in scientific and information visualization applications. Among the projects are architectures for volume rendering, volume rendering of regular and irregular grids, GPU-accelerated scientific computing and visualization, flow and vector field visualization, visual analytics and data mining, methods for volumetric data acquisition, cognitive and perceptional aspects of visualization, computed tomography, and other medical imaging applications.

A student tries out a rendering technique in the Visualization Lab.

The **Wireless Networking and Simulation Lab** (WINGS) is engaged in research on wireless networks, including wireless LANs; wireless ad hoc, mesh and sensor networks; and vehicular networks. The laboratory has a cluster of high-end Linux workstations on a high-speed interconnect for simulation studies. It also has a large number of various commodity wireless networking systems including laptops and palmtops with wireless interfaces, various wireless access points, embedded platforms with wireless interfaces, and also a sensor network testbed.

Our Distinguished Faculty



Distinguished Professor Arie Kaufman works with a doctoral student on a haptic interface in the Center for Visual Computing.

The Department of Computer Science boasts an internationally renowned faculty that is actively involved in the academic and research community in numerous ways. Professors Bernstein, Kaufman, Lewis, Liang, Pavlidis, and Warren have been appointed to the highest level of honor as Fellows of IEEE and/or ACM. Professors Das, Kaufman, Kifer, Ko, Mitchell, Pavlidis, Skiena, Smolka, Qin and Warren have set high standards in their respective fields by acting as editors-in-chief and/or editors of major computer science journals, with Kaufman and Warren having served as heads of their professional organizations. Mitchell received the U.S. National Science Foundation's Presidential Young Investigator Award. Chiueh, Das, Gao, Grosu, Gu, Mueller, C.R. Ramakrishnan, Stoller, Qin and Zadok have received the U.S. National Science Foundation's CAREER award. Skiena and Stoller have received the ONR Young Investigator award. Qin has received the Sloan Research Fellowship. Chiueh, Mitchell, Skiena, and Wasilewska have received the Fullbright Scholarship. Zadok received the IBM Faculty Award twice.

Furthering computer science education is another important mission of the department. Many of our faculty members have written books, and Professors Kifer, Skiena, Smolka, and Warren have developed award-winning educational software. Professors Arkin, Badr, Bender, Chiueh, Kelly, Mitchell, Mueller, Skiena, Stark, and Zadok have received major education or teaching awards. Most of all, our faculty members contribute to the field through teaching the scientists and educators of tomorrow.

Finally, our faculty members have made extensive contributions to the computer science research community. Notable recognitions include: Pavlidis receiving the King-Sun Fu Prize in pattern recognition, Kaufman receiving the IEEE Visualization Career Award and the New York State Entrepreneur Award for developing virtual colonoscopy, Kifer twice receiving the ACM SIGMOD Test of Time Award for the most impact over the past decade, Bender receiving the R&D 100 award for scheduling in parallel computers, and Vasilescu being named by MIT's *Technology Review* Magazine in their TR100 list of top young innovators.

ESTHER M. ARKIN, Professor

Ph.D. 1986, Stanford University

Esther M. Arkin received her B.S. in Mathematics from Tel-Aviv University in 1981, and her M.S. and Ph.D. in Operations Research from Stanford University in 1983 and 1986. After five years on the faculty at Cornell University's School of Operations Research and Industrial Engineering, she joined the faculty at Stony Brook in 1991, where she is now Professor of Applied Mathematics and Statistics and a Research Professor of Computer Science. Arkin has won several awards for excellence in teaching, as well as NSF awards and grants for research. Her research interests are the design and analysis of algorithms for a variety of fields, including computational geometry, graphs, network optimization, scheduling, and pattern recognition.

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LEO BACHMAIR, Professor

Ph.D. 1987, University of Illinois at Urbana-Champaign

Computational logic studies the computational aspects of logical formalisms and their application to computer science, such as specification and verification, databases, and artificial intelligence. The focus of Leo Bachmair's research has been on automated reasoning, the investigation of the mechanization of deductive inference systems, and search methods fundamental to these applications. In particular, Bachmair has studied logical systems with equality essential in computing applications and developed new deductive calculi that have been implemented in state-of-the-art theorem-provers. Bachmair and his colleagues have also introduced the "inference system cum proof ordering" methods to the study of term rewriting-based approaches to equational reasoning. His more recent work has been aimed at developing the methodology of saturation theorem proving and a formal notion of redundancy in proof search that covers special ad-hoc techniques used in most theorem provers. These methods led to improvements in theorem-proving technology, and were a key in the proof of a long-standing open problem in mathematical logic, the Robbins conjecture, by a mechanical theorem-prover.

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HUSSEIN G. BADR, Associate Professor

Ph.D. 1981, Pennsylvania State University

Hussein Badr specializes in the modeling and performance evaluation of computer systems with a focus on computer networks. His research activities center on network traffic analysis and end-to-end protocols. He holds awards for published research (Joint Performance/SIGMETRICS Conference), for Excellence in Teaching (CEAS, Stony Brook University), and for Service to Education (Stony Brook University). Badr joined the Department of Computer Science in 1981. He holds degrees from the University of Edinburgh, Scotland (B.Sc. in Computer Science, 1974) and Pennsylvania State University (M.S. in Computer Science and Operations Research, 1976; Ph.D. in Computer Science, 1981).

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MICHAEL A. BENDER, Associate Professor

Ph.D. 1998, Harvard University

Michael Bender conducts research in the algorithmic aspects of computer science, with a focus on scheduling, parallel computing, data structures, and algorithms for massive data sets. Bender is particularly interested in cache-oblivious algorithms, that is, platform independent algorithms running nearly optimally on all memory hierarchies. He uses such algorithms to accelerate databases and file systems. Bender also studies scheduling problems in a variety of application areas. For example, he developed a processor scheduling and allocation algorithm, in collaboration with Sandia National Labs, which has been commercially licensed and is being used on supercomputers around the country. Bender has received several awards, including an R&D 100 Award for his work on scheduling in parallel computers, and three awards for both graduate and undergraduate teaching. He has held Visiting Scientist positions at both MIT and King's College, London. Bender received his B.A. in Applied Mathematics from Harvard University in 1992 and obtained a D.E.A. in Computer Science from the Ecole Normale Superieure de Lyon, France in 1993. He completed a Ph.D. on Scheduling Algorithms from Harvard University in 1998.

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TAMARA L. BERG, Assistant Professor

Ph.D. 2007, University of California, Berkeley

Tamara Berg's main research area is Digital Media, specifically focused on organizing large collections of images with associated text through the use of techniques from Natural Language Processing and Computer Vision. Today billions of images with associated text are available in web pages, captioned photographs from news sources, video with speech or closed captioning, and others. In order to organize, search and exploit these enormous collections she has developed methods that combine information from both the visual and textual sources effectively. Her past projects include: automatically identifying people in news photographs, classifying images from the Web, and finding iconic images in consumer photo collections. She is generally interested in bringing together people and expertise from various areas of Digital Media including digital art, music, and cultural geography. Berg is affiliated with the Stony Brook Consortium for Digital Arts, Culture, and Technology (cDACT).

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ARTHUR BERNSTEIN, Professor Emeritus

Ph.D. 1962, Columbia University

Arthur Bernstein earned a Ph.D. in Electrical Engineering from Columbia University in 1962. He was a member of the faculty of Princeton University and a research scientist at the General Electric Research Laboratory, where he was a designer of an early time-sharing system. His research interests are in the general area of concurrency. His most recent project concerned transaction processing and the use of formal methods in improving the performance of transaction processing systems and demonstrating their correctness. This has led to an interest in the protocols and transactional aspects of electronic commerce. Bernstein has co-authored a graduate text titled Concurrency in Programming and Database Systems and is co-authoring a text on databases and transaction processing systems. He has written numerous research papers and is a Fellow of the IEEE.

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SUSAN BRENNAN, Associate Professor

Ph.D. 1990, Stanford University

Susan Brennan holds joint appointments in Psychology and Computer Science, and is also affiliated with the Department of Linguistics. She received her doctorate from Stanford University in Cognitive Psychology and her master's degree from MIT's Architecture Machine Group, where she worked on computer-generated caricatures and teleconferencing interfaces. She has conducted research in natural language processing and human-computer interaction at Atari, Apple, and HP Labs. She uses behavioral and eye-tracking techniques to study the interpretation, production, and adaptation of spontaneous speech in interactive settings. In addition to mentoring graduate students with interests in cognitive science, Brennan teaches cognitive psychology, psycholinguistics, and human factors to undergraduates. Recent keynote and plenary addresses include EDILOG 2002 (Scotland) and CHIACS2 (IBM's Conference on Human Impact and Application of Autonomic Computing Systems, 2004). She serves as consulting editor of *Psychological Science*; previously she served as associate editor of *Discourse Processes* and consulting editor of *Computational Linguistics*.

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TZI-CKER CHIUEH, Professor

Ph.D. 1992, University of California, Berkeley

Tzi-cker Chiueh received his B.S. in Electrical Engineering from National Taiwan University, M.S. in Computer Science from Stanford University, and Ph.D. in Computer Science from University of California at Berkeley in 1984, 1988, and 1992, respectively. He received an NSF CAREER award in 1995, a NYNEX Excellence in Education Award in 1996, a Best Paper award from the IEEE Hot Interconnect Symposium in 1999, a Long Island Software Award in 1997 and 2004, and Best Paper Awards from the 20th Annual Computer Security Applications Conference (ACSAC 2005), the 8th International Symposium on Systems and Information Security (SSI 2006), and the 3rd International Symposium on Information Assurance and Security (IAS 2007). Chiueh has published more than 140 technical papers in refereed conferences and journals. His research interest lies in wireless networking, computer security, and storage systems.

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SAMIR R. DAS, Associate Professor

Ph.D. 1994, Georgia Institute of Technology

Samir Das's research interests are in wireless and mobile networking protocols, systems and applications. His work has mainly considered various forms of multihop wireless networks, such as ad hoc, mesh and sensor networks. He is also interested in wireless local and personal area networks, RFID systems and vehicular networks. His research has mainly considered design and analysis of network-layer and link-layer protocols and performance modeling. He is a co-author of the Internet RFC on the popular ad hoc network routing protocol, AODV. Das has received the NSF Faculty Early CAREER award in 1998 and the best paper award in ACM MobiSys conference in 2007. He has been a speaker in the Distinguished Visitor program of the IEEE Computer Society during 2001-03. He co-chaired the technical program committees for the ACM MobiHoc Symposium in 2001 and ACM MobiCom Conference in 2004. He currently serves or has served on the editorial boards of the *IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, ACM/Springer Wireless Networks Journal,* and *Ad Hoc Networks* journal. Das also serves as the Director of Systems and Infrastructure Division in CEWIT.

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DAVID FERGUSON, Distinguished Service Professor

Ph.D. 1980, University of California at Berkeley

David Ferguson is Distinguished Service Professor and Chair of the Department of Technology and Society. He holds joint appointments in the Departments of Computer Science and Applied Mathematics and Statistics. He has directed numerous projects, including a half-dozen NSF projects, aimed at improving science, technology, engineering, and mathematics education at both the undergraduate and graduate levels. His research and teaching thrusts are in the areas of problem solving, advanced technologies in the learning and teaching of mathematics and science, and socio-technological decision making. Ferguson is a New York State and national leader in programs to enhance the participation of underrepresented groups in science and engineering. He directs two NSF-funded projects in this area: the SUNY Louis Stokes Alliance for Minority Participation (LSAMP), and the SUNY Alliance for Graduate Education and the Professoriate (AGEP). He is the recipient of several awards: U.S. Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM), Archie Lacey Award of the New York Academy of Sciences, and the Engineering Educator Award of the Joint Committee on Engineering of Long Island.

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JIE GAO, Assistant Professor

Ph.D. 2004, Stanford University

Jie Gao is interested in algorithm design and analysis, focusing on mobility and distributed algorithms in ad hoc wireless and sensor networks. Her recent work takes a geometric approach to study algorithms in sensor networks, for a number of important architecture components including network topology discovery, network localization, geometric routing, and information brokerage and retrieval. Gao received a B.S. in Computer Science from the Special Class for the Gifted Young, University of Science and Technology of China in 1999, and a Ph.D in Computer Science from Stanford University in 2004. She received the National Science Foundation CAREER Award in 2006.

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RADU GROSU, Associate Professor

Ph.D. 1994, Technical University of Munich, Germany

Radu Grosu's primary research interest is to develop methods and tools with a mathematical foundation for the specification, design, and analysis of reactive and embedded systems. The aim is to increase the reliability and the security of these systems. Research topics include modeling languages, requirements specification and capture, temporal logics, formal verification, model checking, heuristics for state-space analysis, tools and applications to software engineering, computer-aided hardware design, and embedded controllers. He is involved in the development of several tools exploiting novel engineering concepts in order to scale up their modeling and analysis power. The model checker Mocha takes advantage of the architectural hierarchy in the development of hardware close discrete systems. The model checker Hermes takes advantage of the behavioral hierarchy in the development of discrete software systems—for example, network protocols. The modeling and simulation language Charon exploits both behavioral and architectural hierarchy in the development of mixed discrete and continuous systems.

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XIANFENG (DAVID) GU, Assistant Professor

Ph.D. 2003, Harvard University

Xianfeng David Gu conducts research in the area of systematic application of modern geometry in computer graphics, computer vision, computer aided geometric design, visualization and medical imaging. His research has opened up a novel interdisciplinary field Computational Conformal Geometry, which combines Riemann surface theory, differential geometry and algebraic topology with computer science, and has broad applications in solving fundamental problems in engineering fields, such as surface classification, geometric matching, shape analysis and shape manipulation. Gu is developing the paradigm of general geometric structures of shapes, including conformal structure for surface parameterization, spherical structure for brain mapping, affine structure for manifold splines, and hyperbolic structure for shape space. Gu has invented various computational geometric tools, such as geometry images, discrete holomorphic forms, and discrete Ricci flows, which have many industrial applications. Gu received the National Science Foundation's CAREER Award in 2005.

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HIMANSHU GUPTA, Assistant Professor

Ph.D. 1999, Stanford University

Himanshu Gupta received a B.Tech. (1992) in Computer Science and Engineering from IIT, Bombay, and an M.S. and Ph.D. in Computer Science from Stanford University in 1999. After some years in industry and a year at the University of Chicago, he joined the faculty at Stony Brook in 2002. His recent research activities focus on sensor networks, wireless networking, and database systems. In particular, he is interested in sensor networks programming and databases, and theoretical issues in wireless networking. His other research interests are in database systems and theory, within which he is interested in materialized views, (multiple) query optimization, and data analysis.

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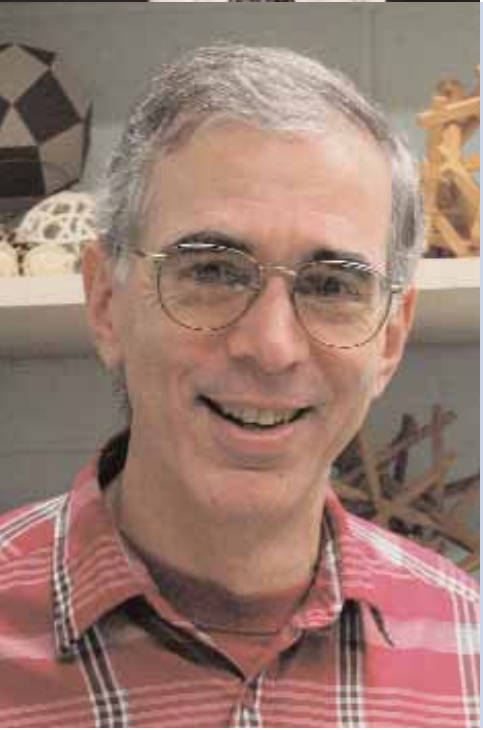

GEORGE W. HART, Research Professor

Ph.D. 1987, Massachusetts Institute of Technology

George W. Hart's research interests include 3-D modeling, computational geometry, algorithms, and computer-aided sculpture. His focus is on developing tools for creating geometric sculptures that connect all the stages between the initial mental conception and the final physical realization. His sculptures, generated with novel algorithms, with modern technology such as laser-cutting and solid freeform fabrication, and with his own hands, have been displayed throughout the U.S. and in Europe. Hart was a research scientist at the MIT Lincoln Laboratory and MIT Energy Laboratory and then a professor at Columbia University before coming to Stony Brook. His writings include two books, *Multidimensional Analysis* (Springer, 1995), and *Zome Geometry* (with coauthor Henri Picciotto, Key, 2001).

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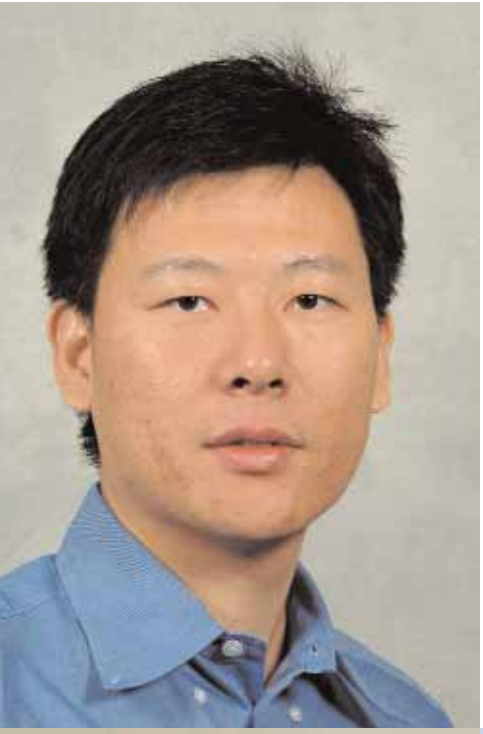

XIANGMIN (JIM) JIAO, Assistant Professor

Ph.D. 2001, University of Illinois at Urbana-Champaign

Jim Jiao's research interests are in high-performance geometric and numerical computing in science and engineering. His work focuses on developing efficient and robust algorithms and high-performance software implementations for dynamic surfaces, mesh optimization, applied computational and differential geometry, and multi-physics coupling, for applications involving heterogeneous physical systems, such as simulations of solid rocket motors, climate modeling, biological organs, and computer animations. He received his Ph.D. in Computer Science from University of Illinois at Urbana-Champaign in 2001. After working in interdisciplinary research for a few years as a Research Scientist at the Center for Simulation of Advanced Rockets at UIUC and then as a Visiting Assistant Professor in the College of Computing at Georgia Institute of Technology, he joined the faculty at Stony Brook in Fall 2007.

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ROBERT JOHNSON, Assistant Professor

Ph.D. 2005, University of California, Berkeley

Robert Johnson received his Ph.D. in Computer and Software Security from the University of California at Berkeley prior to joining the Department of Computer Science at Stony Brook University in 2005. Johnson is interested in all aspects of computer security and has done research in software security, system and network security, cryptography, digital rights management, operating systems, networks, and algorithm design and analysis. His research projects include new digital signatures for authenticating images, static analysis tools for finding security bugs in software, easy-to-use privacy controls for blogs and social networks, and a distributed, cooperative worm-defense system. Johnson's research is supported by the National Science Foundation.

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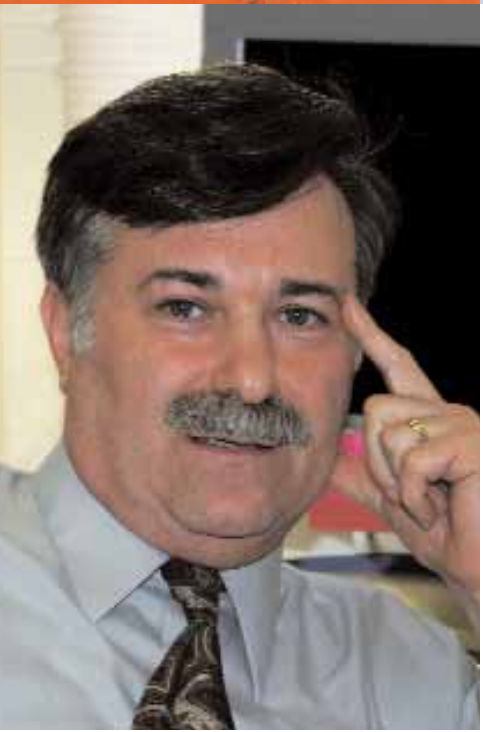

ARIE E. KAUFMAN, Distinguished Professor and Chair

Ph.D. 1977, Ben-Gurion University, Israel

Arie Kaufman is the Director of the Center for Visual Computing (CVC) and the chief scientist of the Center of Excellence in Wireless and Information Technology (CEWIT). He has been conducting research in visualization, computer graphics, virtual reality, user interfaces, multimedia, and biomedical and scientific applications for more than 35 years. Kaufman has been a pioneer and a leader in volume visualization, especially in the areas of volume hardware accelerators (e.g., Cube-4), volume visualization software (e.g., VolVis), biomedical applications (e.g., virtual colonoscopy), volume graphics (e.g., voxel-based flight simulation), and national security (e.g., urban plume modeling). Kaufman was the founding Editor-in-Chief of the *IEEE Transactions on Visualization and Computer Graphics* (TVCG), 1995-1998. He has been the chair or co-chair for multiple Eurographics/Siggraph Graphics Hardware Workshops, IEEE Visualization Conferences, ACM Volume Visualization Symposia, and Workshops on Volume Graphics. He is the co-founder and member of the Steering Committee of the IEEE Visualization Conference series. He has previously chaired and is a director of the IEEE Computer Society Technical Committee on Visualization and Graphics.

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ROBERT KELLY, Associate Chair

Ph.D. 1991, New York University

Rob Kelly's research interests include medical informatics, software engineering, systems engineering, image processing, Internet programming, and parallel programming. The primary research focus has been on systems to reduce the incidents of medical errors in acute health-care facilities. This work includes a system for a high level interface to medical monitors, representation techniques for clinical guidelines as system-independent documents, an anesthesiology clinical support system, a rule-based system for discharge planning, and a system to associate monitor data with outcome data to improve prediction of patient condition in critical care settings. He is also developing systems to process marine science sensor data with the goal of developing inquiry systems for marine features. Kelly has published papers on these topics in major journals and conferences. He has been on program committees and chaired invited sessions of a number of international conferences. Kelly is also the graduate director of the college-level program in Systems Engineering. Collaborating with an industry partner, he has developed a software application that received the Long Island Software Award for Internet-based software.

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MICHAEL KIFER, Professor

Ph.D. 1984, Hebrew University of Jerusalem, Israel

Michael Kifer is working on various aspects of knowledge representation that span the areas of databases, logic programming, expert systems, and artificial intelligence. One of his projects deals with the development of logical foundations for object-oriented database languages. F-logic and Transaction Logic, co-invented by Kifer in collaboration with his colleagues and students, serve as a basis for this study. Kifer's work has twice been recognized by the ACM Special Interest Group on Management of Data (SIGMOD) with the prestigious Test of Time Award. In his theoretical work, Kifer always has practical applications in mind. For instance, the results and tools developed as part of Kifer's research have been recently applied to the development of workflow management systems and Web information systems.

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KER-I KO, Professor

Ph.D. 1979, Ohio State University

Ker-I Ko's research interests are in the area of theoretical computer science, especially the study of computational complexity. Computational complexity studies the inherent difficulty of solving algorithmic problems in digital machines. One of the goals of this research is to identify precisely, using formal mathematical tools, the class of feasibly solvable problems. Ko's major work in this area is the development of a new mathematical theory of computational complexity for numerical problems. This theory applies the notions and techniques of discrete complexity theory to study continuous problems in numerical computation, thus providing a unified view of computational complexity on both areas. Ko published a research monograph on this subject in 1991. Before joining Stony Brook in 1986, Ko taught at the University of Houston and University of California at Santa Barbara. His other research interests include the theoretical study of fractals, computational learning theory, and combinatorial mathematics.

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BRADLEY C. KUSZMAUL, Assistant Professor

Ph.D. 1994, Massachusetts Institute of Technology

Bradley C. Kuszmaul's research applies algorithm design to solve systems problems in high-performance computing. He was one of the principal architects of the Connection Machine CM-5, and is the co-author of two world-class computer chess programs (StarTech and *Socrates). Kuszmaul participated at MIT in the Cilk development project, which provides an algorithmic multithreaded programming system. His entry won 5 out of 6 categories in Jim Gray's 2007 sorting benchmark contest, sorting a terabyte in 197 seconds. Before coming to Stony Brook, Kuszmaul was a faculty member in the Department of Computer Science, Yale University, research scientist at Akamai and research scientist in the Supercomputing Technologies Group at the MIT Laboratory for Computer Science. Kuszmaul is affiliated with the New York Center for Computational Sciences (NYCCS).

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PHILIP M. LEWIS, Professor Emeritus

Ph.D. 1956, Massachusetts Institute of Technology

Philip Lewis conducts research on the correctness of concurrent systems. One approach, developed with Arthur Bernstein, is based on a new definition of semantic correctness of transactions, which allows a significant increase in transaction throughput. Another approach is based on model checking using a state machine model of the concurrent system. He is interested in combining these approaches to study the correctness of Internet transaction protocols involving encryption. Before coming to Stony Brook, Lewis spent 28 years at the General Electric Research and Development Center, where he was Manager of the Computer Science Branch. He did research there on threshold logic, computational complexity, compilers, and transaction processing. He co-invented LL(K) top-down parsing and the Kill-Wait and Wait-Die concurrency controls. Lewis is the author of three books and is a Fellow of the ACM and the IEEE.

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JEROME Z. LIANG, Professor

Ph.D. 1987, The City University of New York

Jerome Liang's research interests include development of virtual endoscopy for cancer screening; low-dose CT for dynamic imaging; quantitative SPECT for functional imaging; high-resolution PET for functional imaging; automatic methods for MRI image quantification; and various models, in terms of physics, mathematics, and statistics, to simulate the practical problems above and to validate the models by experiments. He has authored more than 100 scientific publications and has served on the Editorial Board of the *IEEE Transactions on Medical Imaging* since 1999. He is a Fellow of the IEEE.

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Y. ANNIE LIU, Associate Professor

Ph.D. 1996, Cornell University

Annie Liu's primary research interests are in the areas of programming languages, algorithm design, and software systems, particularly general and systematic design methods for generating efficient implementations from clear specifications. Her research results include powerful analysis, optimization, and implementation methods for complex problems that are specified using loops, sets, recursive functions, rules, and objects. The methods have been applied successfully to problems in hardware design, image processing, query processing, access control, combinatorial optimization, sequence processing, program analysis, trust management, and many other areas. Liu also has interests in database, security, embedded systems, and distributed systems. These include database query optimization, incremental database view maintenance, secure information flow analysis, trust management, worst-case execution time and space analysis, code generation for embedded systems, efficient property detection and enforcement for distributed systems, and systematic approaches to fault-tolerance. Liu has published over 50 refereed articles in major journals and conferences and taught 18 different courses in these areas.

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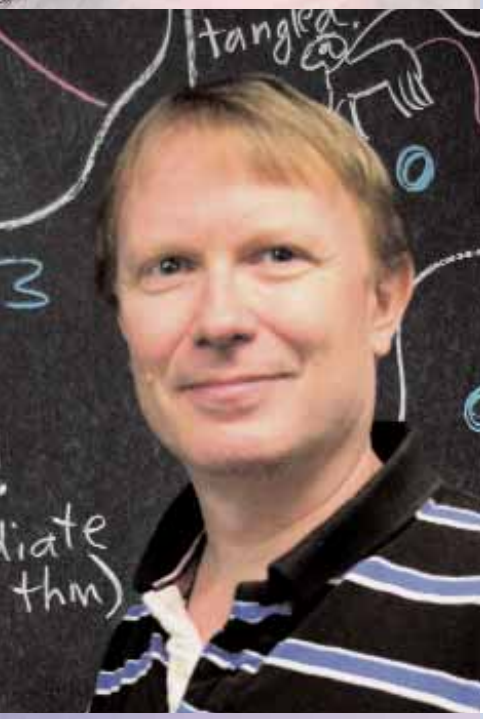

JOSEPH S.B. MITCHELL, Professor

Ph.D. 1986, Stanford University

Joseph S.B. Mitchell received a B.S. (1981) in Physics and Applied Mathematics and an M.S. (1981) in Mathematics from Carnegie-Mellon University. He received a Ph.D. (1986) in Operations Research from Stanford University while on a Howard Hughes Doctoral Fellowship and working at Hughes Research Labs. From 1986 to 1991, Mitchell served on the faculty of Cornell University. In 1991, he joined the faculty at Stony Brook, where he is Professor of Applied Mathematics and Statistics and Research Professor of Computer Science. Mitchell has received various research awards (NSF Presidential Young Investigator, Fulbright Scholar) and numerous teaching awards, including the President's and Chancellor's Awards for Excellence in Teaching. His primary research area is computational geometry, applied to problems in computer graphics, visualization, manufacturing, and geographic information systems. He also has interests in the study of algorithms, particularly approximation algorithms, network algorithms, and scheduling. Mitchell heads the Computational Geometry Lab, which is engaged in an active industrial outreach program of collaboration with industry and government labs on various applied projects.

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KLAUS MUELLER, Associate Professor

Ph.D. 1998, Ohio State University

Klaus Mueller's main research interests reside in the fields of computer graphics, scientific and information visualization, volume rendering, visual analytics and data mining, visual perception, virtual reality, medical imaging, computed tomography, scientific computing, and in the use of graphics hardware (GPUs) to accelerate computations in these domains. Mueller has received the National Science Foundation (NSF) CAREER Award in 2000 and the SBU-CS Graduate Teaching Award in 2002. He has joint appointments at Stony Brook's Departments of Biomedical Engineering and Radiology and is an affiliate member of the Center for Data Intensive Computing (CDIC) at Brookhaven National Laboratory.

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LUIS E. ORTIZ, Assistant Professor

Ph.D. 2002, Brown University

Luis E. Ortiz's main areas of research are artificial intelligence and machine learning, with additional interest in computational game theory, economics, probability, statistics, biology, and finance. Graphical models play a central role in his research. His goal is to solve problems in systems that arise from the complex interactions between a large number of individual entities (e.g., social networks, the Internet, markets, vaccination, protein-DNA binding, and single- and multi-agent systems embedded in complex environments). Prior to joining Stony Brook, he was an Assistant Professor at the University of Puerto Rico, Mayagüez. He held a Postdoctoral Lecturer faculty position at the Massachusetts Institute of Technology (MIT), where he is still affiliated with the Computer Science and Artificial Intelligence Laboratory (CSAIL). He was also a Postdoctoral Researcher at the University of Pennsylvania, and a Consultant in the Field of Artificial Intelligence and Machine Learning at AT&T Labs-Research. He received a Sc.M. and Ph.D. in Computer Science from Brown University and a B.S. in Computer Science from the University of Minnesota. He was a National Physical Science Consortium (NPSC) Ph.D. Fellow and an NSF Minority Graduate Fellow.

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THEO PAVLIDIS, Distinguished Professor Emeritus

Ph.D. 1964, University of California, Berkeley

Theo Pavlidis is a scientific advisor to Symbol Technologies. He was with Princeton University from 1964 to 1980 and AT&T Bell Labs from 1980 to 1986, and recently his general research interests have been in the areas of image analysis, pattern recognition, and computer graphics. His most recent research activities also include the areas of optical character recognition and related problems of document processing, bar-coding applications, and the development of programming tools for imaging and graphics under the X Windows System. He is the co-inventor of the 2-D bar-code PDF417. During his career, he has authored more than 150 technical papers and five books, including *Algorithms for Graphics, Image Processing, Interactive Computer Graphics,* and *Fundamentals of X Programming.* He also holds 12 patents on various aspects of bar coding and document analysis. He was the Editor-In-Chief of the *IEEE Transactions on Pattern Analysis and Machine Intelligence* (PAMI) from 1982 to 1986, and he has been a member of the editorial boards of many other journals.

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HONG QIN, Professor

Ph.D. 1995, University of Toronto

Hong Qin received his B.S. (1986) and M.S. (1989) degrees in Computer Science from Peking University in Beijing, China. He received his Ph.D. (1995) degree in Computer Science from the University of Toronto. In 1997, Qin received the National Science Foundation's CAREER Award. In December 2000, he received the Honda Initiation Grant Award. In February 2001, Qin was selected as an Alfred P. Sloan Research Fellow by the Sloan Foundation. In June 2005, Qin served as the general Co-Chair for Computer Graphics International 2005 (CGI'2005). He is an associate editor for *IEEE Transactions on Visualization and Computer Graphics* (IEEE TVCG), and also on the editorial board of *The Visual Computer (International Journal of Computer Graphics)* and *Journal of Computer Science and Technology*. He was the Conference Co-Chair for the ACM Solid and Physical Modeling Symposium in 2007. In 2008, he co-chaired the ACM Symposium on Solid and Physical Modeling and IEEE International Conference on Shape Modeling and Applications.

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C.R. RAMAKRISHNAN, Associate Professor

Ph.D. 1995, Stony Brook University

C.R. Ramakrishnan performs research in logic programming, specification, and verification of concurrent systems; programming languages and compilers; computer system security; and workflow systems. He has worked on developing efficient techniques for evaluating functional and logic programs and analysis of programs. His research focuses on developing new techniques for manipulating logic programs and applying these techniques to verify concurrent systems, especially infinite-state or infinite families of systems. This research is central to the verification of real-time and hybrid systems, such as controllers, and parameterized systems, such as families of networks. In addition, it enables new uses of verification technology, such as identifying security flaws in computer systems, and detecting inconsistencies in workflow systems. Ramakrishnan is involved with the LMC project for developing verification systems based on these research efforts, the XSB project for advanced logic programming systems, and the WEAVE project for logic-based workflow systems. His research has been supported by several NSF grants, including the NSF CAREER Award in 1999.

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I.V. RAMAKRISHNAN, Professor

Ph.D. 1983, University of Texas at Austin

I. V. Ramakrishnan is a Full Professor in the Department of Computer Science at Stony Brook. He received a Ph.D. in Computer Science (1983, University of Texas, Austin) and a Master of Engineering in Automation and Computer Science (1977, Indian Institute of Science, Bangalore) and Bachelor of Technology in Electrical Engineering (1975, Indian Institute of Technology, Kharagpur). He was an assistant professor at University of Maryland, College Park (1983-1985), and has been on the faculty at Stony Brook since 1985. He has done extensive research in computational logic and its applications. Recently he has been conducting research and technology development for extracting and transforming data from semi-structured and unstructured sources into knowledge using machine learning. In particular he has been actively engaged in research on the design of algorithms for Web agents, building tools to mine, extract, and transform Web data into knowledge.

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DIMITRIS SAMARAS, Associate Professor

Ph.D. 2001, University of Pennsylvania

Dimitris Samaras's research focuses on the interaction of illumination and 3D shape in images in Computer Vision (shape estimation, tracking, recognition) and Computer Graphics (image relighting, augmented reality). Given our expertise in deformable model representations, the main application areas have been face and hand modeling. His group has built a system for high-resolution tracking and learning of 3D facial expressions, which is used for the study of facial appearance and expression. He has proposed a face recognition method from a single image under arbitrary illumination, where a spherical harmonics basis is computed for each image from a statistical representation of spherical harmonics images. This approach has given excellent results in re-synthesis of facial images under different poses and illumination. In the field of Medical Imaging, he is interested in the analysis of the wealth of data that is available through imaging studies of brain function. His group has already demonstrated that Machine Learning methods can be useful in clinical diagnosis of drug addiction from fMRI brain images and is working on exploring temporal and interconnectivity information in fMRI brain sequences.

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LORI SCARLATOS, Associate Professor

Ph.D. 1993, Stony Brook University

Lori Scarlatos focuses on educational applications employing novel computer-human interaction techniques such as tangible user interfaces, physical computing, multi-modal input, collaborative learning spaces, and serious games. Her other research interests include computer graphics (surface modeling, animation, visualization), computer-human interaction, and multimedia. She has been principle investigator on numerous grants from the National Science Foundation, including the prestigious CAREER award and a highly competitive BPC (Broadening Participation in Computing) grant. Her CRCD (Combined Research Curriculum Development) grant has led to several innovative educational applications as well as collaborations with the School of Education at Brooklyn College, the Goudreau Museum of Mathematics in Art and Science, the Cleary School for the Deaf, and Suffolk County BOCES. Her dissertation research, which focused on 3D level of detail modeling, led to an ARPA/USA-TEC contract to extend and apply her techniques. Scarlatos also spent 10 years in industry, working on cartographic applications in Grumman Data Systems' R&D department, and on animated games at Lecht Sciences where she was made a vice-president at age 25.

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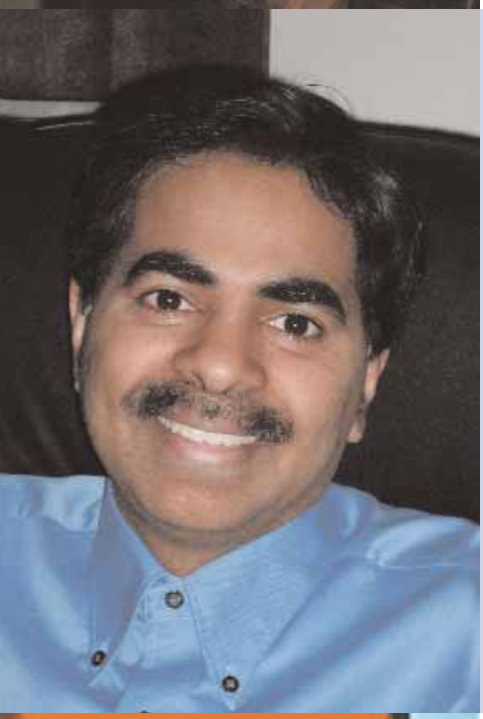

R. SEKAR, Professor

Ph.D. 1991, Stony Brook University

Sekar's research uses a cross-disciplinary approach that combines techniques from compilers, operating systems, algorithms, artificial intelligence, software verification, and networks to develop practical solutions for security problems facing our systems today and tomorrow. One of the main research themes is language-based security, including source-and-binary-code analysis; instrumentation and transformation techniques for software vulnerability remediation; model-based analysis and verification techniques for security policy synthesis and/or enforcement; and software vulnerability analysis. Another focus area is safe execution of untrusted or malicious software, with emphasis on proactive and high-assurance malware defense, intrusion tolerance, and recovery. A third research focus is on developing new models, algorithms and learning techniques for automated detection, signature generation and filtering of attacks in high-speed networks. Sekar's research has been supported by the National Science Foundation, Office of Naval Research, Defense Advanced Research Projects Agency, Air Force Office of Scientific Research, New York State and the industry.

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RADU SION, Assistant Professor

Ph.D. 2004, Purdue University

Radu Sion's research lies in the areas of Information Assurance, Applied Cryptography and Data Security, where he is striving to build systems and protocols that are efficient, yet strongly secure. Instances are regulatory-compliant systems, secure data outsourcing, security in cellular, wireless and sensor networks, management of encrypted data, secure networked storage with privacy, security computation/data grids, digital rights management, anonymous network protocols and micropayment schemes. Collaborators and funding partners include Motorola Labs, IBM Research, the Center of Excellence in Wireless and Information Technology (CEWIT), the Stony Brook Office for the Vice-President for Research and the National Science Foundation. Radu is serving on the organizing committees of numerous conferences, such as CCS, USENIX Security, SIGMOD, ICDE, ICDCS, and Financial Cryptography. Radu is heading the NSAC (Network Security and Applied Cryptography) and THL (Trusted Hardware) Labs.

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STEVEN S. SKIENA, Professor

Ph.D. 1988, University of Illinois at Urbana-Champaign

Steven Skiena's research interests revolve around the design of efficient graph, string, and geometric algorithms and their applications. He is particularly interested in computational biology, the combinatorial problems that arise in obtaining and analyzing sequence data. As the field of synthetic biology emerges, Skiena has developed techniques for *de novo* sequence assembly from new short/micro-read DNA sequencing technologies, and algorithms to optimizing gene sequences for vaccines.

Skienna is also interested in natural language processing. In particular, his Lydia project (see *www.textmap.com*) performs news/blog analysis as a means to monitor and model the political, cultural, and social worlds. Skiena has focused on making tools and techniques from combinatorial computing more accessible for applications. He is the author of four books, including *The Algorithm Design Manual* and *Programming Challenges*, and his Combinatorica program is widely used for research in combinatorics and graph theory. He is the recipient of the ONR Young Investigator Award, the IEEE Computer Science and Engineering Undergraduate Teaching Award, and the President's and Chancellor's Award for Excellence in Teaching at Stony Brook.

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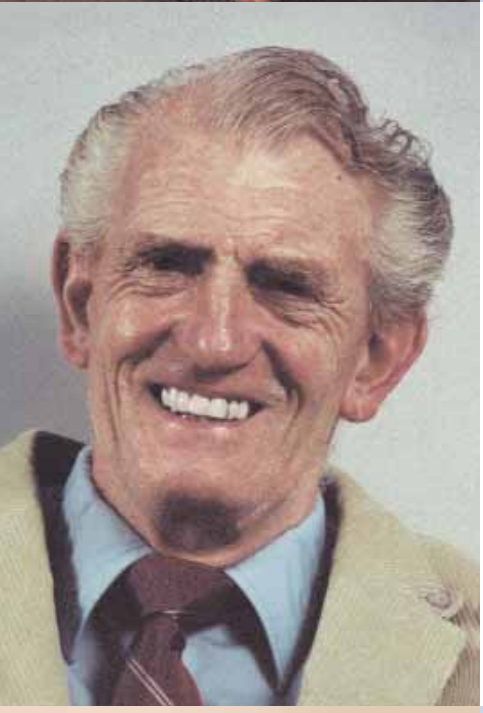

DAVID R. SMITH, Professor Emeritus

Ph.D. 1961, University of Wisconsin at Madison

David R. Smith arrived at Stony Brook in 1966 and (with D. Tycko) established the Department of Computer Science. At Stony Brook, his publications have explored combinational switching functions, shift register sequences, experimental parallel computer and chip architectures, hardware description languages, and hardware synthesis. He is the author of a forthcoming text from Prentice Hall on Verilog styles for synthesis. The continued exponential increase of chip complexity is straining the ability of computer-aided design technology to create such chips and get them working. In the hardware design languages in current use, there are many different ways of describing even a simple design, and the quality of the final synthesized result now depends entirely on the textual specification. To keep pace, it is essential to find ways of describing such circuits at higher and higher levels and to standardize module interfaces to facilitate re-use.

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SCOTT A. SMOLKA, Professor

Ph.D. 1984, Brown University

Scott Smolka's research interests lie mainly in the areas of computer-aided verification of embedded and safety-critical systems, modeling and analysis of biological systems, model checking, concurrency theory, and design of distributed languages and algorithms. He is a Principle Investigator on three federally funded research projects concerning the formal modeling and analysis of excitable cells and tissue such as cardiac cells and neurons; model checking and run-time monitoring of high-confidence systems software; and the design and implementation of a model checker for the TIOA specification language for real-time and embedded distributed systems. Students working with Smolka typically engage in a research program that combines theory with system implementation work with application to real-world systems, such as communication and e-commerce protocols; biological systems; operating systems and other systems software; and process control systems. Along with Michael Kifer, Smolka is the developer of the OSP-2 (Operating Systems Project) courseware package. OSP-2 is a Java-based implementation of a modern operating system as well as a programming project for undergraduate operating system courses.

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EUGENE W. STARK, Professor

Ph.D. 1984, Massachusetts Institute of Technology

Eugene Stark studies theoretical and practical aspects of concurrency in computer systems. On the theoretical side, he investigates mathematical models, usually algebraic or automata-theoretic, for such systems. The fundamental study of such models can lead to simpler ways of reasoning about concurrency, which would ultimately lead to simpler concurrent programming languages and more robust concurrent programs. Recently, Stark has been developing a method of constructing modular, hierarchical, finite-state descriptions of systems, such as communications protocols, that exhibit concurrent and probabilistic behavior. He has devised and implemented computerized analysis tools that can automatically calculate performance parameters directly from a system description. On the practical side, Stark is engaged in operating systems research involving the construction of a network memory server. Such a server will be a cluster-based facility able to exploit the capabilities of gigabit/second communications networks and intelligent paging heuristics to permit memory-intensive applications to run at nearly full speed on limited-memory client systems.

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AMANDA STENT, Associate Professor

Ph.D. 2001, University of Rochester

Amanda Stent heads the Natural Language Processing Lab and the Human-Computer Interaction Lab. She conducts research on natural language generation, spoken dialog systems and text and speech processing. She is particularly interested in models of language that account for variation and adaptation. She and her students have developed the SBU Rate-a-Course dialog system, the SBU RavenCalendar dialog system, and the SBU Question-Answering system. She maintains ties with the Applied Logic Lab and the SPLAT Lab and has a secondary appointment in the Stony Brook Psychology Department. She has supervised more than 20 undergraduate, M.S., and Ph.D. students and has more than 30 conference and journal publications. She teaches graduate courses and seminars on computational linguistics, speech processing, information extraction and information retrieval.

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SCOTT D. STOLLER, Associate Professor

Ph.D. 1996, Cornell University

Scott Stoller's primary research interests are analysis, optimization, testing, and verification of software, with emphases on concurrent and distributed systems, security, and incremental computation. His research group develops new testing and verification techniques and implements them in practical tools, for example, for detecting subtle synchronization errors in multi-threaded Java programs using static (compile-time) analysis, dynamic (run-time) analysis, and combinations of static and dynamic analysis. His research on security focuses on specification, analysis, administration, and enforcement of complex institutional security policies, which go beyond simple access control by expressing trust assumptions involving users, administrators, organizations, and system components. Stoller received a Bachelor's degree in Physics, *Summa Cum Laude*, from Princeton University in 1990. He received an NSF CAREER Award in 1999 and an ONR Young Investigator Award in 2002.

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M. ALEX O. VASILESCU, Assistant Professor

Ph.D. 2008, University of Toronto

M. Alex O. Vasilescu's interests lie at the intersection of computer vision, statistical learning, and computer graphics. She received her education from MIT and the University of Toronto. From 2005 to 2007, she was a Research Scientist at the MIT Media Laboratory, and previously was a Research Scientist at NYU's Media Research Laboratory. She has also done research at IBM, Intel, Compaq, and Schlumberger corporations. Vasilescu is known for having introduced and further developed the multilinear (tensor) paradigm in the fields of computer vision and computer graphics. She has published papers in these fields, particularly in the areas of face recognition, human motion analysis/synthesis, image-based rendering, and physics-based modeling (deformable models). She has given several invited talks about her work, including a keynote address, holds a patent, and has several patents pending. Her face recognition research, known as TensorFaces, has received funding by the TSWG, the Department of Defense's Combating Terrorism Support Program. She was named by MIT's *Technology Review Magazine* to their 2003 TR100 List of Top Young Innovators for her work on TensorFaces and Human Motion Signatures.

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XIN WANG, Assistant Professor

Ph.D. 2001, Columbia University

Xin Wang received B.S. and M.S. degrees in Telecommunications Engineering and Wireless Communications engineering from Beijing University of Posts and Telecommunications, Beijing, China, and a Ph.D. in Electrical Engineering from Columbia University. She is an assistant professor of the Department of Electrical and Computer Engineering with adjunct appointment in Computer Science. Prior to joining Stony Brook, she was an assistant professor in the Department of Computer Science and engineering of SUNY Buffalo from 2003 to 2005, and was a member of the Technical Staff in the area of mobile and wireless networking at Bell Labs Research, Lucent Technologies, New Jersey during 2001-03. Xin Wang received the prestigious NSF CAREER award in 2005. Her research interests include mobile and ubiquitous computing, wireless networking and systems, overlay and peer-to-peer systems, performance evaluations, and network security. Her research projects are supported by the National Science Foundation and National Institute of Justice.

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DAVID S. WARREN, Professor

Ph.D. 1979, University of Michigan

David S. Warren conducts research in the areas of computational logic, logic programming, intelligent knowledge bases, and non-monotonic reasoning. He has directed projects leading to the production of the SBProlog system and the XSB-tabled logic programming system, now distributed to almost a thousand sites around the world. He is the inventor of the SLG resolution strategy, whose implementation in XSB is the first efficient, complete, and robust implementation of a system for computing the well-founded semantics of general logic programs. His research involves extending and applying the XSB system. Extensions include the tabled computation of constraint logic programs and statistical modeling. Applications include model checking for verification of software systems, abstract interpretation for inferring program properties, the extraction of information from ill-structured data, and support for medical diagnosis. Warren is a Fellow of the ACM, a past president of the Association for Logic Programming, and is co-author of several books, including a book on implementing *Prolog, Computing with Logic*. He is a former Chair of the Stony Brook Department of Computer Science.

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ANITA WASILEWSKA, Associate Professor

Ph.D. 1975, Warsaw University, Poland

Anita Wasilewska earned her Ph.D. in Mathematics from Warsaw University, Warsaw, Poland, in 1975, under the tutelage of Professor H. Rasiowa. She has been a member of Rasiowa's Logic and Foundation of Computer Science group since 1967, and she remained on the faculty of the Mathematics Institute of Warsaw University until 1983. She came to the United States in 1980 as a visiting Assistant Professor at Wesleyan University in Connecticut before joining Stony Brook's Department of Computer Science in 1986. Her latest research interests are data mining, knowledge discovery, and applications for the automated theorem-provers. Wasilewska has published papers dealing with inductive learning systems, generalized Fuzzy and Rough sets, uncertainties in Expert Systems, formal languages, and automated theorem-proving in nonclassical logics.

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LARRY WITTIE, Professor

Ph.D. 1973, University of Wisconsin at Madison

Larry Wittie earned a Ph.D. in Computer Science for simulation of learning in networks of thousands of cerebellar neurons. Before coming to Stony Brook in 1982, he was a Computer Science faculty member at Purdue University and the State University of New York at Buffalo. From 1978 to 1984, he built the first reconfigurable multicomputer, MicroNet, and a multi-platform distributed operating system, Micros. His specialty is topology of large networks supporting parallel computing. Wittie's research interests focus on the limits of parallel speed-up of single problems in huge computer systems and networks for rapid distributed-shared memory access among thousands of ultra-fast computers. His most recent projects have been the detection of alterations in written documents, low-latency petabit-per-second data switching using multi-gigahertz logic, and memory-access in an RFSQ superconducting parallel computer that can execute a million billion operations per second using only kilowatts of electrical power. He is a past editor of *IEEE Transactions on Parallel and Distributed Systems*, a senior member of IEEE, and a member of ACM, Sigma Xi, and the Society for Neuroscience.

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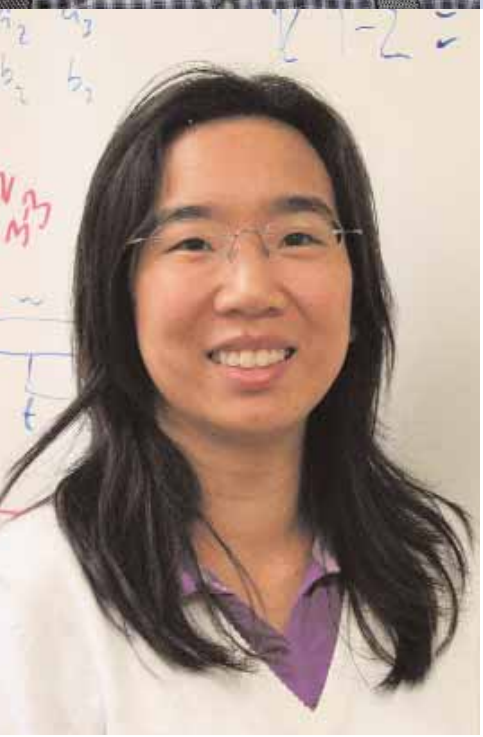

JENNIFER L. WONG, Assistant Professor

Ph.D. 2006, University of California, Los Angeles

Jennifer Wong earned her Ph.D. in Computer Science. Her theses focused on the application of data-driven statistical techniques for the design of integrated circuits (ICs) and sensor networks. She joined the Department of Computer Science as an Assistant Professor in 2006. Wong's research focus is on bridging non-parametric statistical methods with real-world data and optimization techniques. Her research interests at Stony Brook focus on non-parametric statistical modeling for optimization tasks for wireless distributed embedded systems, sensor networks, embedded systems, and computer aided design (CAD). In particular Wong's interests lie in energy efficient optimization approaches for wireless distributed embedded systems, statistical modeling for low power lossy links, and new architectures in CAD. Her secondary interests involve system synthesis techniques, the application of non-parametric statistical techniques for addressing manufacturing variability in CAD designs, real-time operating systems, mobility models and intellectual property protection. Her works on watermarking for intellectual property protection were part of the foundation for developing a VSI Alliance standard.

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YUANYUAN YANG, Professor

Ph.D. 1992, Johns Hopkins University

Yuanyuan Yang's research interests include parallel and distributed computing systems, high-speed networks, optical networks, high-performance computer architecture, and fault-tolerant computing. Her recent work focuses on the designs and performance analyses of the networks that can support efficient collective communications, such as broadcast, multicast, and all-to-all communications among a group of network nodes. The research finding has a practical impact on many Internet and collaborative applications, such as video-on-demand services in multimedia systems and teleconferencing. Yang has published more than 60 papers in major journals and refereed conference proceedings related to these research areas. She also holds two U.S. patents in the area of multicast communication networks. Yang's research has been supported by the National Science Foundation and the U.S. Army Research Office. She has served on the program/organizing committees of a number of international conferences in her areas of research. Yang is a senior member of the IEEE and a member of the ACM, IEEE Computer Society, and IEEE Communication Society.

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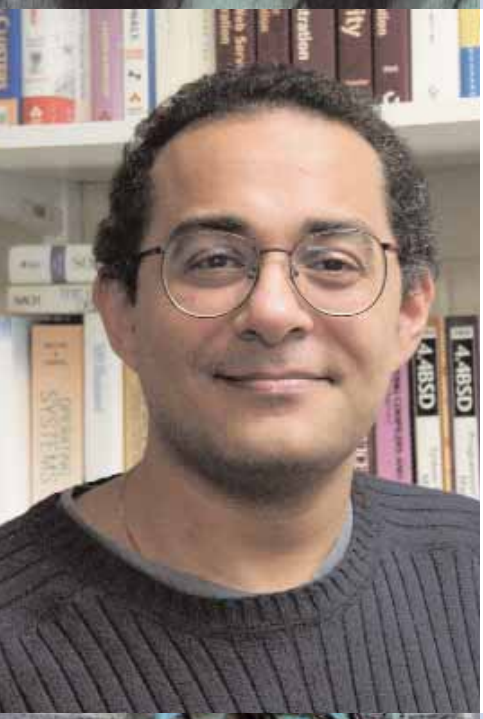

EREZ ZADOK, Associate Professor

Ph.D. 2001, Columbia University

Erez Zadok's research focuses on operating systems, with a specialty in file systems, storage, and security. He studies operating systems and file systems from many aspects: security, efficiency, scalability, reliability, portability, survivability, usability, ease-of-use, versatility, flexibility, and more. Special attention is given to balancing three often-conflicting aspects of computer systems: security, performance, and ease-of-use. Since joining Stony Brook in 2001, Zadok and his group in the Filesystems and Storage Lab (FSL) developed many file systems and operating system extensions; examples include a highly-secure cryptographic file system, a portable versioning file system, a tracing file system useful to detect intrusions, a replaying file system useful for forensics, a snapshotting and sandboxing file system, a namespace unification file system, an anti-virus file system, an integrity-checking file system, a compiler to convert user-level C code to in-kernel efficient yet safe code, stackable file system templates, and more. Zadok's lab exposes students to internals of over a dozen different operating systems. Zadok is the author of *Linux NFS and Automounter Administration* (Sybex, 2001).

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GREGORY J. ZELINSKY, Associate Professor

Ph.D. 1994, Brown University

Zelinsky studies visual cognition by following two interrelated research paths. First, eye movements are recorded as people perform various visual search, change detection, and working memory tasks. This is done in order to obtain a directly observable measure of how a behavior intimately associated with the selection and accumulation of information during a task (i.e., eye movements) changes in space and time during task performance. Second, this eye movement behavior is described in the context of an image-based neurocomputational model. The model "sees" the same stimuli presented to the human observers, then outputs a sequence of simulated eye movements as it performs the task. This simulated pattern of eye movements can then be compared to the human behavior in order to evaluate and refine the model. In developing a computational model of the eye movement behavior made during a task, the broad research goal is to learn more about the representations and processes underlying task performance.

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RONG ZHAO, Director of Software Systems Division, CEWIT

Ph.D. 2001, Wayne State University

Rong Zhao's research interests include information retrieval, data mining, data visualization, user interface, human computer interaction, software engineering, Web technologies, and mobile application development. He has published his research findings in major journals and conferences and co-authored chapters in several books. At the New York State Center of Excellence in Wireless and Information Technology (CEWIT), he oversees the Software Systems Division, which focuses on the development and commercialization of cutting-edge software technologies. He is also the computer science coordinator of the New York State Strategic Partnership for Industrial Resurgence (SPIR) program. Collaborating with local industry through SPIR and CEWIT, he and his students have developed many award-winning software applications. He holds a Ph.D. in Computer Science from Wayne State University and a B.E. degree in Computer Science and Technology from Tsinghua University in China.

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WEI ZHU, Professor

Ph.D. 1996, University of California, Los Angeles

Wei Zhu's major research areas are brain image analysis, climate modeling, experimental design, genetics and proteomics. She is adjunct faculty at New York University where she focuses on the quantitative study of Alzheimer's Disease and its mechanism. Professor Zhu has also been in close collaborations with scientists from the Brookhaven National Laboratory, Cold Spring Harbor Laboratory, and colleagues from Stony Brook University on studies of brain functional pathways, genetic pathways, and multi-scale climate modeling.

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Spotlight on Alumni

Positions Held by Selected Program Alumni (Ph.D. Unless Noted)

1973 Ben Shneiderman, Professor, University of Maryland
Barbara Simons (M.S.), Ex-President, ACM, CA
Isaac Nassi, Executive Vice President, SAP America, CA
Richard Schantz, BBN Technologies, MA
Katamuri Ekanadham, IBM T. J. Watson Research Center, NY
Abraham Silberschatz, Professor, Yale University, CT

1977 John Hennessy, President, Stanford University, CA
Nii Quaynor, Chairman/CEO, Network Computer Systems, Ghana

1978 Fred Schneider, Professor, Cornell University, NY
Sam Kamin, Assoc. Professor, Univ. of Illinois at Urbana-Champaign

1981 James Robert Ensor, AT&T, NJ

1983 David Gelernter, Professor, Yale University, CT

1984 Divyakant Agrawal, Prof., Univ. of California at Santa Barbara
Mustaque Ahamad, Prof., Georgia Institute of Technology, GA
Laxmikant Kale, Prof., University of Illinois at Urbana-Champaign
Ganesh Gopalakrishnan, Professor, University of Utah, UT
Suzanne Wagner Dietrich, Assoc. Prof., Arizona State University

1987 Soumitra Sengupta, Faculty, Columbia University, NY

1989 T. Krishnaprasad, Associate Professor, Wright State University
Rakesh Verma, Professor, University of Houston, TX

1990 Daniel Cohen, Associate Professor, Tel-Aviv University, Israel
Yeh-Heng Sheng, Informix Software, Menlo Park, CA

1991 Sanjiva Prasad, Professor, Indian Institute of Technology, India
R. Sekar, Professor, Stony Brook University
Roni Yagel, General Manager, Insight Therapeutics, Israel

1992 Maria Bonacina, Professor, University of Verona, Italy
Eugene Joseph, Motorola, Holtsville, NY
Chi-Chang Jou, AT&T Bell Labs, Middletown, NJ
Yuh-Jzer Joung, Professor, National Taiwan University

1993 Gudjon Hermannsson, Head of Computer Systems, Renaissance Technologies, NY
J. Hu, IBM Research, NY
Lori Scarlatos, Associate Professor, Stony Brook University

1994 Richardo Avila, (M.S.), Director, Kitware, Inc., NY
Lisa Sobierajski, Vice President, Kitware, Schenectady, NY

1995 Chih-Long Lin, Bell Corp. Research, NJ
C.R. Ramakrishnan, Associate Professor, Stony Brook University
Steven Dawson, SRI, Menlo Park, CA
Sidney Wang, Sony, CA
Shipei Zhang, Morgan Stanley, NY

1996 Karen Bernstein, Director, Forall Systems Inc., IL
Hanspeter Pfister, Professor, Harvard University, MA
Konstantinos Sagonas, Assoc. Prof., Uppsala University, Sweden
Claudio Silva, Assoc. Professor, University of Utah, UT
Oleg Sokolsky, Research Assoc. Prof., University of Pennsylvania, PA
Chitra Venkatramani, IBM T. J. Watson Research Center, NY
Manish Verma, Sun Microsystems Inc., Mountain View, CA
Michael Vernck, Bell Labs, NJ
Michael Wynblatt, Director, Venture Technology, Siemens, CA

1997 Ting Chen, Assoc. Professor, University of Southern California
Juliana Freire, Assoc. Professor, University of Utah, UT
Lichan Hong, Palo Alto Research Center, CA
Prasad Rao, HP Labs, Princeton, NJ

1998 Francine Evans, Schlumberger GeoQuest, Houston, TX
K.D. Hunter, Chief Scientist, NeoMedia Technologies, FL
Cristian Mata, Renaissance Technologies, NY
H.W. Shi, UBS Warburg, NY

1999 Baoquan Chen, Shenzhen Institute of Advanced Technology, China
Jihad El-Sana, Senior Lecturer, Ben-Gurion Univ. of Negev, Israel
Pedro Alexandre Ferreira Do Souto, University of Porto, Portugal

2000 Baoqiu Cui, IBM Silicon Valley Lab, San Jose, CA
Xiaoqun Du, Google, Inc., NY
Tulika Mitra, Associate Professor, National University of Singapore
Abhik Roychoudhury, Assoc. Prof., National University of Singapore
Asish Tiwari, SRI, Menlo Park, CA
Srinidhi Varadarajan, Associate Professor, Virginia Tech, VA

2001 Barry Cohen, Asst. Prof., New Jersey Institute of Technology
Prashant Pradhan, Research Staff Member, IBM T.J. Watson Research Center, NY

2002 Frank Dachille, Google, Inc., CA
Hasan Davulcu, Assistant Professor, Arizona State University
Vladimir Filkov, Asst. Prof., University of California at Davis, CA
Kevin Kreeger, Hologic, Inc., CA
Anindya Neogi, IBM India Research Lab, New Delhi, India
Pavel Sumazin, Assistant Professor, Portland State University, OR
Guizhen Yang, Assistant Professor, University at Buffalo, NY

2003 Samik Basu, Assistant Professor, Iowa State University, IA
Luis de Castro, Google, Inc., NY
Yifei Dong, Assistant Professor, University of Oklahoma, OK
Kartik Gopalan, Assistant Professor, Binghamton University, NY
Lan Huang, Research Staff, IBM Almaden Research Center, CA
Vinhthuy Phan, Assistant Professor, University of Memphis, TN
Bikram Sengupta, IBM India Research Lab, New Delhi, India

2004 Jing Hua, Assistant Professor, Wayne State University, MMI
Piyush Kumar, Assistant Professor, Florida State University, FL
Sarang Lakare, Siemens Corporate Research, PA
Mahesh Marina, Assistant Professor, University of Edinburgh, Scotland
Huamin Qu, Assist. Prof., Univ. of Science and Tech., Hong Kong
Hui Xie, Research Staff Member, Siemens Corporate Research, NJ

2005 Yu-Sung Chang, Senior Research Engineer, Wolfram Research
Saikat Mukherjee, Research Staff, Siemens Corporate Research, NJ

2006 Xiaohu Guo, Assistant Professor, University of Texas at Dallas
Ying He, Assistant Professor, Nanyang Technological University
Saumyadipta Pyne, Research Associate, MIT Broad Institute, MA
Charles P. Wright, Research Staff, IBM T.J. Watson Research Center
Ye Zhao, Assistant Professor, Kent State University, OH
Lei Zhang, Research Staff, Siemens Corporate Research, NJ

2007 Katia Hristova, Asst. Prof., New York City College of Technology
Vishnu Navda, Research Staff Member, Microsoft Research, India
Neophytos Neophytou, Scientist, Intelepix LLC, NY
Fang Xu, Research Staff Member, Siemens Corporate Research, NJ
Haitao Zhang, Software Engineer, NVIDIA, CA

2008 Zhe Fan, Google, Inc., CO
Miao Jin, Assistant Professor, University of Louisiana at Lafayette
Jalal Mahmud, Research Staff, IBM Almaden Research Center, CA

Perspectives

Our alumni share their experience.

Alumnus Divyakant Agrawal
Professor, University of California at Santa Barbara
The time I spent at the Department of Computer Science at Stony Brook for my graduate education was the most rewarding period of my life. Not only did Stony Brook prepare me well for my professional life, the faculty, staff, and graduate students at Stony Brook provided me with an excellent model of the collaboration that is necessary for a successful academic enterprise. If I had to choose a graduate program again—Computer Science at Stony Brook would still be my top choice.

Alumna Lisa Sobierajski Avila, Vice President, Kitware, Inc.
I believe that the benefits obtained from a graduate education are proportional to the effort invested, both on the part of the student and the academic program. I found the Computer Science graduate program at Stony Brook, and in particular, my advisor Arie Kaufman, to be both demanding and supportive. At the time, I often felt that giving seminar presentations, participating in team projects, advising new students, and providing lab tours were burdensome tasks that were secondary to my formal studies and research pursuits. I can now clearly see that these were opportunities for me to learn and grow in ways that endure long past the point when a specific academic lesson is forgotten. In fact, it was these informal lessons that gave me the courage and confidence to succeed in my current endeavor. Although technical expertise is important, I have found that good communication skills, teamwork, and the ability to accept responsibility personally and learn from your mistakes are essential ingredients for success. My advice to current and prospective students at Stony Brook is to embrace the entire educational experience. Participate in activities that require you to interact not only with other researchers in your field, but also with people who have no background in your area. The ability to defend your research to your thesis committee will earn you a degree, but the talent to explain your research to a group of sixth-grade students while educating them about the possibilities for the future will earn you a successful career.

Alumnus Kartik Gopalan. Assistant Professor,
Department of Computer Science, SUNY Binghamton
The environment in the Department of Computer Science provided me with the complete freedom to nurture my first passion—playing with and building real systems. As a member of a dynamic group led by Professor Tzi-cker Chiueh, I was able to learn not only from some of the brightest systems researchers in the country, but I also had the opportunity to translate my own research ideas into working field products. The best facet of the department faculty has been the wide array of expertise in all areas of computer science. I was able to draw significant guidance from a number of encouraging faculty members in algorithms, distributed systems, and networking. Additionally, the student body in the department itself is intellectually bright and socially vibrant. A number of forums such as the weekly Donut hour, the Graduate Student Council, and the annual Graduate Research Conference, are just a few of the many ways to interact closely with other graduate students. The combination of dynamic and encouraging faculty to learn from, bright fellow grads to interact with, and the beautiful environs of Stony Brook village makes for an ideal graduate student life.

The best facet of the department faculty has been the wide array of expertise in all areas of computer science.

Alumnus John Hennessy, President, Stanford University
When I arrived at Stony Brook in early 1974, after completing my undergraduate degree in Electrical Engineering, I entered the Ph.D. program with little exposure to Computer Science as an academic discipline. I had completed a number of programming courses, done some consulting, and was an admitted hacker (back when it was something to be proud of!). My formal knowledge of Computer Science as a discipline with elegant and fascinating theoretical foundations, however, was completely missing. At Stony Brook, I learned to be a computer scientist, and I learned the love of our discipline. I also had the wonderful experience of relating to the faculty as colleagues—colleagues engaged in joint research and colleagues who often learned together in the classroom. When I completed my Ph.D., I felt that I had learned the skills of being an independent researcher, had achieved a broad level of mastery of Computer Science, and was both well-read and able to converse in depth in my area of specialty. More than 25 years later, those are the same skills I try to nurture in the graduate students with whom I work.

Alumnus Myung Oh, President, Konkuk University, Seoul, Korea
The single greatest asset my experience at Stony Brook University afforded me was the ability to work confidently and comfortably with people, allowing me to participate in a broad spectrum of activities. Indeed, when I served as Senior Secretary to the President for Economics and Science Policy in Korea in the early 1980s, I was able to push ahead with developing electronics, semiconductors, and telecommunications as key future industries of Korea against surging opposition from economy bureaucrats. Also, when I served as Minister of Communications in the 1980s, I could boldly pursue the development of Time-division Telephone Exchanger (TDX), 4MD RAM, CDMA, and Supermini Computer technologies as well as the planning of the high-speed train and Incheon International Airport as Minister of Construction and Transportation in the 1990s. From my perspective, I was provided with an invaluable set of skills and strategies, which has allowed me to pursue a diverse and rewarding career at public and private levels in

Korea as Deputy Prime Minister, Minister of four different administrations, Chairperson of Korea's first EXPO, President of the Korea Baseball Organization (KBO), President of Donga Daily Newspaper, and President of Ajou and Konkuk Universities.

Alumnus Hanspeter Pfister, Professor, Harvard University

My extraordinary story is that a company was founded on the Ph.D. research I completed in 1996 at Stony Brook. It is not very often that a new Ph.D. graduate gets the opportunity to turn a thesis into a successful product. In my case, it was certainly a matter of fortunate timing, but also a matter of encouragement, persistence, and long-term vision by my advisor, Arie Kaufman. In 1991, I came from Switzerland to the Department of Computer Science. What struck me immediately was the warm, familiar atmosphere between faculty and graduate students. In 1992, Professor Kaufman and I started working on Cube-3, hardware architecture for real-time volume visualization. By the end of my Ph.D. thesis, we finished the architecture of Cube-4. Mitsubishi Electric licensed the Cube-4 technology, and in 1996 I joined MERL, a Mitsubishi Electric Research Laboratory in Cambridge, Massachusetts, as a research scientist. It took two more years to make Cube-4 into a product, called VolumePro, and it took another year to found Real Time Visualization to design, market, and sell VolumePro. Overall, it took 15 years from the start of the Cube research to the first sale of VolumePro, and it was both an exciting and a challenging time. It takes visionaries such as Arie Kaufman and a nurturing and encouraging academic environment to make such dreams come true. The highest praise I can offer to Stony Brook is that it fosters such an environment.

Alumnus Nii Quaynor, Chairman and CEO, Network Computer Systems, Ghana

Graduate school experience at Stony Brook prepared me very well to lead the Internet revolution in Africa. I had learned to work from basic principles and develop abstractions in implementing system solutions. After my subsequent industrial experience at Digital, I returned to Ghana to first establish a computer science undergraduate department at University of Cape Coast and then founded the company Network Computer Systems that introduced the Internet to West Africa in 1994. Guidance from Professor Art Bernstein ensured that I remained applied to my work in distributed systems which enabled me to develop the Internet in Africa. That guidance remained with me as I worked toward building a community of operators in Africa who participate in technical policy about the Internet. Becoming a recipient of the Jon Postel Award makes me appreciate the experience at Stony Brook even more.

Alumnus Fred B. Schneider, Professor, Cornell University

A Stony Brook graduate education launched me on a rather successful career path as a Computer Science researcher and academic. The collegiality and scientific cohesiveness made it a warm educational environment and the quality of the faculty and students made it an exciting one. Although the department has since dramatically expanded its facilities, its areas of research, and its faculty (including one of my own Ph.D. students), the department remains true to its roots, resulting in a vibrant and supportive place to do graduate work in Computer Science.

Graduate students enjoy a lively, friendly atmosphere for socializing and studying.

Living in Stony Brook

The University is located in one of the East Coast's most desirable spots—the North Shore of Long Island, about 60 miles east of New York City (midway between Montauk and Manhattan). The tranquil waters of Long Island Sound are just minutes away to the north, and the white sandy beaches of the Atlantic Ocean beckon southward.

North of the University, within easy bicycling distance, lies the historic Village of Stony Brook. Its quaint shopping area was created by Ward Melville, heir to the Thom McAn shoe fortune. (Ward and his wife, Dorothy, donated the land where the campus now stands.) One of the best ways to experience Stony Brook Village is to pick up an ice cream cone from the Brook House restaurant, sit on the village green, and enjoy an unobstructed view of the sunset or the fishermen trying their luck at the dock. Across the street is the landmark Three Village Inn, dating back to pre-Revolutionary days. The Stony Brook Grist Mill, built in 1751, is a working mill open to the public for tours. Local cafés and bookstores make the Stony Brook Village area a great place to spend the day.

The Academic Mall, a focal point of campus life, features two fountains, benches, and areas for students to unwind before class.

Cultural Diversity

Culture abounds on Long Island. Although Manhattan is only a train ride away, theatre lovers need travel no further than the Staller Center for the Arts. Located on the Stony Brook campus, the Staller Center presents hundreds of plays, concerts, and special events each year. It houses the 1,100-seat Main Stage Theatre and a 4,700-square-foot art gallery. Staller's summer film festival is recognized as a "mini-Sundance." For those who enjoy cultural events, the Charles B. Wang Center, Celebrating Asian and American Cultures, is a comprehensive conference facility and showcase for the arts, featuring exhibit spaces, interior and exterior pools, gardens, and a chapel. In Stony Brook Village, the Long Island Museum of American Art, History, and Carriages is a must-see for art and history lovers. The complex houses one of the world's largest collections of horse-drawn carriages and the paintings of William Sidney Mount, a Stony Brook native who became the nation's first famous "genre" painter.

Just a 30-minute drive west, the village of Huntington offers the Cinema Arts Center, where one can view the latest "indie" films. In recent years Long Island has developed a reputation for its blues music scene, but a growing number of coffeehouses present other types of music as well; folk, bluegrass, and jazz are just a few of the styles you'll find.

For sports and fitness enthusiasts, the University has a 5,000-seat indoor Sports Complex complete with running track and a pool. The outdoor 8,300-seat stadium holds major sporting events and concerts. The Paul Simons Memorial Bicycle Path—six miles of well-lit, paved trails that encompass the campus—is used year-round by cyclists, skaters, and runners. The Student Activities Center houses the Eugene Weidman Wellness Center, which offers fitness classes in everything from aerobics to yoga, and state-of-the-art exercise equipment. If professional sports are your thing, Long Island has its own ice hockey team, the New York Islanders, and minor-league baseball team, The Long Island Ducks. The excitement of Madison Square Garden, Yankee Stadium, and Shea Stadium (home of the New York Mets) is only 60 miles away.

Long Island is heaven for "foodies." Just about every cuisine you might think of can be sampled here, from seafood shacks to the latest in nouveau cuisine. The region's growing reputation as a producer of excellent wines makes for a pleasant day's tour of Long Island's wineries.



Situated between Manhattan and Montauk, Stony Brook offers the best of both worlds. Our central location provides students with access to a variety of shopping areas, historical landmarks, beautiful parks and beaches, and Broadway-quality entertainment at the Staller Center on campus.

For those who like to "shop till they drop," Long Island does not disappoint. It's home to Roosevelt Field, the nationally known shopping mall, and the Smithhaven Mall, which is just minutes from campus. Long Island offers every type of store, from the nation's first supermarket (King Kullen) to retail outlets, including the popular Tanger Outlet in Riverhead, featuring more than 200 stores.

Family Life

Stony Brook is a great place for families. The University strives to provide students with everything they need to create a home away from home, from the Barnes & Noble bookstore, full-service deli, and health-care facilities to the craft sales, seasonal farmer's markets, and DVD loans at the library. One- and two-bedroom apartments for couples and families, and three- and four-bedroom apartment shares for single graduate students are available on campus at the University Apartments. The Off-Campus Housing Service office will also assist students in finding suitable arrangements close to campus. For families with young children, the Stony Brook Child Care Center offers day care for children ages six weeks to five years old.

Nature's Bounty

Long Island is rich in wild landscapes. The campus is close to the Fire Island National Seashore. To the east lies the unique ecosystem of the pine barrens, where The Nature Conservancy maintains a number of hiking trails and nature preserves. The area's miles of seacoast make it paradise for boaters, anglers, and windsurfers. In fact, the campus is surrounded by Long Island's maritime heritage. Port Jefferson, Setauket, and Stony Brook were once bustling shipbuilding centers; today the ferry that links Port Jefferson to Bridgeport, Connecticut makes the area a convenient jumping-off point for trips to New England.

Life at Stony Brook has something for everyone, no matter where you're from or what your goals may be. The diversity of the people who live, study, and work here helps our community thrive. There is the tranquil pace of the surrounding Village, which has managed to preserve an old-fashioned, small-town atmosphere. At the same time, there are the cutting-edge resources and the abundant international culture of the University itself.

From the marina to the popular Three Village Inn, Stony Brook village provides a variety of shopping, dining, and outdoor activities

Application and Admission

Application Information and Deadlines

The admission process is described in detail on the departmental Web site, *www.cs.stonybrook.edu*. The Web site includes instructions for online application along with the most current information about the deadlines, and a host of other information about our programs. In addition to completing the forms, applicants need to provide: (1) two official transcripts of undergraduate and (if applicable) graduate coursework; (2) official Graduate Record Examination (GRE) scores; (3) an acceptable score on TOEFL for foreign students; (4) three letters of recommendation; and (5) a nonrefundable $60 fee.

Admissions to the M.S. and Ph.D. programs are handled separately, but both are highly competitive. The minimal requirements for admission to graduate study in computer science are a bachelor's degree, usually in a science or engineering discipline or in mathematics (the transcript should show a grade average of at least B in all undergraduate coursework, and in the science, mathematics, and engineering courses); and two semesters of college-level calculus, plus courses in linear algebra and discrete mathematics. Also desirable is a course in either probability theory or probability and statistics. The applicants are expected to demonstrate a minimal background in computer science, satisfying at least five of the following seven proficiency areas with undergraduate level coursework—theory of computation, algorithms, languages/compilers, architecture, databases, operating systems, and networks/graphics. Students who have not completed such courses may take them on a non-matriculated basis prior to applying to the graduate program.

The deadline for receipt of applications and all supporting materials is usually January 15 for fall admission and October 1 for spring. However, applicants are well advised to consult the admission information on the Web site to make sure that the deadlines have not been changed.

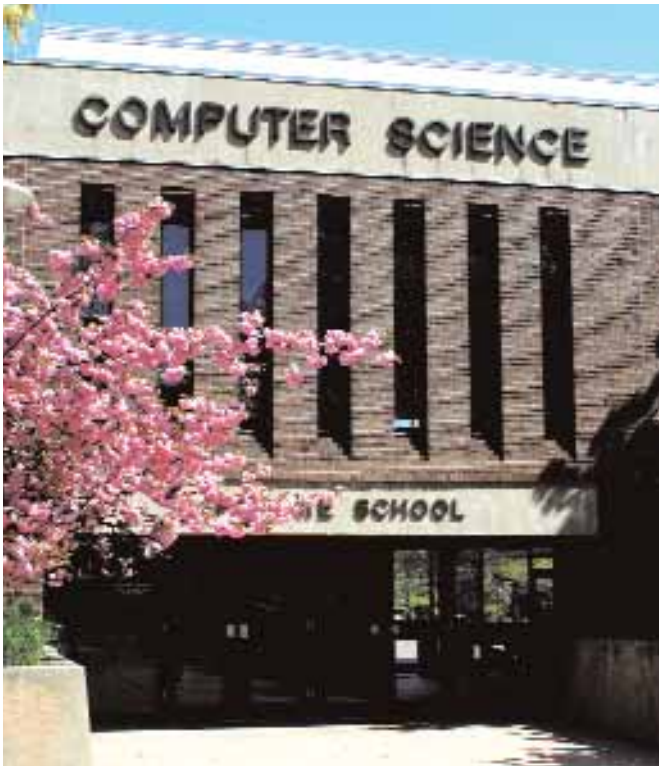
Financial Support and Benefits

First year Ph.D. students are generally supported by teaching assistantships; research assistantships are used to support continuing Ph.D. students. Research/teaching assistantships are sometimes also given to qualified M.S. students. In addition, a number of support opportunities in other academic and administrative departments generally become available to computer science graduate students each year. Teaching and research assistants are assigned part-time duties in the instructional programs or in faculty-supervised research projects, but are still able to carry a full academic program load. An assistant works 20 hours per week for the nine-month academic year and receives the current state rate of stipend plus tuition reimbursement and health benefits. In addition, the department often adds to the state rate for incoming students in the form of a supplement for the first summer. After the first year, Ph.D. students are eligible for additional financial support through their research advisor.

Summer stipends are funded almost entirely by research grants, and the availability of such support and the amount of the stipend may vary from year to year and depend on the student's research area and advisor.

Departmental Web Site

Prospective graduate students can find useful information about Stony Brook on the University's home page on the World Wide Web (*www.stonybrook.edu*). The first page of this site directs the reader to information about the Stony Brook area, campus events, libraries, and academic and research programs. It also links to a list of Web sites for every department and program on campus. One can also go directly to the Department of Computer Science home page (*www.cs.stonybrook.edu)*. Here, one can find more detailed information about the department, faculty, courses and research programs. Graduate students often maintain Web pages of their own that are linked from the departmental Web page. Also available are descriptions of various research labs, activities of graduate students in the lab, and descriptions of current research projects and publications.



The Computer Science Building

How to Get Here

Directions to Stony Brook University

By Automobile

Take the Long Island Expressway (Route 495) to exit 62 N; follow Nicolls Road (Route 97) north for nine miles.

By Railroad

Take the Long Island Rail Road's Port Jefferson line (631-231-LIRR) to Stony Brook.

By Bus

Call Suffolk County Transit (631-852-5200) for schedules, rates, and routes for buses to campus from many local towns.

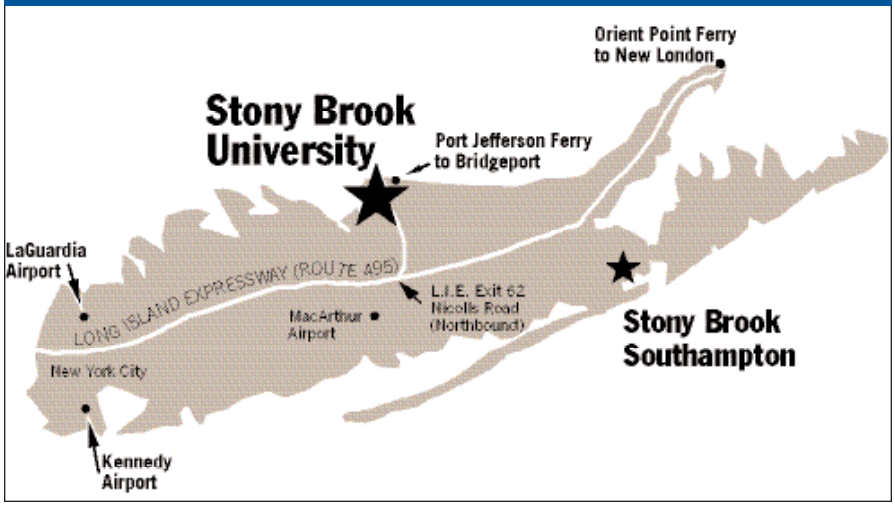
By Air

Land at Kennedy or LaGuardia Airport, 50 miles west of campus, or at Long Island MacArthur Airport (631-467-3210), ten miles south of campus. All airports offer limousine and taxi service to campus.

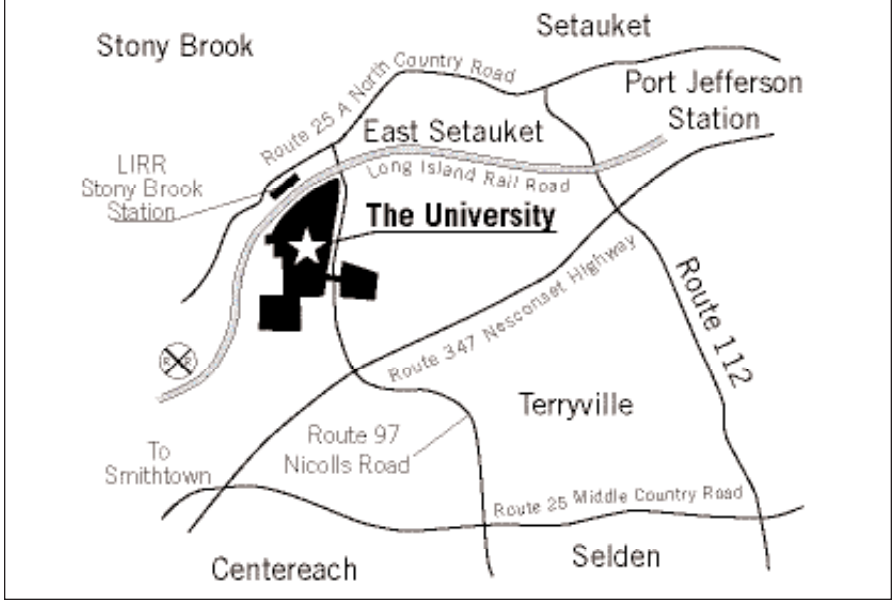
Ferry Connection

Connecticut car ferries run from Bridgeport to Port Jefferson (631-473-0286) and from New London to Orient Point (631-323-2525); call for schedules and information.

Long Island



University Area



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For more information about Stony Brook, visit us on the Web at *www.stonybrook.edu*

On the cover: The essence of the Department of Computer Science Cover image by Tony Scarlatos.

www.cs.stonybrook.edu