Did you ever play with LEGO when you were young—building structures, all-terrain vehicles, monsters, superheroes, or abstract designs? Have you ever wondered what it would be like to live on Mars, Jupiter, or another planet? Well, the For Inspiration and Recognition of Science and Technology (FIRST) Organization, founded by inventor Dean Kamen, has teamed up with the LEGO Company to create FIRST LEGO League so that kids can use their imagination, work with LEGO, and learn about science and technology in a way that

(continued on page 2)

Children developing enthusiasm for science and technology through participation in a FIRST LEGO League Competition
During the intervening years, 20 degree programs were developed and implemented in computer science, information systems, technology systems, telecommunications, Internet technology, and software engineering at the baccalaureate and master’s levels. In 1999, a doctoral program in computing began. Enrollment grew tenfold from 200 in 1983 to 2,000 in 2003. In addition to degree programs, CSIS includes the Center for Advanced Media, Robotics Laboratory, Pervasive Computing Laboratory, Undergraduate Research Center, Digital Art Gallery, Center for Formal Methods, NACTEL program, CLOUT program, Technology Center for Education and Community Outreach, and Pace Computer Learning Center.

Not long after founding the School, the CSIS Advisory Board was established. The board has been a critical and active part of CSIS’ development. Two original members, Allen Deering, PepsiCo, Inc., retired, and Gary Popovich, IBM, retired, continue on the board where Allen serves as chair of the Nominating Committee. Both individuals were honored at the School’s 10th anniversary ceremony.

CSIS takes pride in its excellent faculty and staff, wonderful students, outstanding alumni and alumnæ, and friends. All of you are the people who made CSIS what it is today and we count on all of you to make it an outstanding school of computing tomorrow.

CSIS has evolved and implemented a multitude of academic affairs, will be hosting a FIRST LEGO League Tournament for 17 teams from Westchester, Rockland, and Putnam counties on Sunday, February 8, 2004. The steering committee for the event consists of faculty, staff, and students from the Pace community; industry professionals; and regional schools and community organizations. A team of CSIS students drawn from C.I.R. C.U.I.T., the Westchester undergraduate student organization, is creating a Web site to disseminate information regarding the event, registration, materials needed, and the missions for the benefit of the competing teams. Another team of CSIS students will be learning the LEGO Mindstorms programming package and will staff an online help desk for teams and coaches during the event.

On Sunday, February 8, children, ages 9–14, from local schools, Girl Scout troops, and neighborhoods, will be getting together for the tournament. Each year there is a different internationally announced challenge, and this year’s challenge is Mission: Mars. Students will have to design a robotic device to explore and colonize a simulated, tabletop version of the Martian terrain. In addition to the predetermined tournament missions that the robot will need to complete, the teams will be judged on robot design and programming, a required 10-minute research presentation, and demonstrated teamwork.

It is not just about getting the highest score. It is about the whole experience—creative thinking, working together, and figuring out how to solve problems using engineering techniques and robots. Teams will be evaluated on how well they demonstrate good citizenship, innovation, and the application of technology. According to Anna Maenhout, the director of FIRST LEGO League, the judges will be focusing on the following: “Are you learning about science and technology? Are you applying the concepts? Are you a good citizen and did you treat everyone with respect? If there were teams in need, did you help them out even though they were competing against you? We look at all of those qualities, we put them together and that’s how we define the ultimate FIRST LEGO League Team. It is not enough to get youngsters excited about science and technology, they also need to be good citizens. Put the two of them together and the possibilities are endless.”

For additional information regarding the upcoming FIRST LEGO League Tournament, or to volunteer to assist on the day of the event, contact Bernice Houle at (914) 773-3592 or at bhoul@pace.edu.
MetLife Exec Cavanagh Honored

Event Breaks Fund-Raising Record

by Louise P. Kleinbaum, Assistant Dean and Director of Communications

he rooftop of Reuters in Times Square was the setting for this year’s Award Reception for Leadership and Service in Technology hosted by the School of Computer Science and Information Systems. Over 350 members of the CSIS community, including faculty, staff, students, CSIS Advisory Board Members, alumni/ae and representatives from the corporate IT community attended the reception on June 2 to honor Daniel J. Cavanagh, executive vice president of operations and information technology at MetLife.

The Award for Leadership and Service in Technology, initiated in 1996, is presented annually to the individual or company that best exemplifies leadership in the field of technology, innovation in the application of technology to serve people, and commitment to community service and education. Daniel Cavanagh’s record of professional achievement, corporate citizenship, and community outreach reach more than met the criteria.

Starting as an insurance trainee in 1957 at MetLife, Mr. Cavanagh advanced through positions of increasing responsibility in the technology and business sectors of the organization. He is currently executive vice president in charge of operations and information technology, and is a member of MetLife’s Executive Group, comprised of the top nine leaders of the enterprise. Mr. Cavanagh has championed technology innovation throughout his career and he continues to drive technology solutions that enable MetLife’s businesses. He was recently named one of the “Premier 100 IT Leaders” by Computerworld.

Breaking with tradition, this year CSIS invited a guest speaker to deliver a keynote address at the beginning of the presentation on an important issue in science and technology. The first person to assume this role was Dean Kamen, an inventor, entrepreneur, and tireless advocate for science and technology, who actually transported himself to the event on one of his inventions—the Segway Human Transporter, which has been seen recently in increasing numbers around Manhattan. Kamen spoke provocatively on “Educating the Next Generation in Science and Technology.”

Dean Kamen is personally committed to getting children excited about science and technology. To that end, he established an organization called For Inspiration and Recognition of Science and Technology (FIRST) that sponsors the FIRST Robotics Competition, which teams professional engineers with high school students across the country. Winners from last year’s competition in the New York metropolitan area representing Brooklyn Technical High School were present at the event along with their prize robot. With the success of the FIRST Robotics Competition, Kamen introduced a second competition for younger children, ages 9–14, in 1999. FIRST partnered with the well-known LEGO Company to create the FIRST LEGO League (FLL) competition that uses Legos as the medium for constructing robots. The FLL has experienced tremendous growth, reaching more than 25,000 children in the United States since its inception.

CSIS is pleased to announce that Pace will host an FLL competition this year. The event has been scheduled for February 8 on the Pleasantville campus.

The evening began with an elegant cocktail reception. An hour into the reception, the formal program started with a welcome by University President David A. Caputo, followed by introductions of each speaker by Susan M. Merritt, CSIS dean. After remarks made by Daniel Cavanagh, the honoree, he was presented with a citation read by Dean Merritt and a crystal paperweight from Tiffany’s to commemorate the event.

The annual Award Reception is the primary fund-raiser for CSIS and all proceeds from the event benefit the CSIS Endowed Scholarship Fund. Twelve students received scholarships from this fund, ranging from $500 to $4,000 during the 2002–2003 academic year. In spite of the overall downturn in the economy and the IT market in particular, attendees responded with unprecedented generosity. The event generated $167,000, the largest amount raised to date. The success of this year’s event is largely attributable to Howard Medow of Modis, Inc., and Judith Spitz of Verizon, both CSIS advisory board members, and to the Sponsorship Committee.

Encouraged by the ongoing success of the Award Reception, the School expects to continue to host this event annually. The date for next year’s event has already been set: Thursday, June 8. Details will be announced shortly.
With the proliferation of increasingly crippling computer viruses, it is essential that IT professionals—practitioners and academics—be aware of how the viruses are deployed in order to develop strategies that deter or counteract viral problems. With this in mind, CSIS invited Dr. Hal Berghel, an expert in the field of Internet security and forensics, to raise the consciousness of the CSIS community through a series of talks on related topics.

Dr. Hal Berghel, director of the School of Computer Science at the University of Nevada in Las Vegas, is a Fellow of the ACM and IEEE professional organizations. Dr. Berghel currently chairs the ACM Technology Outreach Program and Electronic Committees, serves on the ACM Publications Board, and is past director of the ACM Lectureship Series. He is a three-time recipient of the ACM Outstanding Lecturer of the Year award (1996, 1997, and 1998), and his columns, editorials, and articles appear regularly in such publications as Computer, Communications of the ACM, and Networker. In addition, Dr. Berghel has worked as an Internet security consultant to various organizations, including law enforcement agencies, over the past ten years.

Dr. Berghel first addressed the CSIS faculty on “The Discipline of Internet Forensics” at the fall CSIS Faculty Council meeting held in New York City on Friday, October 31. Then on Monday, November 3, he began the day with “Digital Prophecy: A Crystal Ball for the New Millennium” at a breakfast for IT executives at the Chemists’ and Midtown Executive Club. He continued with a talk on “Hacking 2003: Beyond Viruses and Trojan Horses,” directed at undergraduate students and the Pace community at large on the downtown campus; then concluded with “Hijacking the Net” cosponsored by CSIS and the CSIS Alumni Association for the benefit of CSIS graduate students and alumni back at the Midtown venue.

In all but the presentation to the IT executives, Dr. Berghel emphasized how important it was for academic institutions to make their students aware of the prevalence of hacking and the damaging nature of its consequences in the hope that future IT professionals will be sensitive to the illegals of this behavior and will strive to develop the means to prevent or counteract it. This can be done by emphasizing the ethics of computing across the curriculum and by requiring a stand-alone computer and society course.

Currently, computer viruses and Trojan horses are doing greater damage and affecting more computers because many systems and individual PCs are unprotected, and hacking software tools are more readily available to those who wish to do harm. Furthermore, there is the inherent conflict between protecting an operating system and fostering its usability. If sufficient barriers are created to provide protection, accessibility is reduced. Microsoft, the most widely used operating system, has opted for accessibility, which, in turn, is the very source of its vulnerability. Consequently, the price one pays for this freedom, as with democracy, is eternal vigilance.

In his address to the IT executives, Dr. Berghel took a more future-oriented tack. He encouraged his audience to stay abreast of what is happening in the industry in order to try to predict and plan 36 to 48 months out since surprises can be highly destructive to an organization. It is also important to distinguish between a trend, which may be fleeting, and a paradigm, which is a major enduring shift in the industry. As for the future, Dr. Berghel predicts that physical information storage devices such as books, DVDs, and servers will become irrelevant because they are limiting and that the emphasis will be on wireless communication because of the mobility it affords the user.

CSIS, for its part, has always emphasized the ethics of computing in its curriculum and currently offers an undergraduate course required of B.S. in computer science majors in research methods in computers and society. Because of heightened awareness of security issues, new courses in computer, network, and Web security are currently being offered and a credit-bearing certificate program in information security is under consideration. Dr. Bel Raggad, an information systems faculty member, has been recognized for his efforts to help developing countries protect themselves from cyber-terrorism and is presently teaching IT security in Tunisia under a Fulbright Scholarship.

The Pace Computer Learning Center, a division of CSIS that teaches noncredit courses and conducts corporate training programs, offers a broad range of classes in information security. For more information, call (212) 346-1222 or (914) 422-4054 or visit http://pclc.pace.edu.

The round of engaging, informative, and sometimes disturbing talks delivered by Dr. Berghel left his listeners with a great deal to think about.
New Accelerated Online Baccalaureate Available

by Dr. David Sachs, Associate Dean

In early August 2003, the School of Computer Science and Information Systems received approval from the State Education Department to offer a new concentration in telecommunications in its existing B.S. in Professional Technology Studies program. This accelerated degree is available online and was developed for the adult student who has work experience and an associate’s degree or its equivalent. By September, 13 students had already begun their studies in this new program. Here are some of the details.

Most of the students in the telecommunications concentration will be working in corporations that are in the telecommunications business. They want to complete their bachelor’s degree and have the credentials and knowledge that will enable them either to be promoted within their company or to move to another employer. Specifically, the concentration strives to:

- Provide a strong foundation in the technical and nontechnical aspects of emerging telecommunications technologies
- Establish an understanding of technology management
- Develop skills to work effectively with the Internet and to create multimedia Web pages
- Refine an ability to work on teams to solve problems
- Use innovative technology to manage projects and establish cost projections
- Prepare graduates for development of effective interpersonal relationships in organizations, including superior-subordinate relationships; formal and informal group interactions; and interpersonal and intergroup conflict, motivation, and job satisfaction
- Develop an understanding of the theory and practice of effective communication among individuals from diverse domestic and international cultures

To learn more about prerequisites, program requirements, and how to apply, visit www.csis.pace.edu/bsintelecom.

Students can potentially complete the program within two years if all requirements are completed. To allow for personal schedules, however, the program is flexible enough to accommodate students who wish to take only one course per term or to take a term off with intentions of returning.

The new degree was developed in response to requests made by students graduating with A.S. degrees in applied information technology through the highly successful NACTEL Program who wished to continue towards a bachelor’s degree. The new B.S. program has been endorsed by the NACTEL Governing Board, and is being promoted to NACTEL individuals who work for Verizon, SBC, and many others.

If interested in participating in the Sloan Scholar program, contact Joan Mark at jmark@pace.edu.
D.P.S. in Computing Kicks Off Fifth Year

by Chris Longo, D.P.S. Program Administrator

On the first day of class for 19 new Doctor of Professional Studies (D.P.S.) in Computing students, a kickoff luncheon was held at the Graduate Center in White Plains, welcoming them into the CSIS community. On hand to greet the new students, who make up the Class of 2006, were CSIS faculty and staff members as well as University administrators who provide support for the D.P.S. program.

Pace’s new provost Dr. Joseph E. Morreale offered welcoming remarks and Dean Susan M. Merritt gave a brief presentation on the demographics of the program, which is now in its fifth year. The students then introduced themselves. Later in the afternoon during Dr. Fran Gustavson’s introduction to the Research Seminar class, the new students had the opportunity to meet further with the faculty and discuss research interests.

The students were on campus to attend a four-day orientation from Wednesday, September 10 through Saturday, September 13. As part of the orientation, Dr. Fred Grossman, program chair, and Dr. Joseph Bergin, D.P.S. faculty, initiated a series of games and projects, including Object Think—Agile Development, XP and Java, and Coffee Machine: Student Design Sprint, to familiarize the new class not only with coursework but with teamwork.

CLOUT Partners with Robin Hood Foundation

Assistance Given to People Impacted by 9/11

by Jonathan Hill, Lecturer in Technology Systems

The CSIS CLOUT Program, with the support of a $300,000 grant from the Robin Hood Foundation, is focused on providing computer applications training and job search skills to New Yorkers who lost their jobs in lower Manhattan as a direct result of the 9/11 attacks.

Working with various groups in Manhattan to identify qualified candidates, CLOUT has focused its proven curriculum on meeting the needs of these displaced New Yorkers. Students who enroll in the program are given in-depth training in Microsoft Office Suite, including Word, Excel, PowerPoint, and Access. They also learn keyboarding skills and Web design to gain a complete range of cutting-edge technology systems skills that make them more employable.

Another key component of the program has been the development of job search, resume writing and job retention skills, which are designed to help students obtain and retain good jobs. Coursework in business communications and career strategies help students build confidence in job search and interviewing techniques, which, in turn, helps them present their experience in the most advantageous way.

The CLOUT New York student body is very diverse. It includes finance professionals, an MBA from a top-ten business school, a celebrated dress designer, a hotel dining room manager with 30 years of experience, recent college graduates, a former disc jockey, a top restaurant sous-chef, a television executive, and a graphic designer with album covers for the Rolling Stones and Kraftwerk to his credit.

“This is a unique population for us,” said Lynne Larkin, director of the CLOUT program in New York. “Students who have entered the program have come from many different fields with varying levels of work experience and education. We knew that we could provide quality training in computing areas that will make them more employable. But this population has been unemployed for a long time and some of them are undergoing serious financial difficulties. Many of them also lived in the area of the World Trade Center and were deeply affected by 9/11. Fortunately, we were able to work with the Robin Hood Foundation, and utilize many Pace resources to meet the needs of the individuals in this group so that they could focus on their education and gain the computer skills that they need to credential themselves for employment.”

In addition to their coursework, students in the group complete 110–140 hours in an unpaid internship. Students in the summer cohort worked in industries as diverse as property management and the recording industry.

“The internship is a particularly important part of the program for these students,” said Larkin. “It allows them to test their new computer skills in a ‘real world’ setting. It also allows them to try working in an industry where they may have always wanted to work. Most importantly, it helps (continued on page 13)
PCLC Partners with AlphaNet

Training in Project Management and Information Security Expanded

by Babette Kronsstadt, PCLC Program Director

The Pace Computer Learning Center (PCLC) has formed an alliance with AlphaNet Learning Solutions. This partnership makes PCLC one of the premier corporate IT training providers in the New York metropolitan area by allowing it to combine the unique strengths of a respected university with leading IT training/consulting firm. Founded in 1984 to meet the technical education needs of Pace’s corporate neighbors, the PCLC has continued to fill its IT training role for almost 20 years by continually expanding and modifying its offerings and training models to meet changing corporate needs. The new partnership with AlphaNet continues this evolution.

AlphaNet has extensive experience providing excellent IT, project management, and security training, and has built strong relationships with best-of-breed organizations that provide strong curricula in these areas. The partnership will enable PCLC to expand its IT offerings and present comprehensive project management and information security training for the first time.

Highlights of PCLC’s expanded curriculum include:

- A full range of PMI-compliant project management offerings for IT professionals and other managers with project management responsibilities, including a 72-hour evening certificate program and two- to three-day seminars.
- Comprehensive information security classes for IT professionals and managers
- Wireless Network Administrator and Wireless Security Professional classes
- Expanded Microsoft offerings, including Server 2003, Exchange, SharePoint, and SQL Server
- Citrix and Checkpoint classes

The instructional and curriculum strengths and client base of PCLC and AlphaNet also complement each other:

- PCLC instructors include full-time faculty members as well as adjuncts and graduates who have leading positions with IT companies. They have extensive teaching experience and expertise in developing materials for online and classroom learning. AlphaNet instructors often combine consulting with teaching and hold leading industry IT certifications. The combined instructional and development staff of Pace, AlphaNet, and their partners brings a depth and breadth of technical expertise unique to training organizations.
- As part of Pace University, PCLC has deep ties to the community. Its training scope, therefore, includes providing solutions to many educational, government, and nonprofit agencies, and small- to mid-sized companies in addition to developing in-depth, comprehensive training programs for large corporations. AlphaNet has strong relationships with different area corporations and belongs to nationwide networks that will allow PCLC to develop nationwide corporate training solutions.

Through this alliance, Pace-AlphaNet can meet the training needs of IT professionals and managers who need to adopt better project management strategies. PCLC’s approach is to help clients maximize the interaction of people, process, and technology to achieve success. PCLC’s methodology is to provide students with practical, real-world experience they can immediately put to use.

For more information about PCLC training classes, visit the Web site at pclc.pace.edu.

CLOUT Director Larkin Recognized

Lynne Larkin, who was recently named CLOUT Director in New York City, was given an Award for Extraordinary Service to Humanity by the Bear Search and Rescue Foundation at a ceremony held at the USS Intrepid in Manhattan on September 6. This honor was bestowed on Larkin “for improving the lives of victims of 9/11 through retraining and employment assistance.”

CLOUT, which stands for Computer Literacy Opportunity University Technology, received a $300,000 grant from the Robin Hood Foundation’s Robin Hood Relief Fund last year to assist individuals living at or below Canal Street who suffered economic displacement as a result of the terrorist attacks. It was through this generous financial support and Larkin’s outstanding leadership that 50 individuals are being assisted on the long road to economic recovery.

CSIS Receives New NSF Grant

by Dr. Christelle Scharff, Assistant Professor of Computer Science

Computers are primarily used for automating numerical calculation, but they can also be programmed to make inferences through symbolic calculation. Powerful automated inference is key to a flexible and reliable computing infrastructure. Such technology can be used to build and analyze abstract models of complex systems, find bugs and optimizations in software and hardware designs, and in the design of more expressive programming languages. These engineering applications of inference technology require lightweight inference tools that are embeddable and composable.

Dr. Christelle Scharff, Computer Science, in collaboration with Dr. N. Shankar (principal investigator), Dr. H. Ruess and Dr. A. Tiwari from Stanford Research Institute (SRI) International, and Dr. C. Lynch from Clarkson University were recently awarded a National Science Foundation (NSF) Information Technology Research grant for $900,000 to support the Infer! project. CSIS will receive $95,000 of this amount. The goals of this joint project are to work towards achieving more effective automation in applications of automated deduction; building deductive middleware for defining, combining, and embedding inference procedures; and integrating the use of automated deduction in education. The latter goal is in agreement with an NSF Educational Material Development (EMD) grant that was awarded last year to Dr. Sotirios Skevoulis (principal investigator), Dr. Paul Benjamin, and Dr. Dennis Anderson of Pace on Integrating Formal Methods Tools into the Undergraduate Curriculum.

To kick off the project and explore synergies with other related efforts, the collaborating institutions organized a miniworkshop on automated deduction, formal digital libraries, and little engines of proof, which was hosted at SRI International in late October.
Students Collaborate on Rockefeller Preserve Web Site

by Terry Kim (MS/ITE), CSIS Graduate Assistant

Students in the CSIS computer science master’s program have collaboratively developed multimedia and interactive content for the Web site of the 1100-acre Rockefeller State Park Preserve (RSPP) in Sleepy Hollow, NY.

Now visible at www.csis.pace.edu/Rockefeller/prototype/, the content the students generated as a dynamic and interactive content was designed to complement the Web site www.friendsrock.org, developed by the Friends of the RSPP. The sites help to fill a need among visitors, volunteers, and donors for a comprehensive, electronic source of information about the preserve and its activities.

The students’ contribution includes interactive tours of the park's 24-acre lake and 23 miles of carriage roads, trail maps with detailed information for walkers and horseback riders, and even applications for equestrian and fishing permits. They also researched and prepared historical, geographical, geological, and botanical information about the preserve and details of its activities and programs. Given to New York State by the Rockefeller family in 1984 with additional donations in later years, the park is operated by the state's Office of Parks, Recreation, and Historic Preservation.

“We asked Pace for help because we knew the computer school links up really high-performance student work with practical experience,” said Alix Schnee, manager of RSPP.

The site became the capstone project of three students in the two-semester Software Engineering Seminar taught by Dr. Charles Tappert, director of the school’s Pervasive Computing Laboratory.

The students are Arati Avhad, of San Jose, CA; Shirali Agrawal, of Hartsdale, NY; and Xue Li, of Ossining, NY; all of whom graduated last spring. They presented the site and their techniques to peers, professors and the public at the School’s Annual Student Research Day. “We designed the site to be an interactive information gateway to the Preserve and hope it will attract more and more visitors to the park. In today’s age, the Internet is the most effective medium to reach people and generate interest from outside the area,” said Avhad.

“I am looking forward to working with Pace to further enhance our site. Frankly, I think the sky is the limit,” said Deanna Grant, administrative director of the Rockefeller State Park Preserve.

Students Compete in Information Security Demo

Last spring, six CSIS students participated in “Information Security Demo” sponsored by Norwalk Community College in Connecticut. Participants were required to make presentations on various aspects of information security, singly and in teams. Prizes were given for the best presentations. Of the six prizes awarded—First, Second, Third, and three Honorable Mentions—CSIS took three.

Third Place
Jeffrey Wheaton (BS/CS), “Java Class File Encryption”

Honorable Mentions
Team: Chris Tomkins (MS/ITE), William Raffaele (MS/IS), and Terry Kim (MS/ITE)
Topic: “Personal Honeyhops”
Advisor: Professor Matthew Ganis

Team: Avinash Srinivasan (MS/CS) and Kannan Govindarajan (MS/CS)
Advisor: Dr. Charles Tappert

This October, Mark Gor (BS/CS) placed third in a programming contest sponsored by the Consortium for Computing Sciences in Colleges and held at Montclair State University in New Jersey. He received a cash prize.
Although Pritesh Damani (MS/CS), was looking forward to last summer, I did not have any definite plans. As it turned out, Associate Dean Dennis Anderson mentioned that there were many research projects underway and wanted to know if I was interested in getting involved. I answered “yes” immediately without giving it a second thought. I could not have planned a better summer. I would like to share this wonderful experience with you.

Videoconferencing is one of the emerging fields of modern computing, CSIS has been taking an active role in researching the development of videoconference-based applications. Some of the research projects, carried over from the previous semesters, involved developing efficient ways of performing IP videoconferencing over the Internet and designing applications, which could make use of the tremendous potentials of Internet 2. In layman’s language, Internet 2 is a second stage of the Internet; it is the advancement of the current level of Internet to a new dimension. Internet 2 and its members are developing and testing new technologies, such as IPv6, multicast, and quality of service (QoS) that will someday revolutionize Internet applications. In this modern computer age, almost every person owns a computer with a camera, and has fast Internet connectivity, which would enable him or her to see and talk to someone anywhere in the world. This, in itself, is a tremendous achievement. A technology called VOICE over IP has been exploited to achieve this facility.

As a graduate research assistant, I have been devising a plug-in, which could be added to any kind of conference software. This plug-in would give the conferencing software the intelligence to schedule meetings among peers. Although it may not seem to be a problem at first, envision 50 people trying to negotiate a time slot for a meeting. Picture intelligent software that goes into a calendar maintained by all the peers in that domain. The software would try to find a desirable time slot for the meeting. Artificial intelligence, probabilistic models, and bidding mechanisms all enter into this decision making. The amount of computation required for computing the probable time slot grows with the number of peers involved.

Aaron Labiaga (BA/CS), an undergraduate research assistant, and I have been working on a National Science Foundation (NSF)-funded project involving the existing open source protocol called OpenH323. OpenH323 protocol is an alternative version of the commercial H323 protocol. The drawback of this alternative is that it is still under development; hence, people who try to use it experience many difficulties. After overcoming many of these difficulties, Aaron and I were successfully making use of the OpenH323 protocol in commercial applications such as NetMeeting, and we were able to enhance the software to see and talk to more than two people. Aaron worked very hard over the summer and felt that “the experience has been stressful yet rewarding.”

Tatyana Kharchevka (BA/CS), another undergraduate research assistant, has been working on an interesting project the objective of which is to update the latest version of JMOL application and make it collaborative using latest version of peer to peer JXTA network platform” under the guidance of Dr. Francis Marchese. With this software, it becomes easier to view a 3D model of a molecule or a chemical compound. The software also has additional functionality like chatting, which helps people using it to communicate with each other. Tatyana says, “I had an incredible learning experience and I know it will be very beneficial in the future.”

Last, but certainly not least, a team of students, including Oleg Yunakov (MS/CS), Samantha Chan (BA/CS), and Shuaib Chowdry (BS/IS) traveled to the Argonne National Laboratory outside Chicago as part of a research program jointly funded by NSF and the U.S. Department of Energy’s Faculty and Student Team (FaST) program. These students, under the direction of Dr. Dennis Anderson and the supervision of Dr. Hsui-Lin Winkler, were able to work on projects that simulate earthquakes in order to study earthquake engineering with the hope of finding new ways to reduce the hazards that earthquakes present to life and property.

All in all, CSIS students involved in these projects had a busy but rewarding summer.
11 Students Awarded School-Based Scholarships

The School of Computer Science and Information Systems awarded nearly $19,000 in scholarship monies for the 2003–2004 academic year to the following students:

**CSIS Endowed Scholarships**

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**Student Achievements (continued)**

**C.I.R.C.U.I.T. Reaches Out to Others**

by Ann Geeverghese (BS/IS)

The sounds of feet shuffling into a room, of muttering, and of book bags being plucked on the floor—it almost seems like another class day, but something is different. Instead of reporting to our respective seats, we head to the front. For the first time we are no longer students, but mentors. Being a member of C.I.R.C.U.I.T has given us a golden opportunity to learn and share our knowledge with others.

C.I.R.C.U.I.T.—Comprehensive Integration Representing Computers, Users and Internet Technology—is the computer club at Pace University in Pleasantville. It has granted us the chance to teach and inspire youngsters of the Pleasantville Cottage School. Every other Thursday we educate a class of teenage boys and enhance their computer skills.

What makes this so inspiring is our ability to share our knowledge with these adolescents.

Many of our lesson plans include understanding the Microsoft XP operating system and learning to access the Internet. We also reinforce the significance of typing by having them work on programs with experience in a high-profile ornament company.

Opportunity is the focus of the club. Club directors are continuing their efforts to offer something for all members and each member has a chance to make something happen. Ensuring the club's success are cofounders Eric Heinen (erique31@hotmail.com) and John Robinson (johnrobinsonny@yahoo.com). They are supported by a hard-working team of student directors, including Parijat Bhattacharjee, Svetlana Kouznetsova, Jennifer Lawler, James Ruina, Toral Shah, Michele Sheehy, Christopher Tompkins, Allyn Thompson, and Naresh Trilok.

S.T.E.P. Adds Value to Pace

by Toral Shah (MS/ITE), S.T.E.P. President

During the first semester of its existence, Students for Technology and Entrepreneurial Pursuits (S.T.E.P.), a multidisciplined club for graduate students, from CSIS, Lubin School of Business, and Pace Law School, has grown to over 50 active members. Even though it is only a semester old, the club has managed to sponsor several skills workshops conducted by experienced professionals; bring in a highly respected speaker, venture capitalist Dennis Goett; complete the development and design of a community Butchery's e-commerce Web site; and develop several pockets of members pursuing their own business ideas.

One new business was formed by James Ruina, a S.T.E.P. director, who is a Lubin M.B.A. student. Ruina formed a strategic consulting firm (JMR Strategic Consulting) to help design, develop, and sustain competitive strategies in Westchester. Another club member, Serhiy Velychko, also an M.B.A. student, sought help from S.T.E.P. for his start-up Christmas ornament business. Through his inquiry, he now has a small team working on the project and he has been introduced to an industry expert with experience in a high-profile ornament company.

Opportunity is the focus of the club. Club directors are continuing their efforts to offer something for all members and each member has a chance to make something happen. Ensuring the club's success are cofounders Eric Heinen (erique31@hotmail.com) and John Robinson (johnrobinsonny@yahoo.com). They are supported by a hard-working team of student directors, including Parijat Bhattacharjee, Svetlana Kouznetsova, Jennifer Lawler, James Ruina, Toral Shah, Michele Sheehy, Christopher Tompkins, Allyn Thompson, and Naresh Trilok. AnnMarie Caruso and Lary LeFever also contribute to the success of the organization.
Faculty Achievements

Dennis Anderson, CSIS associate dean, recently served as a panel judge for the New Media Emmy Award at the invitation of the National Academy of Television and was invited to serve on the Microsoft Faculty Advisory Board and the editorial board of the ACM Computers in Entertainment magazine. He was also cochair of the first International Conference for E-Banking and the Global Marketplace (IceBG) held at Universite de Mons in Belgium.

James Lawler, Information Systems, also attended the conference where he presented “Designing Effective E-Banking: Innovative E-Banking Web Sites” and “Personalization of Customer E-Banking: Strategy for Generating Investment Return.”

Joseph Bergin, Computer Science, participated in several conferences in Europe last summer. He presented a paper “Two Pedagogical Patterns for Course Design” at EuroPloP held in Irsee, Germany, which was published in the conference Proceedings. He also participated in a working group on “Concepts First in Introductory Programming” at the ACM/ SIGCSE Innovation and Technology in Computer Science Education Conference held in Thessaloniki, Greece, and led a workshop on “Patterns in Teaching Software Development” at the European Conference on Object-Oriented Programming held in Darmstadt, Germany.

Sung-Hyuk Cha, Computer Science, received a Faculty Leadership Award from the Center for Community Outreach for overseeing the development of a Web-based database system for the Center by graduate students in his CS 623 Database Management Systems course.

Mary Courtney, Computer Science, participated in a panel discussion on “Objects First: Does It Work?” at the Consortium for Computing Sciences in Colleges Conference held at Montclair State University, Montclair, NJ.

Susan Feather-Gannon, Technology Systems, and Christelle Scharff, Computer Science, conducted a workshop on “Enhancing Academic Achievement: Facilitating E-Portfolio Development” at the Learning Conference Institute of Education, and held at the University of London.


Michael Gargano, Computer Science, was awarded a Certificate of Recognition from St. Paul’s High School in Congers, NY, for his ongoing effort to enrich the school’s mathematics program. This summer he voluntarily conducted five workshops in which he introduced advanced mathematical concepts to interested students.

Bernice Houle, CSIS assistant dean, represented the Information Systems Department at the IS 2002 Model Curriculum Conference held in Mobile, AL. She also attended the FIRST LEGO League Workshop sponsored by Dean Kamen’s FIRST Robotics and LEGO League in preparation for a FIRST LEGO League Tournament to be held on the Pleasantville Campus on February 8.

Richard Kline, Computer Science, had his UnWindows software, a collection of tools that assist the visually impaired in using a computer, incorporated in Sun Microsystems’s new release of their Solaris operating system.

Constance Knapp, Information Systems, participated in “The Practice of Ethics,” a summer seminar sponsored by the Faculty Resource Network, a consortium of 38 universities headquartered at N.Y.U. Dr. Knapp and four other CSIS faculty members were named University Associates for the 2002–2003 academic year, which provided them with library and auditing privileges at N.Y.U.

James Lawler, Information Systems, received a fellowship to participate in the Thought Leaders Meeting at the Direct Marketing Interactive Association Conference held in New York City.

Joseph Malerba, Computer Science, participated in a tutorial titled “Introduction to Modern Concepts in Biology for Mathematical and Physical Scientists” sponsored by the Center for Discrete Mathematics and Theoretical Computer Science—DIMACS held at Rutgers University.


Lixin Tao, Computer Science, was named a Senior Member of IEEE in recognition of his professional maturity and significant professional accomplishments. His name will appear in the November 2003 edition of Who’s Who in America.

Sylvester Tuohy, Computer Science, presented “Programming in Java! = Computer Science I” at the Consortium for Computing Sciences in Colleges Conference held at Montclair State University, Montclair, NJ.

Stuart Varden, Information Systems adjunct, has been elected President of EDSIG, the Special Interest Group for Information Systems Education of the Association of Information Technology Professionals. EDSIG is responsible for putting on ISECOn, the leading national conference devoted to information systems education. EDSIG also oversees the publication of the Journal of Information Systems Education, and annually selects the Information Systems Educator of the Year honoree.
CSIS Welcomes New Faculty and Staff

Keithe Bennett

joined the Pace Computer Learning Center (PCLC) this fall as a Senior Technical Instructor and PC Support Specialist. Her responsibilities include teaching Microsoft Certification classes, setting up labs for PCLC’s advanced technology and security classes, and assisting in networking and PC support for PCLC and CSIS.

Keithe has four years of experience in Networking and Information Systems training and has been a technical consultant for seven years. She is a Cisco Certified Network Associate (CCNA), and has maintained premier Microsoft certification status since 1999. This includes the MCSE (Microsoft Certified Systems Engineer) and MCP+I (Microsoft Certified Professional with Internet specialty) in NT 4.0, and Windows 2000 MCSE. Keithe is also in her fourth year as an MCT (Microsoft Certified Trainer). This combination of skills provides an excellent background for a technical instructor. Keithe possesses both the pedagogical skills necessary to communicate information clearly and the real-life experience to ensure that the training will include the undocumented features and tricks and traps in the products, and be immediately applicable to the work environment.

On working for Pace University, Keithe remarked, “I enjoy working here because of the diverse backgrounds of the staff and faculty, as well as the virtual playground of technology available.” She is especially pleased to be part of a School where so many women hold leadership positions and is glad to be working in academia where both students and staff are encouraged to learn the latest technologies to keep up with the times.

Keithe is a native of New York City and the mother of three children, ages 5, 7 and 12.

Joining the computer science department in New York as an assistant professor is Dr. Orlena “Olly” Gotel. Olly comes to Pace from University College, London where she was a lecturer in software systems engineering. Originally from the Channel Island of Jersey, a small but significant rock in the English Channel (as she likes to point out), Olly obtained her doctorate in the area of Software-Intensive Systems Engineering from the Imperial College of Science, Technology, and Medicine, University of London. She holds a first class B.Sc. in computer science from the University of Warwick and an M.Sc. in advanced methods in computer science from Queen Mary & Westfield College, University of London.

Professionally, Olly has studied and held research posts at Oxford University and the City University of London. She was also senior scientist for the UK government’s Defence Evaluation & Research Agency, where she was a practicing Software Systems Engineer and Head of IT Research for the Open Distributed Information Systems Group. Olly’s research interests include all aspects of Software-Intensive Systems Engineering, with a particular emphasis on the upstream phases of the system lifecycle, the management and communication of the information produced by these endeavors, and process definition and improvement. She takes a multidisciplinary and human-centered approach to this research, recently investigating the role of creativity in software system development practices.

When not at work, Olly is likely to be found walking the streets of New York with her camera or kayaking on the Hudson River. When she cannot be found, she is probably hiding in a darkroom or exploring far-flung places with a backpack.

Olly joins Pace for many reasons, but she cites one as being significant: “Pace prides itself in its diverse and often first-generation university students. I admire and want to support these efforts. Many years ago, I was given encouragement and support to leave Jersey and be the first in my family to study at university. This was the biggest opportunity in my life; what followed turned my life around! During my first few weeks at Pace, I have found the enthusiasm and questioning minds of Pace students quite unlike what I have seen at other universities. It is both wonderful and challenging! Maybe this is just the “American” way. However, I get the distinct impression that this is a spirit that the Pace environment nurtures.”

Jonathan Hill

the new Coordinator for the CIS 101 course for all campuses, comes to Pace with a combined background in higher education and the private sector. Jonathan comes from Travelocity.com in Ft. Worth, Texas, where, as a principal of the Business Development Group, he managed negotiations with technology vendors, consultants, and suppliers, and implemented major e-commerce distribution and partnership deals with companies like BarnesandNoble.com, AskJeeves, Wiley and Sons Publishing, IBM, Staples.com, and others.

Jonathan has also held significant positions in technology, sales, and marketing with firms such as Worldres.com, United Airlines Vacations, the Hertz Corporation, and Aeroflot Russian Airlines. “The travel industry has always been a first adopter of technology, particularly in the area of electronic distribution, and I was fortunate to have had success providing technology solutions in that industry,” he said. This expertise led to an assignment as an adjunct lecturer in the Business and Tourism and Hospitality Departments at Kingsborough Community College. Jonathan successfully developed an evening and weekend studies program. He also created corporate training programs and teacher training in entrepreneurship for the NYC Board of Education. After 10 years, he was promoted in 1995 to assistant professor, cofounded the Institute for Tourism Research, contributed to several refereed journals, and served as acting chair for a semester.

Remarking about his career to-date and new appointment at Pace, he said, “I have been incredibly fortunate in my career. I worked in an industry where technology was a priority. I got to teach in a CUNY program where my private sector experience was viewed as an asset and gained a lot of experience as a teacher and administrator. I got to work in Russia at the time of Glasnost and Perestroika. I learned corporate budgeting and finance disciplines at major companies like Hertz and United, and I got to work in Silicon Valley at the height of the dot com bubble. Being away from academia, I have learned that the most meaningful (continued on next page)
things I have done have involved working with students, faculty, and administration in a university setting. I am coming to Pace University and CSIS at an equally ideal time, when CSIS is poised for growth under strong leadership and there are great opportunities to be involved. I am very blessed to have been given the chance to work with such dynamic people.”

**Judy Sullivan**

was recently named to the newly created position of Assessment Research Analyst. Judy first joined the Pace community as an undergraduate student in the 1970s when she earned a B.A. in elementary education with a concentration in mathematics. After taking some time off to raise her daughter, Judy returned to Pace to pursue a master’s in computer science. Throughout her time as a graduate student, she taught for the CLOUT program. She has also been involved in teaching both asynchronous and synchronous Java classes with Dr. Allen Stix, and has assisted in writing asynchronous programs.

In her new role, Judy is responsible for assisting the CSIS department with program review and documentation for various external accrediting agencies, including the Computing Accrediting Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET). She is also involved in helping the different schools determine the potential for new programs such as Security Assurance. In addition, she has taken on the responsibility of providing Enrollment Management with information regarding the demographics of CSIS applicants and registrants.

On her experience at Pace and on her new position, she says, “I really loved going through the master’s program and am thrilled to be doing something as important as assessment for CSIS. What makes this job particularly exciting is that assessment is new and has so many different facets. What makes it particularly attractive is working with so many people I admire.”

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**New Accelerated Online Baccalaureate Available**

(continued from page 5)

Qwest, and Frontier, and who are members of the IBEW and CWA. The program is also open to others not affiliated with any of these organizations.

For specific questions about the program, contact the NACTEL Program codirector, Dr. David Sachs, at dsachs@pace.edu.

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**CLOUT Partners with Robin Hood Foundation**

(continued from page 6)

them to rebuild their confidence in their ability to thrive in the workplace.”

The first cohort of 25 worked through the summer and graduated in September. A second cohort of 25 enrolled this fall and will finish in January.

The following words of a participant indicate that the program is working: “This program has given me focus and something to work toward and that, in turn, has given me hope. As a result I feel better than I have in two years.”

That is worthwhile work indeed!

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**Welcome!**

CSIS is pleased to welcome those who joined us recently:

**Adjunct Faculty**

- David Leis
  Technology Systems

- Vincent DiPalermo
  Technology Systems

- Margaret Juszczak
  Julia Khan-Nomee
  Leyton Murray
  Ojo Olufemi
  CIS 101

**Graduate Assistants**

- Szewai Chan
  CS, New York City

- Seung-Seok Choi
  Dean’s Office

- Yvette DeLeon
  Dean’s Office

- Prashant Karmarkar
  CS & IS, Westchester

- Archana Perumal
  CS, New York City

- Sheuli Sengupta
  Dean’s Office

- Sweety Varghese
  Dean’s Office

**Staff**

- Keithe Bennett
  Senior Technical Instructor/PC Support Specialist
  Pace Computer Learning Center

- Ashley Joseph
  Program Specialist
  Pace Computer Learning Center

- Jacqueline Volkell
  Employment Specialist
  CLOUT, New York City

**Student Aides**

- Desmond Rosario
  Jessica Rizzo
  CSIS, Pleasantville

- Falk Haxhiymeri
  Sevitha Iyengar
  Carolina Mendez
  Ilyas Pinkhasov
  CSIS, New York

**Part-Time Employees**

- Baron Katarzyna
  New York City

- Aaron Labiaga
  New York City

- Udochukwu Nwachukwu
  New York City

- Shenkar Iyer Ranjita
  New York City

- Oleg Yunakov
  New York City

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**...And Farewell**

The following people have recently left CSIS:

- Jennifer Beall
  Academic Advisor
  New York City

- Allison Horan
  Student Advisor and Seminar Coordinator
  CLOUT

- Michael Sidaras
  PC/Network Support Analyst
  Dean’s Office

- Jennifer White
  Assistant Dean for Research and External Relations
Congratulations Are in Order!

TO:

Dr. Sung-Hyuk Cha, Computer Science, on his marriage to Jung Mi Kim on June 7.

Dr. Jean-Christophe Deprez, Information Systems, and his wife Lilly on the birth of their daughter Emma on May 4.

Kimberly Dunbar, CSIS/NYC, on her promotion to academic counselor.

Dr. Susan Feather, Technology Systems, on her marriage to Jack Gannon on May 24.

Bonnie Gartner, Information Systems adjunct, and husband Paul on the birth of their granddaughter Paxton on August 30.

Dr. Fred Grossman, Information Systems, and wife Linda on the marriage of their daughter Jill to Erich Giebelhaus on June 8.

Lynne Larkin, CLOUT/NYC, on her promotion to CLOUT director, New York City.

Dr. Pauline Mosley, Technology Systems, and husband Paul on the birth of their second child Maurice Edward Paul on August 23.

Fran O’Gara, dean’s office, on her daughter Karen’s graduation magnae cum laude from Albertus Magnus High School in Bardonia, NY.

Marietta Savino, dean’s office, on the birth of her grandson, Thomas Frederick on June 14.

Ellen Tilzer, Information Systems adjunct, and husband James on the birth of their grandson Joseph Eli Tilzer on April 11 and the marriage of their daughter Kathy to David Simon on July 13.

As in the past, our new students bring a wide-range of professional experience and knowledge to the program and are encouraged to share these experiences and ideas with their classmates. They are employed by companies such as Advanced Health Care, AT&T, CMA–HRA The City of NY, Cognosys LLC, Electronics for Imaging, IBM, Intel Corp., ITT Industries, MetLife, Mobius Management Systems, Norfolk State University, Prudential Financial, Remote DBAPlus, Sanofi-Synthelabo, Inc., Software Composition Technologies, SIAC, and SUNY Farmingdale.

The D.P.S. in computing program originated in 1999 and graduated its first class of 20 students in May 2002. Fifty-five students—17 women and 38 men—are currently enrolled in three classes. The program focus is on research and it offers IT professionals the unique opportunity to earn a doctorate in three years through part-time study, while continuing a full-time professional career. The program uses a team approach to teaching and learning, and student teams form during the four-day orientation. For additional information about the program, contact clongo@pace.edu.

In kicking off its fifth year, the D.P.S. in computing program can no longer be called “new,” but it continues to be unique, challenging, and doable. It’s one of a kind.

Stay in touch with your classmates through the official alumni online community of Pace University, free to all alumni. In addition to the online alumni/ae directory and permanent e-mail forwarding, the community now features online ClassNotes where you can read and post messages on what’s new with you—weddings, births, career moves, and more! Visit and register for the online community today at http://www.pace.edu/alumni.
BOOKS, JOURNALS, ARTICLES, AND CONFERENCE PROCEEDINGS

Paul Benjamin

Linda Jo Calloway and Helen Li

Sung-Hyuk Cha and Charles Tappert

Mary Courtney and Michael Gargano

Ronald Frank


James Gabberty

Anthony Joseph and M. Larrain

James Lawler


Francis Marchese, Jude Mercado, and Yi Pan

Namchul Shin

Namchul Shin, Mihail Stoica, and Nimit Chawat

Charles Tappert, Sung-Hyuk Cha, and S. Srijani

Michael Gargano and Mary Courtney

Anthony Joseph and Mabel Payne

David A. Sachs

CSIS TECHNICAL REPORTS

Nelson A. Carella

Melissa K. Carroll

CSIS Faculty
Lions and Tigers and Bears, Oh My!

How to Prevent and Protect Against Computer Viruses and Trojan Horses

by Matthew Poli, Director of IT Support

DDS are that most of you have had your computer infected or affected by one of the many computer viruses that plague the Internet. We all know the routine questions the helpdesk representative asks you—is your machine patched with the latest updates? Does your antivirus program have the latest antivirus definition files? You DO have an antivirus program, don’t you?

Usually what follows is a chunk of time spent on doing updates, system scans, running specific virus cleaners, some more scans, a few prayers hoping that all is fixed and clean, and of course a nice piece of the day wasted. But the frustration doesn’t always stop there. Most recently, we have all felt the effects of virus attacks that create so much network traffic that many of the servers, such as e-mail, become nearly unusable. So, your machine may be clean as a whistle and yet a virus can still plague you!

To battle this ever-present threat, it is important to understand what we mean when we say “virus.” Most people label any program that causes bad things to happen to their PC as a virus. We would then have to include most software companies such as Microsoft as producers of viruses, but we will leave off the easy humor this implies. There are, basically, two types: viruses and Trojans. Both are programs that once run on your PC, produce an undesired or unexpected result—usually malicious in intent. The key difference is a virus is self-replicating, while a Trojan is not, but don’t be fooled—both can be just as destructive to your PC.

There are currently over 50,000 known viruses, Trojans, or variants in existence. So, the method of the delivery and the symptoms are quite varied. A Trojan is usually hidden inside another program or download and is passed around and run, unknown to the user. The Trojan is then activated and infects your machine. A virus, on the other hand, does not necessarily need any interaction from the user at all. Flaws in applications or operating systems on a PC are usually all a virus needs to propagate. Once it finds a PC with the flaw, it can infect that PC and then have it, in turn, start looking for PCs to infect. Depending upon the type of flaw it has used to access the PC, it may also be free to run amok inside the infected PC, doing damage. As more infected machines start broadcasting, looking for other potential victims, the network traffic becomes so overwhelmed that normal data traffic suffers from being drowned in the massive “noise.”

Ironically, the broad reach of the Internet and the steady improvement to PC hardware only makes things worse. Your powerful fast PC on a broadly-reaching network, when infected, makes for a powerfully fast, broadly-reaching problem generator. In the past, viruses took months to spread and antivirus response and prevention could be implemented before a virus’ full potential could be reached. Today, what once took months, can take days, if not hours.

In the end, we must realize that protection and prevention is a responsibility we all must share. These three tips from the Computer Emergency Response Team (http://www.cert.org) are the best line of defense available. Learn them, love them, live them.

General Tips
• Apply vendor-supplied software patches in a timely manner
• Install antivirus software and keep it up-to-date
• Use caution when opening e-mail attachments and following URLs

Useful Web Sites
http://windowsupdate.microsoft.com
http://securityresponse.symantec.com
http://office.microsoft.com/OfficeUpdate/

Free Software for Faculty and Students!

CSIS has recently subscribed to the Microsoft Developer Network Academic Alliance (MSDNAA). One of the privileges associated with this subscription is the right to download free copies of software. Over 25 faculty and more than 400 students have obtained online accounts in the first two months of the subscription. The most popular downloads have been Visio, Project, and Visual Studio.Net. For a full description of the program, go to the MSDNAA Web site at www.msdnaa.net. Faculty can find out how to set up instructor and student accounts by visiting csis.pace.edu/support/msdnaa or sending an e-mail to csis@pace.edu.

On the Lighter Side . . .

Computing Proverbs
• Home is where you hang your @.
• The e-mail of the species is more deadly than the mail.
• A journey of a thousand sites begins with a single click.
• You can’t teach a new mouse old clicks.
• Great groups from little icons grow.
• C:\ is the root of all directories.
• Pentium wise, pen and paper foolish.
• The modem is the message.
• Too many clicks spoil the browse.
• There’s no place like home.
• Don’t byte off more than you can view.
• What boots up must come down.
• Virtual reality is its own reward.
• Give a man a fish and you feed him for a day; teach him to use the Net and he won’t bother you for weeks.