Gone are the days of simplistic video games, such as the 1970s hit Pong. In the past 30 years, video games have become highly interactive, graphically advanced vehicles for a multibillion dollar industry. Each time a new video game is released, retailers see long lines of eager gamers anxiously awaiting a chance to conquer the latest game. While to date a majority of research has focused on the effects of video game violence, new studies are revealing that some repetitive play may have physical and psychological benefits.

To explore the benefits associated with gaming, CSE and psychology professor Paul Schrater, his students, and additional researchers are embarking on a five-year, multi-institutional study funded by the National Institutes of Health. Schrater, who studies human perception and motor performance, says that video game usage can improve attention-based tasks. “Video games form a really natural environment where visual and motor skills are required,” he said, adding that repetitive use seems to be a way to gain these skills. Although this type of project may seem like fun and games, Schrater is concerned about proving the science behind the play and is hopeful about the findings. “What we are really hoping to find are engineering principles that underlie human learning,” he said. “What kind of events are rewarding in learning?”

gaming benefits
CSE senior Jose Rivera started gaming at age 4. He said he loves playing video games so much that he has trouble finding a game he doesn’t like.

Rivera said he believes gaming does have benefits in motor skills, which he has noticed in himself when recently trying piano lessons. “My ability and hand-eye coordination would not be the same if I hadn’t played video games for so long,” he said.

Rivera’s example echoes what Schrater said scientists have discovered already. Schrater said that people who play specific types of video games – shooting games, for example – often acquire specific motor skills, such as shooting precision and peripheral vision improvements. “One key finding is that video game training makes you faster at processing and responding to perceptual information,” he said.

Schrater said many of these findings are the result of previous research on the effects of video game usage conducted at the University of Rochester in New York by professor Daphne Bavelier and her students. He said they are considered to be leaders in this area of study.

(Story continued on page 14)
This year marks an important milestone for the department — its 40th anniversary, celebrated at the CSE Technology Forum and Open House, Oct. 5, 2007.

To commemorate the department’s 40 years of excellence, we produced a booklet to highlight CSE history and the cutting-edge, interdisciplinary research taking place in the department. The booklet debuted at the CSE open house.

In the booklet, the beginnings of the CSE department are traced back to the glorious history of computing in Minnesota, which includes the first commercial computer, Atlas I, developed by the Engineering Research Associates (ERA), a number of computing giants including Unisys, Control Data, and Cray Research, as well as a thriving software industry.

The booklet documents the growth in computing as a discipline throughout the 1960s, resulting in the 1967 formation of the graduate program for Computer and Information Sciences and the establishment of the Department of Computer Science in the spring of 1970, later renamed Computer Science and Engineering.

The booklet also highlights the innovative CSE educational and outreach efforts. It shows how CSE faculty use creative methods to teach, such as organizing robot dog dance competitions or a student-run Web service business. The booklet shows how faculty and graduate students also make outreach a high priority, by working to interest young students — women and minorities, in particular — in college and computer science through campus tours and visits to local K-12 schools.

A major section of the booklet highlights CSE research accomplishments. It showcases the work of CSE faculty, who are leading experts in many computer science specialties and regularly participate in interdisciplinary projects impacting a variety of areas, such as health care, homeland security, computer security, and space exploration.

Since its modest beginnings, the department has come a long way. Over the past four decades, the university has awarded more than 4,000 bachelor’s, 1,400 master’s, and 399 doctoral degrees to CSE students. CSE faculty and graduates have formed more than 180 companies in Minnesota and beyond.

In 2007, CSE was ranked third in the Faculty Scholarly Productivity Index in a study reported in The Chronicle of Higher Education and ranked ninth for Citation Impact of Published Research Papers by Science Watch. In addition, CSE is one of only five computer science departments in the nation with multiple recipients of the Presidential Early Career Award for Scientists and Engineers (PECASE) and also boasts 16 winners of the prestigious NSF CAREER Award.

The department is very proud of the accomplishments of its faculty, students, and alumni who played a part in building this distinguished legacy. Your continued support in our endeavors is much appreciated!

— Vipin Kumar, CSE Department Head and William Norris Professor
CSE in the news

Local and national news

The National Public Radio show ‘Future Tense,’ the local WCCO and KTLK radio stations, and KMSP-TV in Minneapolis featured interviews with CSE professors Loren Terveen and John Riedl, discussing the findings of their study of Wikipedia, a popular online encyclopedia. Stories also appeared in the Shakopee Valley News and The Minnesota Daily. (Nov. 5-8, 2007)


Twin Cities Metro Magazine selected CSE professor Nikos Papanikolopoulos and the Scout robot as one of the ‘Top 100’ interesting people and things in the Twin Cities. (Sept. 27, 2007)

The Pioneer Press mentioned CSE professor John Riedl in a story about a new online fashion phenomenon in which women post pictures of themselves and others for a fashion critique. (Sept. 3, 2007)

THE Journal posted a story on its Web page about the CSE Kids Technology Camp. (Aug. 30, 2007)

A Pioneer Press story about robotic cars that drive themselves featured CSE professor Nikos Papanikolopoulos discussing the new technology. (Aug. 16, 2007)

The Star Tribune highlighted the Scout robot spin-off company, Recon Robotics, in a story entitled “Minnetonka firm’s robot is on a roll.” The Scout was developed by CSE faculty and students. (May 23, 2007)

The Chaska Herald newspaper ran a story about the University of Minnesota team that won the College Bowl National Championship, highlighting the participation of CSE freshman Robert Carson. (May 8, 2007)

Campus news

A story in The Minnesota Daily highlighted CSE professor Tian He talking about the process University professors go through to patent their work. (Oct. 31, 2007)

The Minnesota Daily featured CSE professor and Director of Graduate Studies, Loren Terveen in a story about the computer platforms of Microsoft and Apple. (Oct. 29, 2007)

The Minnesota Daily featured CSE professor Maria Gini and graduate student Shana Watters in a story about the need for more minorities and women students in science and technology fields. (Oct. 22, 2007)

The Minnesota Daily discussed the therapeutic benefits of the Nintendo Wii gaming system in physical rehabilitation. (Oct. 12, 2007)

The Minnesota Daily highlighted the work of CSE and psychology professor Paul Schrater in a story about the study of psychological benefits of playing video games. (Oct. 5, 2007)

The Minnesota Daily showcased CSE professor John Riedl’s Chipmark class in a news story, highlighting his innovative approach to education. (Sept. 28, 2007)

The Star Tribune highlighted the Scout robot spin-off company, Recon Robotics, in a story entitled “Minnetonka firm’s robot is on a roll.” The Scout was developed by CSE faculty and students. (May 23, 2007)

The Minnesota Daily featured the evacuation work of CSE and University Distinguished McKnight Professor Shashi Shekhar. (July 18, 2007)

The Minnesota Daily featured the Scout robot, developed by CSE Professor Nikos Papanikolopoulos and his students, in a story and video posted on its Web site. (June 5, 2007)

The Pioneer Press mentioned CSE professor John Riedl in a story about a new online fashion phenomenon in which women post pictures of themselves and others for a fashion critique. (Sept. 3, 2007)

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CSE happenings

DTC hosts Recommender Systems Conference
The University of Minnesota’s Digital Technology Center (DTC) hosted the 2007 Association for Computing Machinery Recommender Systems Conference on Oct. 19-20. CSE professor Joseph Konstan chaired the event; professor John Riedl co-chaired the program committee and professor Loren Terveen co-chaired the doctoral symposium.

Speaking Event Draws Hundreds to U Campus
CSE’s University of Minnesota Software Engineering Center (UMSEC), IBM University Relations, and the IBM Academic Initiative sponsored a talk on Sept. 26 which drew hundreds to campus. The speaker was renowned software developer Grady Booch.

U of M hosts International Conference
The University of Minnesota hosted the 9th International Conference on Electronic Commerce (ICEC) on Aug. 19-22. CSE professor Maria Gini co-chaired the conference.

Kumar Selected as Editor-in-Chief of IEEE Bulletin
CSE William Norris Professor Vipin Kumar was appointed Editor-in-Chief of the IEEE Intelligent Informatics Bulletin, the official publication of the IEEE Computer Society Technical Committee on Computational Intelligence.

CSE, Architecture project at University gallery
CSE professor Gary Meyer collaborated with Architecture faculty member, Marc Swackhamer, to create a prototype for a new architectural wall structure. Meyer’s software was used to select and create the colors on the wall. A prototype is on exhibit at the University’s Goldstein Museum of Design, as part of the ‘Here by Design III’ exhibit.

CSE/DTC Host Kids Tech Camp
CSE and the DTC hosted the third annual University of Minnesota Kids Technology Day Camp in August. The camp, started by CSE doctoral student Kelly Cannon, is aimed at exposing middle school age children, mostly girls and minorities, to a collegiate atmosphere. The goal is to get them interested in science and technology. At the camp, students spend time in University labs working on fun projects they can take home. Around 30 CSE graduate student volunteered for the event.

CSE Faculty at the Minnesota State Fair
Professor Nikos Papanikolopoulos and his students hosted robot demonstrations at the Minnesota State Fair in August.

Faculty speaking engagements
CSE Professor Konstan speaks, instructs abroad
The Swiss Federal Polytechnic University invited CSE professor Joseph Konstan to speak at its Summer Research Institute on July 17 in Lausanne, Switzerland. Konstan also taught a taught a week-long course on human-computer interaction and user interface design at the Universitat Politècnica de Catalunya in Barcelona, Spain.

CSE Professor Mokbel gives Keynote Address
CSE professor Mohamed Mokbel gave a keynote address entitled “Data Uncertainty: Reasons and Queries” at the 3rd Workshop on Rough Sets and Emerging Intelligent Systems Paradigms on Aug. 13, in Cairo, Egypt.

CSE Professor Yew gives Keynote Address
CSE professor Pen-Chung Yew gave a keynote address about the framework of multi-core processes at the 12th Asian-Pacific Computer Systems Architecture Conference (ACSAC) on Aug. 23, in Seoul, Korea.

CSE Professor Gini gives plenary talk
CSE professor Maria Gini gave a plenary talk about multi-robot systems at the Performance Metrics for Intelligent Systems Workshop (PerMIS’07) Aug. 28-30, in Gaithersburg, VA.

Upcoming CSE related events

Code Freeze, Jan. 17
Software engineering professionals and academics will join together to discuss business and technology innovations at Code Freeze, an annual software engineering symposium on Jan. 17, 2008 at the McNamara Alumni Center, 200 Oak Street S.E., Minneapolis.

For more information, visit www.umsec.umn.edu.

CSE Professor to Serve as Symposium Co-Chair
CSE professor Jon Weissman will serve as the program co-chair of the IEEE Symposium on High Performance Distributed Computing (HPDC) to be in June, 2008, held in Boston.

Jennifer Bitzan joined the CSE department in September as the receptionist.

Peggy Stewart joined the CSE department in June. She processes visa requests, assists faculty with grant proposals, journaling, coordinates meeting provisions, and handles other miscellaneous duties.

Meyer’s architectural wall on display at the University’s Goldstein Gallery.
Professors Zhang and Zhai Receive IBM’s 2007 Faculty Award

CSE professors Zhi-Li Zhang and Antonia Zhai received the IBM Faculty Award for 2007. The IBM Faculty Award is a competitive worldwide program that seeks to build collaborations between researchers at top universities and those in IBM development, research, and service groups. It is also intended to promote a curriculum that encourages growth in disciplines that are related to IBM’s mission. Zhai and Zhang are two of the 132 award recipients for 2007.

Professor Konstan Nominated for Vice President of ACM

CSE professor Joseph Konstan was nominated as Vice President of the Association for Computing Machinery (ACM) group.

The Vice President serves as one of three main governing officers and is on the ACM Executive Committee. The elections will be held in the spring and appointments begin July 1, 2008.

Best Paper Awards

Professor Yew Wins Best Paper Award

A paper co-authored by CSE professor Pen-Chung Yew received a Best Paper Award at the 2007 International Conference on Parallel Processing (ICPP) held in China in September.

Yew worked on the paper with a group in the School of Software Engineering at Fudan University in Shanghai while on sabbatical in 2005-2006.

The ICPP is the longest running conference in the parallel processing field, started in 1971; it is one of the major conferences in the field.

Professor Wins Best Journal Paper Awards

CSE professor Stergios Roumeliotis received a Best Journal Paper Award from the Robotics Society of Japan for a paper he co-wrote entitled, “Slip-Compensated Path Following for Planetary Exploration Rovers.”

At the International Conference on Intelligent Robots and Systems (IROS’06) held in Beijing in October 2006, Roumeliotis also received a Best Paper Award. He co-wrote the paper, “Multi-robot SLAM with Unknown Initial Correspondence: The Robot Rendezvous Case,” with CSE Ph.D. student Xun (Sam) Zhou.

Graduate Student Wins Best Paper Awards

Betsy George, a CSE doctoral student studying spatial databases and data mining, with CSE professor Shashi Shekhar, wants to improve Web services relating to travel. So far, her work on the issue has yielded two Best Paper Awards.

George’s paper on the subject, entitled “TAG: A Framework for the Discovery of Spatio-Temporal Patterns in Sensor Data,” won a Best Paper Award from ACM’s First International Workshop on Knowledge Discovery from Sensor Data. Earlier this year, George also received another best paper recognition.

Graduate Student Gets Runner-Up Best Paper Award

CSE graduate student Amrudin Agovic received the runner-up award for the best student paper at ACM’s First International Workshop on Knowledge Discovery from Sensor Data. The award is for his paper, entitled “Anomaly Detection in Transportation Corridors using Manifold Embedding Methods.” For his paper, Agovic said he used manifold embedding methods for feature preprocessing. This work was a joint project with the Oak Ridge National Labs. The award included a certificate and $500.
Graduate Student Wins Grace Hopper Conference Scholarship

The National Science Foundation awarded CSE graduate student Katie Panciera a scholarship to attend the Grace Hopper Conference for women in computing in Florida on Oct. 17-20.

This is the second time Panciera has attended the conference on a scholarship. At the conference, she presented a poster entitled, “Wikipedians Over Time: A Comparative Study of User Contributions,” based on the class project for a course taught by CSE professor John Riedl. Her co-authors on the poster included Anna Rouben and Mike Cardosa.

CSE Student Receives Fellowships, Participates in World Competition

CSE doctoral student Huzefa Rangwala received two recent fellowships, one from the European Union, Biosapiens Network to attend a 2006 conference held in Eilat, Israel and another from the United States Department of Energy to attend a conference last July in Vienna, Austria. Rangwala works with CSE professor George Karypis to develop machine learning algorithms for protein structure prediction.

Get involved!
Mentor a student through the IT Mentor Program

CSE alumni are invited to participate in the U of M’s Institute of Technology Mentor Program, in which students are matched with professionals working in science, math, and engineering fields.

Participating alumni have the chance to introduce students to their business, exchange ideas, and help a promising student succeed. Mentors gain personal satisfaction and they also help their company with recruitment and community service efforts.

Registration opens online in the fall at www.it.umn.edu/mentor. For more information, visit http://it.umn.edu/alumni/itas/mentor/index.html.

2007 Undergraduate Scholarship Awards

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<tr>
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<tr>
<td>Lando Scholarship</td>
<td>$2,000</td>
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<td>Nathaniel Born</td>
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<td>Loren Fiore</td>
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<td>John Olds</td>
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<td>Derek Straka</td>
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<td>Thomas Burt</td>
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<td>Timothy Hillukka</td>
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<td>Brandon Johnson</td>
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<td>Blake Kellar</td>
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<tr>
<td>Matthew Soukup</td>
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<tr>
<td>Honeywell Scholarship</td>
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<td>Grant Miller</td>
<td>$2,000</td>
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<tr>
<td>Luke Parrott</td>
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<td>Ken Kragh</td>
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<td>Zachary Longren</td>
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<td>Jayd Pather</td>
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<td>Christopher Arnold</td>
<td>$1,000</td>
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<tr>
<td>Thomson West Scholarship</td>
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<tr>
<td>Alexander Lau</td>
<td>$2,500</td>
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<tr>
<td>CFFM Scholarship</td>
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<tr>
<td>Ken Kragh</td>
<td>$1,000</td>
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<td>(He also won a Honeywell scholarship)</td>
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CSE professor Tian He, students advance wireless sensor technology

(From left to right) CSE graduate students Ziguo Zhong, Jaehoon Jeong, Professor Tian He, Yu Gu, and Ting Zhu.

By Robyn White

Sensor networks consist of thousands of little sensor nodes, many of which are as tiny as one cubic centimeter. Wireless sensor networks are a low cost way to gather volumes of data that would otherwise be too expensive or too dangerous to collect. Currently, these networks are used by the military in intelligent battlefield situations, hazard response systems, and for environmental monitoring.

The Minnesota Embedded Sensor System Group, led by CSE professor Tian He, is making significant progress on this emerging technology. In one project, He and his students have designed an event-driven localization method called Multi-Sequence Positioning (MSP), to pinpoint the locations of tiny sensors. Through another project they are developing modeling tools for users to ease the design process, deployment, and remote maintenance of sensor networks. Lastly, through two new projects, He and his students are devising new techniques for efficient communication and energy conservation and storage.

He’s work in wireless sensor networks helps to expand the potential uses for wireless sensor network technology.

Since He joined the department in 2005, his research has made significant progress. He is currently in the process of applying for a patent for the MSP technology and has had many projects featured at the best sensor network conferences throughout the past two years.

LOCATION SENSORS AND MODELING TOOLS

The MSP project focuses on sensor node localization and positioning in outdoor environments. First year doctoral student, Ziguo Zhong said that in the future sensor networks will be huge and it will be impossible for humans to manually identify the locations of all sensors.

The unique idea in the MSP method is to estimate the location of each sensor, either in two or three-dimensions, by multiple one-dimensional orderings of nodes obtained through a loosely guided event distribution.

For example, laser scans with different angles can be used to generate events one at a time. As an event propagates in the network, each node will detect it at a specific time. The order in which nodes detect the event creates a sequence of nodes for each event, used to estimate the location of each sensor. MSP can achieve accuracy within one foot.

Zhong said the auto-localization could eventually be applied to national security issues. For example, he said robots with sensors could be used at the U.S. borders with Canada and Mexico.

For many, it is easy to see similarities between location-based sensors and a Global Positioning System (GPS). However, He said that GPS is much different.

“GPS is so costly and energy hungry,” he said. Sensors are usually cheaper and more energy efficient in comparison. In addition, Zhong said that GPS technology doesn’t work indoors, which is a problem that wireless sensors easily overcome.

To conduct experiments for the sensor localization project and others, Zhong built a ‘testbed’ system called Mirage, sporting up to 360 sensor nodes. The testbed consists of boards on a blank wall covered with small sensors. “It’s the largest indoor testbed,” He said proudly.

When conducting experiments, the group attaches sensors to the wall, controls the environment, and runs tests on the network.

(Story continued on page 11)
CSE Technology Forum & Open House

Celebrating 40 Years of Excellence

CSE celebrated 40 years of excellence at CSE’s Technology Forum and Open House on Oct. 5, 2007. The event was a success, drawing nearly 300 people to campus, including faculty, alumni, and members of industry.

Other important guests at the day’s events included computer science faculty members from local colleges and universities who also attended a program the day before, held to inform them of opportunities for their graduates in the CSE department.

At the open house approximately 50 industry and research exhibits filled the main atrium and main floor of the CSE building, serving as a major highlight of the event by giving attendees a sneak peek into the latest research and technology.

At the open house luncheon held at the University’s McNamara Alumni Center, Vipin Kumar, CSE Department Head and William Norris Professor, honored those who have made a major impact on the department with awards and Certificates of Appreciation.

This year’s CSE’s Distinguished Alumni Award winner Jeffrey Dean (B.S. 1990), a Google Fellow, was honored with a plaque and gifts before giving an engaging talk about his time at the University and his career path in computer science.

Other honorees included: CSE founder, Professor Emeritus Marvin Stein, first department head Ben J. Rosen, former IT Dean H. Ted Davis, and adjunct faculty member Richard Hedger, accepting on behalf of the Computer Science Associates, the Minnesota High Tech Council, and the Minnesota High Tech Association. John Champine, of Thomson West, was also recognized for his generous support in sponsoring female CSE students to attend the Grace Hopper Women in Computing Conference in 2006.

Following the honors, Keynote Speaker Stuart Feldman, Vice President of Engineering at Google, gave a stimulating talk about Google’s current work.

This was followed by a panel discussion on ‘The Future Workforce: Supply and Demand.’ The attendees and panelists debated the merits of different methods in supplying industry with graduates and exchanged ideas for improvement.

Although the party is over, the CSE department is looking forward to hosting the next Technology Forum and Open House in October, 2009.
The CSE Open House luncheon at the McNamara Alumni Center.

CSE Professor Gary Meyer (back) discussing his work in color reproduction at the CSE Technology Forum.

CSE panel discussion on “The Future Workforce: Supply and Demand.”

CSE Department Head Vipin Kumar (left) presenting the Outstanding Alumni Award to Jeff Dean (B.S. 1990).

Distinguished Alumni Award Winner
Jeffrey Dean, Google Fellow

CSE alumnus Jeffrey Dean (B.S. 1990) works at Google in California as a Google Fellow in the Systems Infrastructure Group. He has a passion for building useful systems, and is willing to tackle any problem, no matter how daunting it looks. Dean’s contributions at Google range from low level libraries to high level components and services, all used extensively by various groups and products at Google as building blocks.

Dean has helped design and implement five generations of the software to handle searches entered on Google.com, and played important roles in several of Google’s advertising products. Dean has also worked on key pieces of distributed systems infrastructure, including MapReduce and BigTable. BigTable is used underneath more than 80 Google products, and MapReduce is the primary system used for large-scale batch computations at Google. These and other contributions by Dean play a critical role in the scaling of Google’s web search system so that it can handle thousands of queries per second over billions of documents in fractions of a second.

Dean received a B.S., summa cum laude from the University of Minnesota in Computer Science & Economics in 1990, and a Ph.D. from the University of Washington in 1996. Before joining Google, he worked for Digital Equipment Corporation’s Western Research Lab in Palo Alto, where he worked on low-overhead profiling tools, design of profiling hardware for microprocessors, and Web-based information retrieval. From 1990 to 1991, he worked for the World Health Organization’s Global Programme on AIDS, developing software to do statistical modeling, forecasting, and analysis of the HIV pandemic.
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<th>Name</th>
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Energy Conservation and Communications Improvements

While He's older projects are finding success, his two new sensor projects work to create more sustainable sensor networks by conserving energy and improving communication. When trying to conserve energy to achieve a longer sensor life, they set the sensors to a hibernating mode – like the sleep mode on a computer – as it uses only one percent of the power. Yu Gu, a third year CSE doctoral student, said energy conservation presents a host of challenges.

Gu explained that sensors are a relatively cheap technology, so they cannot support much data. When communicating with hibernating sensors, messages are delayed until the sensor “wakes up.” Sensors also have difficulty handling large volumes of information. Gu said to solve this problem they are looking for reliable and energy efficient technology.

A related project focuses on energy conservation by adding solar panels to sensors to collect energy through ambient light, which is then stored in a capacitor and used in lieu of a battery.

Ting Zhu, a second year CSE doctoral student working on the project, said most sensors are run on batteries, but this project is proving that there is a better way. He said an ultra capacitor is used in this project to store energy, which is much more efficient than a battery.

“They have a very large recharge cycle,” he said, adding that while a battery can only be recharged 500 times, a capacitor can be recharged one million times. The capacitor also lasts much longer than a battery and Zhu said it’s also easier to use. If a sensor battery goes out, it needs to be changed manually, but the capacitor allows the sensor to recharge automatically for more than 10 years.

While He has only been with the department for a relatively short time, his work with his students is already pushing the limits of wireless sensor network technology. All of He’s work is funded by multiple grants from the National Science Foundation.

For more information, visit: www-users.cs.umn.edu/~tianhe/.
CSE alumnus Edmond Chow (Ph.D. 1997) is a computer scientist at D. E. Shaw Research in New York where he works on algorithms and software for high performance molecular dynamics simulations.

These simulations determine the motion of atoms using classical physics and models of how atoms interact, called force fields. Chow said computational chemists are using this technology to investigate proteins and the mechanisms behind their function, which could ultimately lead to better pharmaceuticals.

One highlight of Chow’s recent work is a parallel code for performing molecular dynamic simulations. “We put a lot of effort into making it really fast,” he said. A paper he co-authored on the subject won the Best Paper Award at the 2006 ACM/IEEE Supercomputing Conference in Tampa, Florida.

During his graduate work at the University, CSE professor Yousef Saad served as Chow’s advisor. Chow said he has many fond memories of the University and Professors Saad, Haesun Park and Daniel Boley.

He said he often wishes that he would have stayed in graduate school longer, singling out math and physics as courses he would have taken.

CSE professor Yousef Saad described Chow as a “good success story.” He said that Chow made quite an impression as the “new kid on the block,” when only a couple months after his arrival to the department Chow had a well received paper at a conference on iterative methods.

In between receiving his doctorate and his current position, Chow worked as a computational scientist and project leader in the Center for Applied Scientific Computing at Lawrence Livermore National Laboratory. There he worked on large-scale simulations solving large linear systems; a direct offshoot of his doctoral thesis. During this time, Chow was awarded a Presidential Early Career Award for Scientists and Engineers (PECASE), the highest award bestowed by the United States government to engineers and scientists beginning their careers.

Alumni Spotlight: Edmond Chow

At 9-years-old, CSE alumnus Brad Miller (Ph. D. 2003) knew that he wanted to go into computer science. He said the fascination began when his school received its first Apple computer and he had his first taste of programming.

Fast forward to today; Miller is a computer science professor at Luther College in Decorah, Iowa, where he completed his bachelor’s degree. He teaches undergraduate students everything from computer graphics to programming. He also participates in research with students and has co-authored textbooks with fellow Luther professor David Ranum, including, Problem Solving with Algorithms and Data Structures Using Python, and another textbook set to be published in February, 2008.

While Miller’s job requires him to be nimble in all areas of computer science, his background lies in recommender systems. He said sorting through all of the information on the Internet has always been an issue, but recommender systems offer solutions.

While attending graduate school at the University of Minnesota in 1995, Miller began working with CSE professors Joseph Konstan and John Riedl on various projects, including GroupLens. Soon they discussed forming a company, along with post-doctoral students David Gardiner and Steven Snyder (psychology). In 1996, they formed Net Perceptions, pioneering the commercialization of recommender systems. The company became one of the University’s most successful technology start-ups. At its peak, Net Perceptions was one of Minnesota’s leading information technology companies, with a market capitalization of more than $1 billion. Miller’s involvement yielded accolades, including the distinction of Fellow of the World Technology Network and receiving the Sloan E-Commerce Award from MIT in 1999.

Prior to attending graduate school, Miller spent 10 years in the industry sector. He worked at Control Data in expert systems in energy management and then later at a company called Apertus as project leader for expert systems. Luther’s Ranum said Miller’s diverse industry background is a great asset to Luther College. “His technical knowledge is unmatched,” he said. “We really lucked out and kind of got the best of both worlds when we hired Brad.”

Alumni Spotlight: Brad Miller

Alumni, we want to hear from you!

Send your news about jobs, promotions, and awards to newsletter@cs.umn.edu.
Submissions will be included in the next newsletter.
CSE alumnus Jim Pichler (M.S.S.E. 2003) isn’t afraid of a challenge. He ambitiously nurtured two highly successful start-up companies in the past 15 years; Technology Squared and Digital River, while still finding time for volunteering.

After graduating with a bachelor’s degree from the University of Minnesota-Duluth, Pichler took a job with a small start-up, called Technology Squared. In that job he did everything from setting up the network to wiring.

The company grew fast and in 1995 Pichler’s talents were tapped for a spin-off company, called Digital River. At Digital River, Pichler thrived on building e-commerce stores. The company soon became a world leader in digital software downloads. In 1998, Pichler designed the systems integration for the company, which is still widely used today. He also refined an expertise in fraud prevention, a topic that he has published papers on and speaks about at conferences.

Pichler returned to academia in 2001, entering the CSE’s two-year Master of Science in Software Engineering (MSSE) Program, administered by the University of Minnesota’s Software Engineering Center (UMSEC). He attended classes on select days, while continuing to work at Digital River full-time. Pichler, who currently serves as Digital River’s Senior Director of Software Quality Assurance, said the program had a definite impact on his career and forced him to think differently about his work.

While Pichler has proven to be goal-focused in the business and academic worlds, he is equally passionate about reaching out to children and encouraging early involvement in science and technology fields. He is the president-elect of the University’s Institute of Technology Alumni Society (ITAS) and plays a major role in leading K-12 activities and outreach. In addition, he’s a senior member of the IEEE computing group and currently serves as a member of the CSE department’s

### Alumni Achievements

**Brian Bailey** (Ph. D. 2002) received the National Science Foundation’s Faculty Early Career Development (CAREER) award. Bailey is an Assistant Professor of Computer Science at the University of Illinois-Urbana.

**Chen Even** (B.A. 1989) was appointed chairman of the board of directors for a biodiagnostics company, Glycominds Ltd., which specializes in glycan biomarkers for disease diagnosis and management. Even is the Senior Corporate Vice President of Commercial Operations and board member for the Italian diagnostic company, DiaSorin.

**Dean Hougen** (Ph.D. 1998) was promoted to Associate Professor with tenure at the University of Oklahoma.

**Richard Keeney** (B. S. 1986) ran for a seat on the Prior Lake City Council this November, but lost by approximately 100 votes. Keeney is employed by Electronics for Imaging with an office in Eagan, Minn. Since graduating, Keeney has authored nearly a dozen U.S. Patents and received a Scientific and Engineering Academy Award from the Academy of Motion Picture Arts and Sciences in 1991.

**Kurt Krebsbach** (Ph.D. 1993) was promoted to Associate Professor with tenure at Lawrence University.

**Steve Lindfors** (M.S. 1976) completed a new APL interpreter. The features include complex numbers, user-defined functions, recursive functions, and both real and complex simultaneous equations.

**Karen Sutherland** (Ph.D. 1994), a Professor at Augsburg College, was appointed to serve as a member of the CRA Computing Community Consortium Council, aimed at fostering the development of new research directions in computing.

**Colin McMillen** (B.S. 2003), a doctoral candidate at Carnegie Mellon University, received a Best Paper Award at the Twenty-Second Conference on Artificial Intelligence (AAAI-07) for his paper entitled “Thresholded Rewards: Acting Optimally in Timed, Zero-Sum Games.”

**Nancy Reed** (Ph.D. 1995) was promoted to Associate Professor with tenure at the University of Hawaii, Manoa.
Gaming Research Shows Learning

C. Shawn Green, a student from Rochester’s research team, recently joined Schrater at the University of Minnesota to begin work on this project. Of his previous research, he says, “We’ve shown that experience with fast-paced action video games leads to enhancements in a number of fundamental visual skills including the ability to attend to the visual periphery, to keep track of multiple independently moving objects, and to resolve objects that are presented in crowded scenes.”

While Schrater said previous findings are promising, he does remain somewhat skeptical. “People that gain these skills play a minimum of five hours [a day] for a year or more,” he said, adding that many play 40-60 hours per week. “These skills are coming at costs in time.” Schrater said if anyone put that level of effort towards any activity, like karate or homework, for example, their performance would more than likely improve.

Despite that concern, virtual training using video games has continued to gain popularity outside of the gaming world. “Many teams at a collegiate level are using football simulations,” Schrater said, adding that he has even read that professional athletes use sports video programs in their training regimens to improve reaction time and coordination.

NEW GAMING STUDY

For this new study on the effects of video game usage Schrater, University of Minnesota computational psychologist Daniel Kersten, and their students teamed up with University of Rochester, Massachusetts Institute of Technology (MIT), and Vanderbilt University researchers.

This past fall, the group began studying the physical and psychological benefits of playing video games. Schrater said that visually demanding games will be a major part of the work. So far, he said they have purchased a few of the hugely popular Nintendo Wii gaming systems.

“What we are really hoping to find are engineering principles that underlie human learning.”
— Paul Schrater, CSE and psychology professor

Green described his hopes for the study, saying, “We’re hoping to determine what aspects of video games promote such strong learning.” He added that they’d like to identify the roles of arousal, motivation, and reward in these studies. Green wondered, “Can we quantify something like intrinsic reward and use it to predict how good of a learning tool a given video game will be?”

As part of this project, Daniel Acuña, a CSE graduate student with an interest in cognitive science, is working to identify the processes and replicating problem-solving mechanics in the human brain.

Using a simple slot machine game simulation, Acuña said he is analyzing how people react at the perceptual level to things like the colors used or the sounds associated with the games. He is also studying how people react at the cognitive level – the learning processes that go into playing the games. So far, he said people tend to attempt to solve gaming problems using the best possible solutions. “When people try to think more about a task, they do worse,” Acuña said.

So what are the potential applications for this kind of game analysis?

Schrater said one issue they want to address through this research is generalization in learning. For example, “What kinds of training generalize from a simulator to a new environment?” Schrater said that answering this question will provide significant insight in the design of simulation trainers for applications in rescue and safety, law enforcement, surgery, and sports.

Green agreed and said that once they can identify games that are the most effective for learning, they can make strides in improving the technology. “…the eventual goal would be to use this information to specifically design ‘games’ that teach a specific skill,” he said.
Many thanks to our supporters

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With December 31st around the corner, you may be like thousands of other individuals who are reviewing their financial and estate plans to ensure that your family’s goals are being met. Year-end gifts help uphold CSE’s ongoing commitment to excellence, while creating financial benefits and/or tax benefits in 2007 and beyond. If you itemize on your income tax returns, you are able to deduct your charitable contributions for the past year.

The Pension Protection Act of 2006 also offers special opportunities for giving. If you are age 70 ½ or older you can make an outright gift to CSE by transferring funds directly from your individual retirement account (IRA) without paying federal income taxes on the distribution. The gift must be made by December 31, 2007, and would count towards your minimum required distributions. Such a gift can be made for up to $100,000 per year.

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Now is an exciting and attractive time to create endowed scholarships and fellowships to support CSE students. Currently, there are two matching programs in place that allow the impact of a gift to be doubled on the payout. Gifts of $25,000 or more that meet program qualifications are eligible. For example, a gift that pays out $2,500 will be doubled to create $5,000 of student support through the President’s Scholarship Match or the 21st Century Fellowship Endowment.

These are just a few examples of the ways to support CSE at year-end. Please contact Anastacia Davis at (612) 625-4509 or aqdavis@umn.edu for more information on ways to give.

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