CSE professor Antonia Zhai meets the challenges of the multicore revolution

By Robyn White

As technology advances, personal computers are faster and more nimble. But on the heels of this technology are new applications for computers that challenge its ability to process tasks faster and more efficiently.

PROGRAM LOADING, WAITING…. Enter: multicore technology.

By using multicore technology, CSE researchers are looking to improve computational speed by allowing applications to utilize different processor cores on the same chip space.

CSE professor Antonia Zhai is working to prepare for this emerging technology with CSE professor Pen-Chung Yew, tackling the problem of optimizing the computational work shared on multicore processors. She said her goal is to: “Make things run faster, while keeping it simple.”

Faster computation

Zhai’s work in computer architecture is focused on thread-level speculation, which anticipates computer code dependencies to determine the eligibility of computational tasks to be completed in parallel.

Zhai started this work in the 1990s. “At the time when we started multicore research, there was no multicore (processor),” she said. But now, Yew said everyone in the computer industry needs to invest in multicore technology. Industry strongly supports their research, which is funded by IBM and the Intel Corporation.

Zhai said the key to this work is parallelism. “You want to make sure (cores) work together simultaneously,” she said, adding that it involves being able to strategically slice up and map out jobs in a number of cores to run concurrently.

But mapping this computational work presents a number of challenges. Zhai said another issue is identifying the future workload. “Underlying hardware is changing and the applications are changing,” she said. “You have to adapt both ways. You need to carefully orchestrate each component to get good performance.”
Message from the Department Head

It is nearly impossible to miss news headlines blaring with talk of a recession. But despite the gloomy economic news, the demand for computer science graduates is on the rise, making a degree from the CSE department a hot commodity in today’s market.

The University of Minnesota’s Career Center for Science and Engineering reports that over the past two to three years, the demand for computer science students has nearly doubled. Advisors say that computer science students typically have three or four jobs to choose from upon or prior to graduation. Given the dramatic demand, the department is working to do more to ensure that we can contribute to meeting the needs of the future technology workforce.

In May, the department solidified a long-term prospective undergraduate student marketing plan, aimed at increasing future enrollment in the discipline. Helping craft this plan was the Computer Science Associates (CSA) group, which is made up of industry members who advise the department on the needs of the business world and department curriculum.

The main goal is to increase public awareness of the needs in the field and the important role the department plays in the future of the computing industry in the state and beyond. Main thrusts of the plan include goals and strategies related to outreach activities, communications objectives, and industry involvement.

As part of the department’s outreach objectives, the department is seeking to increase involvement in K-12 Science, Technology, Engineering, and Math (STEM) initiatives and events to boost future CSE student enrollment among young students.

To help address the large gender imbalance in computer science, we are also participating in activities targeting young girls in promoting a computer science career. An important element of this outreach is the Kids Technology Camp, hosted by the Digital Technology Center and the department. The camp is aimed at exposing underprivileged middle school students – primarily girls and minority students – to computing fields and a collegiate atmosphere. (See page 4 for more information).

As part of the CSE plan, communications materials and activities will focus on continuously raising awareness of the need for computer science workers, the benefits of a computer science career, and the hireability of CSE workers. This is being executed through the renovation of the department’s student Web pages that will help to improve the information and usability for prospective students. Increased publicity of the department and marketing materials are also an important part of the plan.

Another critical part of the department outreach plan is the engagement of industry members. The department will encourage greater industry support in CSE outreach efforts, such as coming to speak to current and prospective students about the industry, and greater financial support for student scholarships and fellowships.

The demands of the future are encroaching on the computing industry today. Together, the CSE department and members of industry can help to meet the future needs and sustain the computing community into the coming years. To get involved, please send an e-mail to industry_relations@cs.umn.edu.

— Vipin Kumar, CSE Department Head and William Norris Professor
Local and national news

The Chronicle of Higher Education featured CSE professor Ravi Janardan in a news story focused on the benefits and perils of video recorded class lectures. In the story, Janardan expressed concern that video recorded lectures can lead to lower class attendance. (May 16, 2008)

CSE graduate student Jesse Vig’s Web site, GeoGreeting.com, was nominated for the Best NetArt Web site as part of the 12th annual Webby Awards and mentioned in a story in the Star Tribune. (April 10, 2008)

A new study by CSE professor Joseph Konstan and graduate student Max Harper, revealed that the answer quality provided by online question-and-answer Web sites, such as Yahoo! Answers and Google Answers, depends on how much you pay and how many people contribute to your answer. News of this research was posted on the ScienceDaily Web site. (April 9, 2008)

The journal, Molecular & Cellular Proteomics, featured news about a breakthrough from a University research group, for which CSE professor John Carlis and doctoral student Getiria Onsongo analyze saliva and use it to help identify proteins for the early detection of oral cancer. (Feb. 19, 2008)

The breakthrough work of a University of Minnesota research team was published in an article in the Journal of the American Chemical Society and later in ScienceDaily. The story detailed how the group discovered a new way to turn off T-cell genes in the human immune system, which could help develop new drugs to help people fighting various diseases, such as lupus. CSE professor George Karypis used computer programs to analyze the genes as part of the project. (Feb. 8, 2008)

A story in Finance and Commerce highlighted a project called EthicShare, a Web site and database for ethics scholars and students created through a collaborative project with CSE professor John Riedl, the University Libraries, and the Center for Bioethics. (Jan. 28, 2008)

KTLK-FM radio featured CSE professor John Riedl as an expert guest in an interview discussing the launch of a new Wikipedia-related open-source search engine, called Wikia Search. (Jan. 7, 2008)

The Fox 9 television station and multiple media agencies in India and Asia featured news of CSE professor Joseph Konstan and public health professor B. R. Simon Rosser’s work on a software program that aims to reduce the risk-taking behavior associated with the spread of HIV and other sexually transmitted infections. (Dec. 19, 2007)

The Minnesota Daily newspaper also mentioned this project in a story. (April 8, 2008)

The KARE-11 television station featured CSE graduate student Kelly Cannon in a news story highlighting her involvement in University of Minnesota tours aimed at trying to interest young girls in science and math fields. (Dec. 5, 2007)

CSE professor John Riedl spoke on National Public Radio about the technology behind how Netflix recommends movies to customers based on their previous rentals using an algorithm to sort the information. (Nov. 21, 2007)

CSE professor Yongdae Kim addressed the problem of e-mail attacks in a story in The Minnesota Daily, highlighting the growing problem of e-mail scams being harder to detect among University users. (Feb. 7, 2008)

CSE professor Nick Hopper warned of the dangers of e-mail scams, also known as “phishing,” in a story that appeared in The Minnesota Daily. (Nov. 26, 2007)

CSE professor Shashi Shekhar was featured in a story in The Minnesota Daily about University clocks being changed for daylight savings time using Global Positioning Systems. (Nov. 5, 2007)

CSE Rankings Continue to Rise

The U.S. News & World Report released its 2008 list of top graduate programs in which the University of Minnesota’s computer science program ranked 31st in the nation. That ranking continues to climb from the previous rankings of 34th place in 2007 and 36th place in 2006.

Other department rankings have followed this upward trend. In 2007, the department ranked 3rd in the Faculty Scholarly Productivity Index reported in The Chronicle of Higher Education and ranked 9th for the Citation Impact of Published Research Papers by Science Watch. (April, 2008)
Claudette Caparelli joined the CSE department in March, 2008. She is the new Grants Coordinator. Originally from San Francisco, Caparelli has research grant management experience from working at the University of California, San Francisco and Roger Williams Medical Center in Providence, Rhode Island.

The University’s Digital Technology Center and CSE department will host the fourth annual five day technology summer camp for middle school students Aug. 18-22. The camp targets underprivileged students from underrepresented groups, such as girls and minorities. The goal is to interest students in science and technology and expose them to a college atmosphere.

For more information or to help sponsor the event, e-mail: industry_relations@cs.umn.edu

CSE happenings

SCImagine! 2008 Robots Take Over the Library

CSE robots took over Walter Library at the University of Minnesota on May 9 as part of the Science & Engineering Library’s annual science showcase, SCImagine! At the public event, held in the University’s Digital Technology Center, CSE faculty and students gave exciting robotics demonstrations. Many young children, students, parents, and community members attended to see the latest creations of artificial intelligence, virtual reality, and robotics from the CSE department.

CSE hosts a student engagement event

The CSE department hosted an event for current and prospective undergraduate students in April, 2008. The program included insights on computer science education from Professor Yale Patt, an ACM Distinguished Speaker from the University of Texas – Austin, industry speakers, and a discussion about CSE research potential. The event was organized by the department and the ACM Student Chapter.

Software Engineers gather for Code Freeze

More than 165 members of industry and researchers interested in software engineering gathered in January for the third annual Code Freeze 2008 Software Symposium at the University of Minnesota’s McNamara Alumni Center to discuss the topic of innovation. The University of Minnesota Software Engineering Center hosted the event. David Hussman, DevJam, served as the program chair and UMSEC Director, Mats Heimdahl and Director of Graduate Studies, John Collins, served as organizers.

Legislators tour state-of-the-art CSE classroom

A delegation of Minnesota Legislators visited the University in early December, touring classrooms, research facilities, and learning about CSE’s innovative teaching methods. As part of the tour, the group visited CSE professor Maria Gini’s graduate class on Intelligent Agents in the EE/CSci building’s newly refurbished classroom, room 2-260, and learned about the teaching quality in a highly interactive, technologically advanced classroom.

Faculty speaking engagements

CSE professor Jaideep Srivastava will give a plenary talk at the IEEE International Conference on Security Informatics in June 2008 in Taipei, Taiwan. He will also give an invited talk at the 23rd International Symposium on Computer and Information Sciences in October, 2008 in Istanbul, Turkey.

The Department of Computer Science and Technology at Tsinghua University in Beijing, China appointed CSE professor Pen-Chung Yew as an EMC Visiting Chair Professor. It will be a three-year appointment to promote collaborative research and teaching. Yew will visit Tsinghua University for one month each summer during each year’s appointment to work with faculty and grad students, and teach a short course.

CSE professor Maria Gini was the featured Ada Comstock Distinguished Women Scholar Lecturer at the annual speaker series held on March 31 at the Hubert H. Humphrey Center. This lecture series honors the scholarly leadership and achievements of distinguished women faculty at the University and seeks to give them a forum to share their ideas with community members.

The MSSE Director of Graduate Studies John Collins was invited to give a lecture entitled “Trading Agents in Electronic Markets” at Erasmus University in March 2008 in the Netherlands.

CSE professor Shashi Shekhar was the keynote speaker at an event called the, “Research & New
Chad Myers joins CSE faculty

The CSE department is pleased to welcome Chad Myers as an Assistant Professor. He joined the department in January 2008, after earning his doctorate in computer science at Princeton University. Myers specializes in computational biology and functional genomics. He has co-authored 15 refereed publications for various conferences and journals. Myers’s research focuses on machine learning methods for integrating large-scale genomic datasets to understand gene function and biological networks.

“Computational biology is an exciting field because genomic approaches are allowing us to address many fundamental biomedical questions, and computer scientists are at the center of these efforts. We are lucky because we get to see the immediate impact of the methods we develop in improving our understanding of biology and disease,” he said.

Since joining the department, Myers has embarked on a study to understand interactions between genes in yeast. Genetic interactions are the root cause of several common diseases, and he is applying computational models to learn about this phenomenon in yeast, with the ultimate goal of gaining insight into human disease. He is building collaborations with experimental researchers working in higher model organisms, such as zebra fish, which will allow more direct study of diseases like cancer. In addition to research, he is teaching an upper level bioinformatics course with CSE assistant professor Rui Kuang, which he is hoping will become part of the regular curriculum.

CSE Publications Win University Awards

CSE took home three writing awards at the 2008 University of Minnesota Communicators Forum annual conference on May 15 at the St. Paul RiverCentre. The Communicators Forum is a professional group of communications staff at the University. Each year, the group presents Maroon and Gold Awards to recognize publications and materials that best embody the University’s core values. Winners are selected by a panel of expert judges.

CSE received a Gold Award for excellence in writing for the story ‘From Tanzania to U,’ from the Spring 2007 issue of the Soundbyte newsletter.

CSE also won two Maroon Awards – one for promotional writing for the commemorative booklet, ‘Department of Computer Science and Engineering: 40 Years of Excellence,’ and another for a press release entitled, ‘UM Researchers Reveal New Findings About Wikipedia Authorship and Vandalism.’

Venture Showcase on Geospatial Sciences,” in January at the University of Texas – Dallas.

Dr. Brian Berry, a member of the National Academy of Science and one of the foremost researchers in the area, presided over the event. Shekhar’s talk was entitled, “The Geospatial Sciences Scene in 2015.”

CSE Department Head Vipin Kumar gave a keynote talk at the International Conference on High Performance Computing (HiPC), December 18–21, 2007 in Goa, India. The title of his talk was, “High Performance Data Mining – Application for Discovery of Patterns in the Global Climate System.”

CSE professor Jaideep Srivastava gave the keynote address in December at the Australasian Data Mining Conference. His talk was entitled, “Data Mining for Social Network Analysis.” Srivastava also gave a tutorial later that month entitled, “Application of Data Mining Techniques for Computer Security,” at the third International Conference on Information Systems Security at the University of Delhi in India.

Publications

CSE professor Shashi Shekhar, along with Professor Hui Xiong from Rutgers University, published a book entitled, “Encyclopedia of GIS.” The book includes more than 200 articles on computational topics related to Geographic Information Sciences (GIS). (February, 2008)

AI Magazine featured a story about the obstacles involved in supporting supply chain management and an event in which researchers from around the world engage in a Trading Agent Competition. CSE professor John Collins co-wrote the article that reviews this game. The story addresses ways in which artificial intelligence could better manage supply chains. (February, 2008)
CSE professor Riedl named ACM Distinguished Scientist

The Association for Computing Machinery (ACM) named CSE professor John Riedl one of 20 new ACM Distinguished Scientists. ACM names new Distinguished members each year to honor significant contributions to computing and information technology.

CSE professor Hopper awarded the University’s McKnight Land-Grant Professorship

The University of Minnesota awarded CSE professor Nicholas Hopper the McKnight Land-Grant Professorship, a two-year appointment that includes a research grant for each year. Hopper’s award was based on his work in ‘provable security analysis of privacy-related technologies.’

The McKnight Land-Grant Professorship is a University-wide award given to the school’s most promising junior faculty each year. Hopper is the 10th CSE faculty member to receive this prestigious award. Hopper specializes in cryptography and computer security. He’s a member of the International Association for Cryptographic Research and he received the National Science Foundation’s (NSF) CAREER award in 2006.

CSE researchers secure major NASA grant

A research team led by CSE professor Jaideep Srivastava and colleagues CSE professors Vin Kumar, Arindam Banerjee, and William Schuler, secured a major grant from NASA to study the applications of data mining to the monitoring and analysis of the operational health of airborne vehicles. The grant totals nearly $1 million and runs until 2010. The project is part of a larger NASA initiative on the Next Generation Air Safety, which will benefit NASA missions, the Federal Aviation Administration, and the United States Air Force’s Air Mobility Command. This research is carried out in partnership with the NASA Ames Research Center and United Technologies.

CSE professors in the news

CSE professor Tripathi named IEEE Fellow

The Institute of Electrical and Electronics Engineers (IEEE) awarded CSE professor Anand Tripathi the distinction of Fellow for his contributions to distributed system software architectures and programming frameworks. Tripathi is the 7th CSE faculty member to be named as an IEEE Fellow. The IEEE Fellow designation is conferred by the Board of Directors to professionals with an outstanding record of accomplishments in any of the IEEE fields.

CSE professor Gini elected AAAI Fellow, awarded the IT Distinguished Professorship

The Association for the Advancement of Artificial Intelligence (AAAI) awarded CSE professor Maria Gini with the distinction of Fellow for her major contributions to work in multi-robot and multi-agent systems, her demonstrated leadership in the artificial intelligence community, and her work to inspire youth. The AAAI will celebrate this honor at a Fellows dinner in Chicago on July 15.

The University of Minnesota’s Institute of Technology also recognized Professor Gini, awarding her the Institute of Technology Distinguished Professorship. This award honors exceptional faculty for their contributions to teaching and scholarly research, and for their commitment to IT and its activities. IT Distinguished Professors receive an award of $15,000 for professional development or research. Gini is the second CSE faculty member to receive this honor – Professor Yousef Saad received this award in 2005.

CSE professor Gini appointed to CRA Committee on women in computing

CSE professor Maria Gini was appointed to the Computer Research Association’s Committee on the Status of Women in Computing Research, where she is a co-coordinator of the Distributed Mentor Project.

Dovolis wins ‘IT Best CSE Professor’

The Institute of Technology Student Board (ITSB) named CSE teaching faculty member Chris Dovolis winner of the Institute of Technology’s 2008 Best Professor Award. The ITSB selects an award recipient from each IT department every spring. Selection is based on a student poll. This is the fifth Best Professor award for Dovolis, one of CSE’s repeat winners regularly recognized for his teaching quality and commitment to students. Past CSE winners include Carl Sturtivant and John Carlis.

Revamped CS course recognized

CSE professor Carl Sturtivant and graduate student Jon McLachlan revamped the CSE course CSci 4211, Introduction to Computer Networks. As a result, both received the ‘Thank you for being a Great Teacher’ award from the University of Minnesota’s Center for Teaching and Learning. An anonymous student from the class nominated the duo for the award.
CSE graduate student elected GAPSA Vice President of Student Affairs
University students elected CSE grad student James Faghamous to be the Vice President of Student Affairs for the University of Minnesota’s Graduate and Professional Student Assembly group on campus in November. This group represents the interests of graduate students at the University level.

CSE graduate student selected for national research practicum
CSE graduate student Bridget Thomson McInnes, a GAAN Fellowship recipient, was accepted into the National Library of Medicine Research Participation Program, which provides funding for her to spend six months completing her thesis research at the National Library of Medicine (NLM) at the National Institutes of Health (NIH).

As part of this research practicum, Thomson McInnes will have the opportunity to work on her thesis with the assistance of NLM resources. Her thesis is focused on exploring methods to disambiguate words in the biomedical text using biomedical knowledge sources, such as the Unified Medical Language System and Medline abstracts.

Graduate students honored with CSE Excellence in Research Awards
The CSE department honored seven exceptional CSE doctoral students with the annual CSE Excellence in Research Awards.

The award honors Ph.D. students who have passed the Written Preliminary Exam and made a singular, significant research achievement as a primary contributor.

These awards are funded by a generous grant from the Guidant Foundation. Each recipient is given $500. The 2007 awardees include:

- Chi-Yin Chow, advisor Professor Mohamed Mokbel
- Yu Gu, advisor Professor Tian He
- Joel Hesch, advisor Professor Stergios Roumeliotis
- Faraz Mirzaei, advisor Professor Stergios Roumeliotis
- Aravindan Raghuveer, advisor Professor Stergios Roumeliotis
- Huzefa Rangwala, advisor Professor David Du
- Xun (Sam) Zhou, advisor Professor Stergios Roumeliotis

CSE graduate students awarded the Doctoral Dissertation Fellowship
The University of Minnesota’s Graduate School awarded CSE graduate students Yu (Jason) Gu (above left) and Faraz Mirzaei (above right) the Doctoral Dissertation Fellowship for the 2008–2009 academic year.

Recipients of the 2008–2009 fellowship will receive a stipend of $22,000 for the academic year, plus full tuition for thesis credits. Candidates are nominated by their graduate program’s Director of Graduate Studies. Approximately 75 Doctoral Dissertation Fellowships are awarded annually.

CSE graduate student wins award for women’s outreach work
The Office of University Women awarded CSE graduate student Kelly Cannon the Sharon L. Doherty Award for her outstanding outreach efforts focused on encouraging women and members of underrepresented groups to explore science and technology fields.

The Sharon L. Doherty Award was established in 1993 to recognize University students who have demonstrated outstanding volunteer service work focused on women’s issues. Cannon is also the recipient of the 2007 Anita Borg Scholarship, which supports women in computing, technology, and leadership.

Invest in tomorrow!
Support CSE Students with a Scholarship or Fellowship
Creating a scholarship or fellowship is the perfect way for corporations and individual donors, such as alumni, to meet their philanthropic goals, while supporting CSE students. It is also an excellent way to raise awareness about your company among the CSE student population. The University of Minnesota’s Presidential Scholarship match assures that your contribution will go far.

For more information, visit:
www.cs.umn.edu/external_relations/giving/index.php
CSE 2008 commencement

CSE celebrated commencement ceremonies on May 9, 2008 at the University of Minnesota’s Northrop Memorial Auditorium.

Above are some of the CSE graduates who attended Spring 2008 commencement, including doctoral students: Betsy George, Pamela Ludford, Anastasios Mourikis, Huzefa Rangwala, and Lijun Qu.

Back row (from left to right) Anastasios Mourikis, Lijun Qu, and Huzefa Rangwala. Front row (from left to right) Betsy George, CSE Graduate Studies Coordinator Georganne Tolaas, and Pamela Ludford.

Undergraduate Honors 2007-2008

Author: Matthew Broten
Title: Using a neural network to filter comment spam
Advisor: Dan Kersten

Author: Michael Levin
Title: CellWriter: grid-entry handwriting recognition
Advisor: Nikolaos Papanikolopoulos

Author: Adam Momsen
Title: Hybridization of feature matching and 3-D model comparison for object recognition
Advisor: Nikolaos Papanikolopoulos

Author: John T. Olds
Title: Predicting for Productivity: Folder Recommendation Strategies for Avid Bookmarkers
Advisor: John Riedl

Author: James Parker
Title: Circuit learning with side information
Advisor: Nick Hopper

Author: Zachary Snow
Title: Tac: An Adaptable and Generic Interactive Theorem Prover
Advisor: Gopalan Nadathur

From left to right: Master of Science in Software Engineering graduates Debbie Gillespie, Vasudha Channapasappa, Sree Kunduru, and Ranga Narayanam.
MCS Graduates
Jason T Albert
David M Braasch
Wei Hu
Michael Andrew Raymond

MS Graduates
Abdirizak A Ahmed
Pranav Bhargava
Derek Allen Bodin
Yanlai Chen
Steven Bjorn Damer
Li Feng

Vijay Mahendra Gandhi
Betsy George
Amanuel Godefa
Christopher John Heuer
Paul Huntington
Reshma Kamat
Pei-Hung Lin

Sandeeep V Mane
Faraz Mohammad-Mirzaei
Lakshmi Naarayanan
Ramakrishnan
Kenneth Craft Reily
Gennady Rubinchik
Daniel J Sandler

Brandon W Schulz
Jason Dale Sollom
Marci Lynn Sperber
Prasad Sriram
Thomas Mason Whipple
Ruinan Zhang
Xin Zhao
Jiaping Zheng
When most people think of E. coli bacteria, the fear of food recalls and intestinal illness commonly come to mind. But CSE professor Dan Boley is using his mathematical expertise to aid chemical engineers in looking for ways to turn the bacteria into a tool for increasing the production of ethanol, a biofuel becoming an increasingly popular alternative energy option.

Bacteria, such as E. coli, depend on a large number of different pathways, each of which produces a different compound – CO2, for example, or ethanol. “Mathematically each one of these pathways is a chain of chemical reactions,” Boley said. His job is to try to expand the analysis of ethanol pathways in the bacteria, so that researchers can alter the organism to increase the pathways that make ethanol and block the ones that don’t.

University of Minnesota chemical engineering professor Friedrich Srienc, in the University’s Bio Technology Institute, said this ethanol project is one aspect of a larger research effort started many years ago focused on metabolic engineering, in which he is also exploring biopolymers and biodegradable plastics. Boley joined this project two years ago through a grant from the University’s Digital Technology Center, with the goal of developing computer algorithms that can handle larger, more complex networks.

Srienc said he hopes Boley’s participation in the ethanol project will help to identify the principles to extend the analysis of the pathways in more complex networks. Doing this, he said, could allow for applications to a variety of areas. For example, he said one could use this to optimize the production of a metabolite or produce a specific product using biotechnology.

Boley, who specializes in numerical analysis, linear algebra, and computational methods, then uses algorithmic and theoretical analysis to parallelize the algorithms to handle even larger networks. “They want to look for all the elementary paths through this network,” he said, adding that it’s his job to find them efficiently.

Boley said the mathematical issues posed by this project can be traced back to similar problems studied by classical mathematicians, as far back as Jean Baptiste Joseph Fourier in the early 1800s. “The problem is related to issues in computational geometry and linear programming,” he said.

By using his mathematical expertise, Boley has been able to find ways to more easily identify path combinations. “If you are given a path, you can tell if it’s a combination of other paths without computing all of them,” he said.

Once the algorithms for analyzing network pathways are identified, Boley’s work on the project moves to the hands of two talented graduate students, who tackle the problems with software and chemical engineering.

Pathway manipulation
CSE graduate student Dimitrije Jevremovic came to the University from Serbia in 2007 to work on his doctorate, focused in bioinformatics. He began working on this biofuels project in August 2007.

Jevremovic’s work on this project involves developing a software program for a supercomputer. He said the program is used to analyze the metabolic networks and help chemists compute pathways of very large metabolic networks. The software will run on computers at the Minnesota Supercomputer Institute and the IBM Blue-Gene supercomputer in Rochester, MN, where IBM has generously allowed U researchers to test it on models and evaluate the results.

Jevremovic’s work is supported by a Traineeship Program award through the
The University of Minnesota will award its Outstanding Achievement Award for alumni to CSE alumnus Arvind (M.S. ’72, Ph.D. ’73) in a ceremony next fall. This award is reserved for select alumni who have attained unusual distinction in their fields and who have demonstrated outstanding achievement and leadership. This exciting honor is in addition to another major accomplishment for Arvind; his election to the National Academy of Engineering (NAE). Election to the NAE is the highest professional designation for an engineer.

Arvind is the Johnson Professor of Computer Science and Engineering at the Massachusetts Institute of Technology (MIT) and a member of the Computer Science and Artificial Intelligence Laboratory. Since graduating from the University, he has become extremely successful in the academic and business worlds, and is one of the most notable pioneers and practitioners in the computer science field. Arvind is known as a trailblazer for his work on dynamic dataflow architectures and the functional programming language, id, designed specifically for dataflow computer architectures in 1980s and 1990s. He has also done influential work in formal methods that includes semantics, lambda calculus, and term rewriting systems.

Throughout Arvind’s distinguished academic career, he has produced and worked with many talented Ph.D. students from MIT. Many of them currently hold influential positions in academia and industry, including Dr. Gregory Papadopoulos, EVP and Chief Technology Officer (CTO) of Sun Microsystems, Dr. Robert Iannucci, CTO of Nokia, Dr. Vinod Kathail, Founder and CTO of Synfora, and Stephen Brobst, CTO of Teradata Corporation. Several others are currently distinguished chair professors in major universities, including Professor David Culler, Howard Freisen Chair Professor at the University of California – Berkeley and a member of the NAE, Professor Keshav Pingali, W.A. Moncrief Chair Professor at University of Texas – Austin. All have made a significant impact on the computer industries, computer science research communities, and today’s society.

Alumni achievements

Aaron Brethost (B.S. 2003) worked as a Program Manager at Microsoft for four years and designed the user interface for Visual Studio 2005, Visual Studio 2008, and Microsoft Popfly. In 2007, he joined Skytap, a new start-up company working on virtualization solutions for software testing.

Dan Cosley (Ph.D. 2006) accepted a tenure-track position as an Assistant Professor in Information Science at Cornell University.

Zack Garbow (B.S. 2003) was named an IBM Master Inventor in 2007. As part of the Y Combinator start-up program, he co-designed a software tool called, 8aweek, which tracks Internet browsing habits and limits distracting Web sites.

Sridhar Iyer (M.S. 2004) was recently awarded Medtronic’s CRDM Cultural Norms Award in the “Lead Through Empowerment and Require Accountability” category, which recognizes employee excellence in empowerment and accountability. Iyer works as a Senior Software Engineer for Medtronic’s Cardiac Rhythm Disease Management (CRDM) division.

Don Krantz (Ph.D. 1995) is the Chief Operating Officer at Protomold. The key to the success of the company in rapidly producing prototypes of plastic parts from 3-D CAD models is a powerful computer cluster. The company’s cluster technology was featured in TechBriefs. (Feb. 1, 2008)

Heidi Kvinge (M.S. 1983) is the Program Chair for the 2008 Grace Hopper Celebration of Women in Computing with the theme, “We Build a Better World.” More than 1,000 attendees are expected for the conference on October 1–4, 2008, at the Keystone Resort in Colorado. Kvinge works at Intel.

Yingshi Li (M.S. 2003, Ph.D. 2005) won a Best Paper Award at the International Conference of Wireless Algorithms, Systems, and Applications for the paper, “Constructing Connected Dominating Sets with Bounded Diameters in Wireless Networks.” The conference was held in August, 2007 in Chicago.

Sandeep Mane (Ph.D. 2008) is now a Senior Engineer at Oracle in California.

Xiaoru Yuan (Ph.D. 2007) accepted a job as a Professor in the Center for Information Science at Peking University in China.
While many CSE alumni are highly successful in academia and industry, Professor Imrich Chlamtac (Ph.D. 1979) is in a class of alumni whose careers have taken off in a dramatic way, making a significant impact on the academic and business worlds at a global level.

Chlamtac is the Bruno Kessler Honorary Professor at the University of Trento, Italy, and is the President and founder of the Center for Research and Telecommunication Experimentation for Networked Communities (Create-Net), an independent non-profit international research consortium.

Among some of his major projects, Chlamtac is the principal investigator of BIONETS, a multi-disciplinary project aligned with 13 top European academic and industrial institutions. This project explores the application of biologically inspired approaches to the management of future computing and communication systems. Chlamtac is also the Chair of the Scientific Council at the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering.

After receiving his doctoral degree in computer science from the University of Minnesota under the guidance of CSE professor emeritus William Franta, Chlamtac made significant contributions to the field. He is known as the inventor of the lighpath concept, which is the basic mechanism for wavelength routing. In the early 1980s, Chlamtac was also the first to introduce fundamental concepts of multi-hop networking, covering issues such as channel conflict resolution, hidden terminal problems, routing, and broadcasting. IEEE and ACM both honored Chlamtac with the designation of Fellow in 1993 and 1995, respectively.

Chlamtac has held many faculty positions at Technion, Israel Institute of Technology, the University of Massachusetts – Amherst, Boston University, and the Distinguished Chair in Telecommunications Professorship at the University of Texas – Dallas, where he also served as the Associate Provost for Research.

Victor Bahl, Chlamtac’s former Ph.D. advisee at the University of Massachusetts – Amherst, is now a Principal Researcher and founding manager of the Networking Research Group at Microsoft. “Imrich Chlamtac epitomizes academic entrepreneurship. He is an energetic charismatic leader who has created opportunities for young researchers like no other academic I know of,” he said.

Despite his already significant accomplishments, Chlamtac continues to seek answers to major research questions. “Technology is taking us to a world where myriads of heavily networked devices interact with the physical world in multiple ways, and at multiple scales, from the global Internet scale down to micro- and nano-devices,” he said. “A fundamental research challenge is to devise decentralized computing systems, which are capable of operating under changing environments, and yet exhibit the desired behavior and response time, under unpredictable operating constraints.”

For CSE alumnus Wolf Ketter (Ph.D. 2007), the lure of computer science wasn’t in the discipline itself, but in its dynamic applications to the business world. Ketter’s broad mastery of this area has enabled him to do fascinating work in the area of information systems and supply chain management (SCM).

Since earning his doctorate in computer science, Ketter became a tenure-track faculty member doing research on the technology for information systems at one of world’s top management schools, the Rotterdam School of Management at Erasmus University in the Netherlands. He founded and runs a 10-15 person research group called Learning Agents Research Group at Erasmus. The group’s work focuses on autonomous intelligent agents to support human decision making capabilities in the area of business networks, electronic markets, and SCM.

As part of this work, Ketter’s team cracked into the big business of international flower auctions held in the Netherlands. “60 percent of flowers being sold in the world are auctioned from the Netherlands,” Ketter said. For one project, his team is creating a system to improve tactical and strategic decision-making of the flower chain and at the flower auction sites.

In another new project, his research group is working on smart business networks by developing advanced decision support systems and autonomous software agents to assist managers by gathering and analyzing information, making recommendations, and supporting business decisions.

Ketter said he became interested in
When CSE alumnus Mike Rogalski (B.S. 1990) earned his undergraduate degree, the CSE department’s building was brand new and the business world had yet to be rocked by the power of the Internet.

Fast forward to the present, Rogalski holds an impressive position as a Senior Executive at Accenture and attributes his undergraduate education to preparing him for the challenges and opportunities ahead.

Rogalski said he became interested in the computing field, because he liked the ability to use technology to solve tough problems. Serving at Accenture as a Senior Executive in the health and life science practice, he uses technology to solve problems for hospital clients and health insurance companies.

His large projects include work in portal development and Web 2.0 technologies. Rogalski described his work as, “Leveraging technology to improve the interactions and business processes between consumers and health care organizations.”

When and former colleagues of Rogalski describe him as a great supporter. Philip McKoy, Director of Product Development in Technology Services at Target Corporation, worked with Rogalski at Accenture in the late-1990s.

“I would not be in the position I am in without Mike,” he said. “If he saw that you were good, he took the time to stand up for you and for your career.”

Rogalski’s rise at Accenture started right after graduation in 1990. He said the Institute of Technology’s job placement staff helped him to secure a job after graduation at Andersen Consulting doing systems implementation. Since then, the company was renamed Accenture and Rogalski was promoted to Partner in 2000.

Rogalski said he has many fond memories from the CSE department and the University of Minnesota. He attended a programming language class with CSE professor Jaideep Srivastava and also took courses with CSE professor emeritus Marvin Stein – a founder of the department. Rogalski said that at that time computer science was starting to take off, with exciting technology in development, such as the Internet and client/server, and e-mail.

In addition to technology interests, Rogalski also participated on the University’s Track and Field team. He is still an active supporter of the University’s Track and Field team, as well as CSE department activities. Rogalski serves on CSE’s industry advisory board, the Computer Science Associates. In addition, he plays a crucial role in overall recruiting efforts for Accenture at the University of Minnesota.

As for advice for current students, Rogalski said students should remain open to a variety of industries. “Technology plays a big part in every industry,” he said. “Computer science permeates everything in industry now a days.”
MULTICORE CONTINUED

“It will take a lot of effort to port your code to multicore,” Yew said. “Achieving good performance is hard and people have high expectations.” Zhai said another issue is refining the responsibilities of each component of the system while not interfering with its ability to get the job done.

KEEP IT SIMPLE

CSE graduate student James Greensky is working with Zhai to solve this issue through building a Resource Management Layer or ‘virtualization layer’ above the hardware layer that will create threads and distribute jobs between the cores, without creating more complexity for software developers.

“You want the programmers to focus on what they want to do without worrying about the low level details,” Zhai said, adding that the layer would provide functionality, while considering various aspects of the system, such as power consumption and heat generation.

“This is a fairly novel project,” she said, as no one knows how the layer should behave. Greensky, who started his doctoral work on this project in 2008, said he hopes to work on the project for at least the next three years and is excited by the challenges it brings.

Greensky was awarded a GAAN Fellowship, which supports employment and tuition for up to three years for doctoral students from underrepresented groups.

Greensky said testing the virtualization layer in a simulation environment is hard. “Our target processors have not been built yet, so you have to use software simulation,” he said, adding that no one has built a layer like this before. Greensky said he hopes to be the one to make it a reality.

MEETING FUTURE CHALLENGES

On a broader scale, Zhai’s work is part of a larger multicore initiative involving numerous faculty from CSE and the University’s Electrical and Computer Engineering department.

This work is segmented into applications, systems software, and hardware support. The goal is to develop faster, more reliable, programmable, and secure systems on multicore processors.

Work in applications will help to identify emerging workloads and includes faculty in areas such as bioinformatics, data mining, computational biology, and multimedia. Research in systems software will design new programming models, testing tools and performance enhancers and involves faculty focusing on software engineering, programming, compiler work, and runtime parallelization. Efforts in hardware will include processor design and support, and includes researchers in computer architecture, computer aided design, and low-level design specialties.

Due to the complexity of this technology, Yew said that it will take time for the technology to mature. “It’s a huge challenge,” he said. Despite the complexity and measured progress, Yew said that this technology will eventually become a crucial part of the computing landscape. “People may not realize the importance of this,” he said. “But it will revolutionize computing.”

University of Minnesota’s Biomedical Informatics and Computational Biology program, which aims to establish an academic and research center in Rochester, MN and an interdisciplinary, all-University graduate program in Biomedical Informatics and Computational Biology.

Cong Trinh, a chemical engineering graduate student working under Srienc, started work on the project in 2007 as part of his thesis. Trinh uses the algorithm results to decide how to modify the bacteria in the lab. Srienc said Boley found a new interesting way to classify pathways that he hopes to use when studying large networks.

Trinh said it is complicated work, but the goal is to use metabolic engineering to modify the organism to boost the production of desired products, such as ethanol. A central E. coli network can have close to 60 reactions leading to over 40,000 viable pathways. He said that Boley’s pathway identification helps refine the metabolic engineering process. “After knowing those existing pathways, we can find the best,” he said.

Trinh has been successful so far. “We have generated strains where we have optimized cell growth using this technique and increased cell growth,” Srienc said. Boley estimated the increase at close to 30 percent.

Trinh said that the mathematical work involved in the project is very challenging, but has proven to be extremely helpful in meeting the goals of this project. “Professor Boley is an expert in this kind of linear algebra,” he said. “I am impressed by the results we developed to unify the areas to solve the problems.”

Given the nature of the project, the interdisciplinary collaboration with computer scientists has been crucial. “The way that they approach the problem is from a completely different point of view,” Trinh said. “This collaboration in that sense is extremely useful.”
Many thanks to our supporters

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