

most significant bits

newsletter of the uw department of computer science & engineering

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Alumni Spotlight

Alan Shen: Superconductor

When CSE alum Alan Shen isn't developing new varieties of communication devices for Microsoft, you might find him conducting Brahms' *Variations on a Theme of Haydn*. That's because this amazing 23-year-old is not only a successful program manager but also the man behind the Puget Sound Symphony Orchestra – a non-profit group of talented young musicians.

Since graduating from the Computer Engineering program in 1997, Shen has worked for Microsoft's Smartphone division, where he is building a cellular phone that promises to provide everything from e-mail, web browsing and over-the-air configuration/synchronization in a hand-held device.

But in 1999, Shen, an avid piano and violin player, decided to fulfill a lifelong dream of assembling an orchestra. He was well prepared for the task having served as concertmaster for the Tacoma Youth Symphony and the Tacoma Young Artists Orchestra. He had also conducted the Microsoft orchestra for one quarter. "I loved it so much," Shen recalls, "that one afternoon I came home and announced to my roommate that I was starting a symphony. At the time, she just laughed at me, but now she's financial director!"

To build the Puget Sound Symphony Orchestra, Shen posted flyers in UW residence halls calling for auditions. The response was overwhelming. "The main draw of PSSO," Shen explains, "is its mission: being a musically enriching and fun group with minimal competition and politics."

The Orchestra grew to around 50 members, and they recently celebrated a successful first anniversary. So far, 3 concerts are planned for the coming season, including a performance of Saint-Saens' Organ Symphony in the University Presbyterian Church.

This will be a notable performance as the church has one of the most spectacular organs on this side of the country.

While e-mail and web-based communication have helped keep the symphony organized, Shen admits there are few other connections between his computer science background and musical life. "I wish I could say implementing quicksort or knowing the number of transistors in a NOR gate provides me musical inspiration at the podium. But they are like ducks and donuts." Ducks and donuts aside, we look forward to seeing (and hearing) the future fruits of Shen's innovation.





letter from the chair

Welcome to a new *MSB* feature – the “Letter from the Chair.”

Many of you are probably thinking that simply receiving an issue of *MSB* after a 2-year hiatus is a pretty great feature. Indeed. We promise to do better.

And some of you are aware that my first “Letter from the Chair” will also be my last: on June 30 my term will end and I’ll return to my faculty role. So, not surprisingly, you’re in for a bit of reflection.

Eight years ago, at the start of my term, I thought about the “competitive advantages” of universities in general, and of UW and CSE in particular. Why choose to work at a university, given the multitude of other opportunities? Here are four great reasons:

- Universities have students.
- Universities are uniquely charged to focus their research on the long term.
- Universities are inherently multidisciplinary.
- University jobs offer tremendous flexibility: education, research, leadership, entrepreneurship.

In addition, the Puget Sound region, the University of Washington, and CSE itself offered some special advantages:

- The Puget Sound region has the nation’s most vibrant computing industry, plus Microsoft Research.
- The University of Washington has special strengths in many academic areas, and also has one of the nation’s smartest and most effective Computing & Communications organizations.
- CSE has a strong and successful department culture – “nurture the young.”

Lord knows, there are plenty of *drawbacks* to working at a university! So, consciously celebrating and capitalizing upon these wonderful advantages seemed critical to me. In this spirit, the department committed to a five-part plan:

- A re-dedication to excellence and access in our educational programs.
- A commitment to seek high-leverage research directions with long-term impact, and to search for interdisciplinary opportunities with the strongest colleagues campus-wide.
- A strengthening of our partnership with the region’s computing industry.
- A focus on institutional and regional impact, in addition to national and international impact, and a commitment

to actively communicate our goals and accomplishments to the public .

- A recognition that there are way too many meritorious things to be done, so we need to focus ruthlessly on those where we add special value.

I think the scorecard is pretty good, and I’d like to share it with you.

Education: CSE has become the University of Washington’s poster child for across-the-board excellence in education. Since 1995, four CSE faculty members have been honored with the *University of Washington Distinguished Teaching Award*. In 1999 the department was honored with the inaugural *University of Washington Brotman Award for Instructional Excellence* – a new “departmental distinguished teaching award.” In 2000, David Notkin received the second-ever *University of Washington Distinguished Graduate Mentor Award*.

CSE attracts the University of Washington’s finest undergraduates, through the excellence of our educational programs, and through our innovative recruiting initiatives). This year, CSE student Emma Brunskill was named a *Rhodes Scholar* (UW’s first in 15 years), and CSE student Kevin Zatloukal was named the nation’s *Outstanding Undergraduate* by the Computing Research Association. This year, two of the four *University of Washington Class Medallists* were CSE students: Christopher Twigg and Thomas Carlson. An extraordinary four CSE students received *NSF Graduate Fellowships* earlier this month. Our Capstone Design Courses are widely recognized, and our interdisciplinary educational initiatives have been extremely well received.

CSE has become the University of Washington’s poster child for across-the-board excellence in education

At the graduate level, three Ph.D. students nationwide were honored this year in the *ACM Outstanding Dissertation Award* competition – and two of them were CSE’s William Chan and Mike Ernst. Last spring, CSE’s Stefan Savage was unquestionably the most heavily recruited student in the nation (Stefan chose to join CSE alums Fran Berman, Bill Griswold, Dean Tullsen, and Geoff Voelker on the faculty at UC San Diego, over offers from Berkeley, Carnegie Mellon, MIT, Stanford, and every place else), and CSE’s Mike Ernst, Chris Lewis, and Gun Sirer also were extremely well received on the academic market (they are now faculty members at MIT, Pennsylvania, and Cornell, respectively).

Research: First and foremost, I take pride in the extraordinary faculty who have joined us in recent years. Jerre Noe, our founding chair, established as a foundation of the department that we must strive to hire people every

year who are even stronger than those we hired the year before, and that we must invest in these young men and women in order to maximize their success.

This year, Assistant Professors Raj Rao and Dan Suci became CSE's sixth and seventh Sloan Research Fellows. Assistant Professor Chris Diorio became CSE's fourth ONR Young Investigator Award winner. Assistant Professors Dieter Fox, Zoran Popovic, and Dan Suci became CSE's sixth, seventh, and eighth NSF CAREER Award winners. (An extraordinary *twenty-two* current CSE faculty members have received this award or its predecessors.) Alon Halevy received a Presidential Early Career (PECASE) Award – the nation's highest honor for young scientists and engineers.

Among the senior faculty, Alan Borning, Linda Shapiro, and Steve Tanimoto were elected Fellows of major professional societies this year, bringing the department's total to seventeen. David Salesin received the Computer Graphics Achievement Award, the top technical award in his field. And I became CSE's first member of the National Academy of Engineering (and only the third member among UW's active faculty).

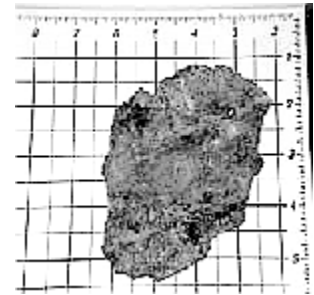
Entrepreneurship has become an integral part of the academic enterprise in recent years, and here, too, we have been successful. CSE faculty and students have created ten companies in the past four years, and in addition, a number of CSE technologies have been transferred to existing companies. I'm proud that nearly all of these entrepreneurial initiatives derive from a program of fundamental research, rather than an attempt to develop a commercializable technology. I'm even *more* proud that *undergraduate* students have been involved in many of these innovations. In CSE, education and research truly are inextricably linked.

Leadership: Space is running short, and probably your patience as well. Suffice it to say that CSE today has enormous visibility and impact on the institutional, regional, and national scene, for activities ranging from educational technology to K-12 outreach to leadership in organizations such as the Washington Software Alliance, the Computing Research Association, the NSF Computer and Information Science and Engineering Directorate, and the NRC Computer Science and Telecommunications Board.

The bottom line: I hope that you – our alumni and supporters – are proud of what your department continues to accomplish. I sincerely believe that our students, staff, faculty, and culture are unsurpassed. I think the results bear that out.

Earthquake Report: Sieg Hall Still Standing. Rats...

"My office is a complete shambles – books and papers everywhere. The floor is cracked and there are horrible brown stains on the walls and floor. Wires are snaking everywhere. In short, completely unfit for human habitation. Of course, it looked that way *before* the earthquake as well." – February 28th email from CSE faculty member Henry Kautz.



A huge honkin' hunk of metal shed by Sieg

The 6.8 magnitude earthquake that rocked Seattle caused the windows to rattle in Sieg Hall, but when it was all over, the building – often described as the ugliest on the UW campus – was still intact. Shortly after the quake, Ph.D. alumnus Mike Ernst, now a faculty member at MIT, sent an email to the department reading simply "I'm sorry to hear that Sieg is still standing. Better luck next quake."

The reason for the surprise and disappointment, as recent denizens of Sieg can attest, is that poor Sieg Hall, aside from being terribly cramped, has been slowly decaying for many years. The building, named for Lee Paul Sieg, UW President from 1934-1946, was heralded as an architectural marvel after its construction in the 60's. Recently, though, it has been compared to a "Ramada Inn gone to seed," perhaps sparked by the large chunks of rock and metal that routinely fall from the structure.

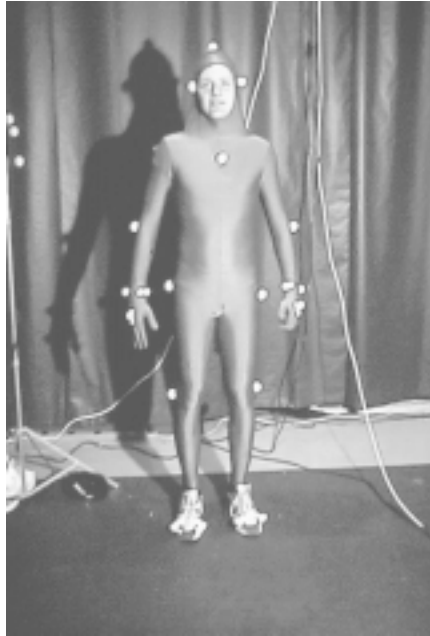
One upshot to Sieg's disintegration is that it gives us a large supply of souvenirs to hand out to prospective students. The department inaugurated a new tradition in 1999: we sent every visiting prospective graduate student home with "a piece of the rock." As one successful recruit noted, "How could I say 'no' to a school that gave me a piece of their computer science building?"

As this issue goes to press, however, progress is being made in the search for a more suitable home for the department. We look forward to updating you on this vital project that will ensure the department's continued growth and success.

Popovic Busts a Move

What started as an excuse to wear a tight lycra bodysuit has led to groundbreaking research in computer animation by new CSE faculty member Zoran Popovic.

Popovic joined the department in 1999 after receiving his Ph.D. from Carnegie Mellon, and has been developing innovative ways to capture and rapidly synthesize realistic motion. Part of Popovic's research concentrates on building a reusable motion library. The library and associated algorithms will allow storytellers who are not highly proficient computer animators to modify existing motion sequences and apply them to their own animations. The library consists of sequences obtained in Sieg Hall's new Motion Capture Studio. Here, subjects outfitted in a special suit have various points on their bodies tracked in real time using infrared sensors mounted throughout the room. These points are plotted and shaped into a simplified



Zoran in motion capture gear circa 1999. Today's gear is far less awkward, but we like this picture better.

character model that replicates the subject's movement.

Until recently, once this data was captured, there was no easy way to edit it. As a solution, Popovic, along with CMU's Andy Witkin, developed an algorithm that allows transformation while preserving the essential physical properties of the original motion. This process enables the user to manipulate physical dynamics such as number of joints, placement of footsteps, length and mass of limbs, and gravity. For example, an animated capture of a figure walking could be altered to add a limp without changing the fundamental motion.

The applications of motion capture research are broad, ranging from special effects for movies and video games to the creation of anthropomorphic robots. The motion capture library could also allow home users to create their own custom animations – according to Popovic, “making everyone with a PC an effective storyteller.”

Undergraduates Honored by CRA

The Computing Research Association has honored CSE senior Kevin Zatloukal as one of two winners (one male and one female) of this year's national CRA Outstanding Undergraduate award. The award recognizes undergraduate students who show outstanding potential for research careers.

Zatloukal, a dual major in Computer Science and Mathematics, has developed a new algorithm for nearest-neighbor searches in data compression. He has also worked on several aspects of data caching with colleagues at Microsoft, where he has spent several summers. This work includes algorithm design and structure layout for improved cache performance, and a cache-conscious Web server. Most recently, Zatloukal has turned his attention to



from left: Outstanding Undergraduates Kevin Zatloukal, Steve Zhang, and Matt Rosenkrantz

computational molecular biology. Zatloukal's undergraduate research has resulted in three papers and a patent.

Zatloukal has been a teaching assistant for four courses, a mentor to disabled high school students, and a tutor for the Women in Engineering program. He has been named a University of Washington Undergraduate Scholar, a Mary Gates Scholar, and a Robert C. Byrd Honors Scholar.

CSE seniors Matt Rosenkrantz and Steve Zhang were among 27 students nationwide who received Honorable Mention in this year's competition. Last year, CSE senior Emma Brunskill was one of two national Runners-Up, and CSE senior Adnan Sulejmanpasic received Honorable Mention.

“UW Computer Science & Engineering is blessed with some of the finest students in the nation,” said department Chairman Ed Lazowska. “I'm thrilled at the recognition they're getting.”

Professional Masters Program a Boon for Start-Up Employees

Working for a smaller high-tech company has its perks, according to Jared Reimer, vice president of oz.net, a local ISP. "It's very much a sink-or-swim kind of place – there's no room for dead weight here. We have found that our people invariably rise to the occasion and achieve a tremendous amount because of the freedom we give them."

While many are attracted to the freedom, these seemingly casual workplaces are at the same time terribly hectic and high-pressure. Bryan Dudash, Senior Software Engineer for Network Commerce, notes that "requirements change frequently, sometimes hourly, and your product delivery schedules are one-fourth of what a normal schedule would be. You're lucky if you have a full quarter to do a job."

Given the demanding pace, it may be surprising that professionals like Reimer and Dudash are choosing to continue their education through CSE's Professional Masters Program. Created in 1996, the Professional Masters Program (or PMP for short) is tailored to fit the demands of area information technology professionals, allowing them to complete a Masters degree through part-time evening and distance learning courses. The PMP offers access to CSE's world-class faculty and curriculum to a student group that includes some of the area's strongest computer talent. PMP students receive their Masters after completing, on average, two and a half years of coursework.

"To me, the strength of the PMP courses is their ability to provide state-

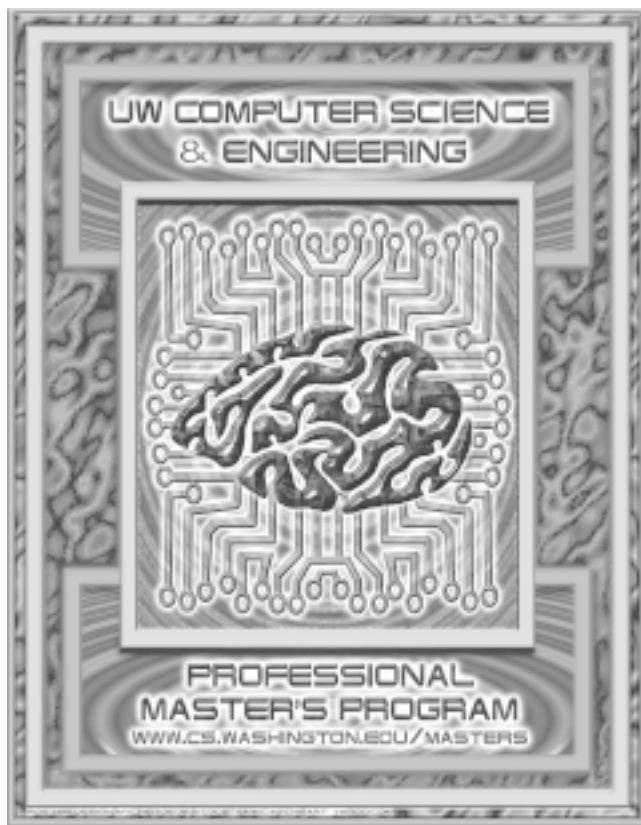
of-the-art overviews of Computer Science topics that are nearly impossible to get in any other form," remarks Michael Libes, co-founder of 2WAY Corporation. "My first class was 'Alternative Computing Systems,' which covered topics such as neural, DNA, and quantum computing. My final class was Software Entrepreneurship, which covered all

different part of the computer industry and was working on a different kind of project in a different working environment than I have been," notes Andrew Berg, senior software design engineer for votehere.net. "It was always fascinating to see how the 'other half' live."

Jared Reimer agrees, stating, "Interacting with people in different high tech companies helps me think outside the box, and helps me make mental (and business) connections I might not otherwise have made!"

Of course, completing a rigorous Masters program can be challenging when coupled with an already demanding career. But even this challenge is viewed as a benefit of the program, according to Jenny Lam, Software Engineer for Imandi.com. "A lot of my friends are interested in the PMP, but they hesitate to apply because they think they won't have time. I had the same concern, but it turns out that the PMP doesn't seem to 'take away' a lot of my time. Instead, I learned how to manage my time more effectively, which

is a bonus to me." And given the breadth of courses available, many students find the experience extremely rewarding. As Bryan Dudash explains, "The courses I have taken all contribute to my experience and knowledge ... they make me a well-rounded engineer, and as such I can adapt more easily to a changing environment."



aspects of doing a startup. Classes such as these are rare in a traditional Masters program, and bring out the best in a research University, teaching what *could be* done rather than what *has been* done."

According to students, the coursework isn't the PMP's only benefit. Many have made important connections with their classmates. "Every quarter I met someone new who was working in a

Emma Brunskill Named Rhodes Scholar

On December 9, CSE alumna Emma Brunskill was named one of 32 2001 Rhodes scholars. Brunskill, now a Presidential Scholar in the EECS graduate program at MIT, will head to Oxford University in England to complete a Masters in Experimental Psychology before finishing her doctoral work in computer science.

Entering the UW at age 15, Brunskill went on to extraordinary accomplishments as a dual major in Computer Engineering and Physics. She was a Goldwater Scholar and a Mary Gates Scholar.



She interned at WRQ (a Seattle software firm) and at CERN (the European center for particle physics in Geneva), as well as studying French at the Sorbonne. She was one of two national runners-up in the 2000 Computing Research Association Outstanding Undergraduate award competition.

Brunskill participated in seven different research projects while an undergraduate at UW – three in CSE and four in other departments. Her Capstone Design team project, a system that uses image understanding techniques to translate American Sign Language into characters, is featured on the current departmental CD-ROM, and can also be seen at www.cs.washington.edu/info/videos/.

CSE Chair Ed Lazowska notes that Brunskill is a great example of how young women can succeed in the field of Computer Engineering. “She has more promise than any other student I have encountered in my 23 years at the University of Washington. She is utterly first class in absolutely every respect, literally the best I have known.”

Domingos, Halevy, Suciu, Popovic, and Fox Win NSF CAREER Awards
During the 1999-2000 academic year, UW CSE Assistant Professors Pedro Domingos and Alon Halevy both received Faculty Early Career Development (CAREER) awards from the National Science Foundation. During the 2000-2001 academic year Dan Suciu, Zoran Popovic, and Dieter Fox also received CAREER awards. The awards are given annually to junior faculty whose work represents an integration of research and education.

Since the award's establishment in 1995, three other CSE faculty members have received the honor—Brian Curless, Chris Diorio, and Steve Seitz.

Diorio Receives Distinguished Teaching Award

Chris Diorio has been named a 2001 recipient of the UW Distinguished Teaching Award. Faculty members are nominated by students, staff, and their peers to receive the honor. Winners are chosen based on a variety of criteria, including mastery of the subject matter; enthusiasm and innovation in the teaching/learning process; ability to engage students both within and outside the classroom; ability to inspire independent and original thinking in students, and to stimulate students to do creative work; and innovations in course and curriculum design.

Diorio joins Gaetano Borriello, Carl Ebeling, and David Salesin as UW Distinguished Teaching Award recipients. Two years ago, the department as a whole received the inaugural UW Brotman Award for Instructional Excellence, essentially a departmental distinguished teaching award.

Faculty Recognized with Endowed Professorships and Chairs

Five UW professors from the Department of Computer Science & Engineering were recently named to endowed professorships.

- Hank Levy was appointed as the Microsoft Professor of Computer Science & Engineering.
- Dan Weld was named the Washington Research Foundation/Thomas J. Cable Professor of Computer Science & Engineering.
- David Notkin was named the Boeing Professor of Computer Science & Engineering.
- Jean-Loup Baer was formally recognized as the Boeing Pennell Professor in the College of Engineering, to which he had been named several years previously.
- Ed Lazowska was appointed to the Bill & Melinda Gates Endowed Chair in Computer Science

Computer Engineering Program Doubles in Size

Beginning autumn 1999, the department doubled the size of our Computer Engineering undergraduate major program from 40 Bachelors graduates per year to 80, increasing total CSE Bachelor's-level output from 120 to 160 graduates per year. In spring 1999, the University provided funding to allow this expansion so that we could meet the burgeoning need for graduates with skills such as real-time operating systems in embedded devices, applications of artificial intelligence in embedded and network computing, experience with programming of modern task-specific computing devices, and increased exposure to multidisciplinary design teams.

Seven UW Papers Accepted by SIGGRAPH

The 2000 meeting of the ACM Special Interest Group on Computer Graphics (SIGGRAPH) featured 7 papers by UW authors. The SIGGRAPH conference is computer graphics' most prestigious forum for presenting new work, and most researchers regard presenting just one paper at this meeting a major accomplishment.

Papers presented and UW authors were: "The Digital Michelangelo Project: 3D Scanning of Large Statues" (Brian Curless, Jonathan Shade) "Escherization" (Craig Kaplan, David Salesin), "Example-Based Hinting of TrueType Fonts" (Douglas Zongker, David Salesin), "Extensions to Environment Matting: Towards Higher Accuracy and Real-time Capture" (Yung-Yu Chuang, Douglas Zongker, Joel Hindorff, Brian Curless, David Salesin), "Interactive Manipulation of Rigid Body Simulations" (Zoran Popovic), "Surface Light Fields" (Daniel Wood, Daniel Azuma, Ken Aldinger, Brian Curless, Tom Duchamp, David Salesin, and Werner Stuetzle), and "Video Textures" (David Salesin). Collaborators for these papers included authors from Stanford, Nokia, Cyberware, CMU, Pixar, Microsoft Research, and Georgia Tech.

CSE Undergrads Win "High Scholarship Medals"

The Honors Subcommittee awarded 1999-2000 President's High Scholarship medals to CSE sophomore Christopher Twigg (center) and junior Thomas Carlson (right) (pictured with freshman medalist Jaime Lust). These awards are presented to the undergraduate from each class whose work represents the pinnacle of academic achievement.



Curless, Diorio, Suciu and Rao receive Sloan Research Fellowships

Faculty members Brian Curless and Chris Diorio were both named Sloan Research Fellows during 1999-2000. Dan Suciu and Rajesh Rao were named fellows in 2000-2001. Sloan Research Fellowships provide support and recognition to young scientists who show the most outstanding promise of making fundamental contributions to new knowledge in their fields. The four join Tom Anderson, Alon Halevy and David Salesin as recipients of this tremendously prestigious award.

CSE Staff Members Named "Outstanding" by College of Engineering

CSE's chief systems architect, Jan Sanislo, received the College of Engineering's Outstanding Staff Member award for 2000. Sanislo was nominated by his colleagues for his accomplishments and innovation.

CSE undergraduate advisor Jennifer Seller received an honorable mention. Faculty, staff, and students nominated Seller for her efforts on behalf of the department and its students, citing her cheerful and meticulous attention to students' concerns.

Ed Lazowska Elected to NAE

In February, CSE department chair Ed Lazowska was elected to the National Academy of Engineering (NAE). Election to the Academy is among the highest professional distinctions accorded an engineer. In choosing Lazowska, the Academy cited his "leadership and contributions to computer performance evaluation and distributed systems."

Lazowska came to UW in 1977 after earning a Bachelor's degree from Brown University and a Ph.D. from the University of Toronto. His research and teaching concern the design, implementation, and analysis of computer and communication systems. He has also been active in national and regional policy and advisory roles, including chairing the Computing Research Association and the National Science Foundation Advisory Committee for Computer and Information Science and Engineering, serving on the Board of Directors of the Washington Software Alliance, and serving on technical advisory boards for Microsoft Research and for a number of high-tech startups and venture firms. Lazowska was selected to receive the 1998 University of Washington Outstanding Public Service Award. He led his department to the 1999 University of Washington Brotman Award for Instructional Excellence.

The National Academy of Engineering operates under a charter signed in 1863 by President Lincoln. According to the Academy, membership honors those who have made "important contributions to engineering theory and practice" and those who have demonstrated "unusual accomplishment in the pioneering of new and developing fields of technology." Lazowska is one of only three NAE members among UW's active faculty.

William Chan Memorial Dissertation Award Honors Outstanding Ph.D.s

CSE lost one of its most promising Ph.D. graduates in November 1999. William Chan's life was tragically cut short in a car accident only a week after he successfully defended his dissertation, and a month before he was to join the faculty of Brown University.

"William's death was a terrific loss in both personal and professional terms," says David Notkin, Chan's co-adviser (along with Richard Anderson and Paul Beame). "His brilliance produced a string of results in software model checking that are already broadly cited; there is no question that he would have continued on to become a star researcher at Brown. This loss, however, pales in the face of the loss of William as a person."

In William's memory, the department established the William Chan Memorial Fund, an endowment recognizing the achievements of our most outstanding Ph.D. graduates.

The first award was presented to Michael Ernst, who graduated in June 2000. His dissertation, *Dynamically Discovering Likely Program Invariants*, provides the first practical approach in software engineering to compute invariants that provide value to programmers.

"Mike's dissertation was clearly deserving of this award. It is groundbreaking work that turns conventional wisdom about invariants on its head. With Mike's approach, there is a legitimate chance for programmers to get many of the benefits of invariants in situations where they haven't been written along with the program itself," comments Notkin. Notkin was Ernst's adviser, as well as Chan's – along with informal co-adviser Bill Griswold, a UW alumnus now on the faculty at UC San Diego.

As the recipient of the Chan award, Ernst's work was also entered in the

ACM's annual Doctoral Dissertation Award competition where it, along with Chan's *Symbolic Model Checking for Large Software Specifications*, received honorable mention. CSE faculty member Carl Ebeling and former PhD student Anne Condon (now at the University of British Columbia) are also previous recipients of honorable mentions in the contest.

Upon receiving the award, Ernst stated, "I'm honored to have won the award, but I would rather have had the benefit of William's comments on my work. William was both a friend and a colleague; on a number of occasions he made useful suggestions or pointed out connections that I would not otherwise have noticed. I had looked forward to following up on these some more when we were both finished with our dissertations. While I regret not being able to do that, I am grateful for the interactions we did have, both technical and social."

Larry Snyder: FITness Guru

Today's students are increasingly computer savvy but, according to Larry Snyder, many could use some FITness training.

Snyder, CSE professor and Chair of the National Research Council's Committee on Information



Technology Literacy, is co-author of *Being Fluent With Information Technology* (FITness for short), a report which proposes that students need a deeper understanding of IT to succeed in their personal and professional lives.

"Computer literacy is typically 'skills-

based,' training students to use specific software, hardware and information resources," says Snyder. "Though literacy gets one onto the computer quickly, it usually misses the underlying concepts and ideas. A fluent person, knowing the underlying ideas, will independently learn the new technology. Fluent people understand enough to 'move with the technology' through a process of lifelong learning."

Snyder has translated the concepts of FITness into action by creating CSE 100, "Fluency with Information Technology," a project-based course that takes students beyond simple proficiency and teaches core concepts (such as the digital representation of information, networking, encryption) and skills (such as basic programming, testing, and debugging). Course projects have included creating a Windows

application that looks up astrological signs, and developing an H.I.V. tracking system for a fictitious hospital.

According to Snyder, "The projects in CSE 100 were chosen first to fulfill the goals of teaching fluency. They are opportunities for students to engage in sustained reasoning and problem solving."

The course is now offered jointly with UW's new Information School. Students report that they develop confidence as well as competence, and some have even received campus research jobs as a result of what they learned in CSE 100. As the course grows, UW students will not only be better prepared to manage rapid changes in information technology, they'll also benefit from the problem solving and logical thinking skills computer science requires.

David Notkin: Always Distinguished

CSE's David Notkin has been honored with the University of Washington's 2000 "Distinguished Graduate Mentor Award."

Sponsored by the Graduate School, this award recognizes faculty who exemplify excellence in graduate education. Marsha Landolt, Dean of the Graduate School, cited Notkin because "he encourages students to pursue their personal research passions even when they do not overlap with his own ... he continues to be a mentor and colleague long after the student has graduated."



Notkin's students echo this sentiment, recognizing his selflessness and dedication. Current advisee Vibha

Sazawal notes, "While other students may work for faculty on a project they do not plan or control, I work with David on a project that I have conceived by myself and direct myself ... David encourages me to follow my ideas even when it makes his life difficult."

CSE Ph.D. alumnus Michael Ernst – an Assistant Professor at MIT who spearheaded the nomination – feels that the key to Notkin's success as a researcher and educator is his focus on interaction with students. "He has come to the point in his career where he considers his advisees his most important legacy. My research has greatly benefited from David's sharp insight.

Ed Lazowska, CSE chair, praised Notkin for this individualized attention to his students. They are, according to Lazowska, "not cogs in a well-oiled machine, or elements in a well-defined

trajectory ... each follows his or her own passions, strengths, and idiosyncrasies, guided subtly, painstakingly, and expertly by David's encouraging hand. And in this process, each gains a deep understanding of how to do research, and how to guide research."

Notkin says that his approach to graduate education was shaped by his own advisor, Nico Habermann, who passed away in 1993. "When Nico was chair of the department at Carnegie Mellon, he said something I have never forgotten: 'Focus on producing great graduate students. Why? Because you can produce great research without producing great students, but you can't produce great students without also producing great research.' I've been terrifically lucky to have students who have been great educators, great researchers, and great people."

CSE's Founding Chair, Jerre Noe, Honored by SRI

CSE's founding chair, Jerre Noe, and the team that he led, were recently honored by SRI with its Weldon B. Gibson Achievement Award, which recognizes "outstanding contributions, by an SRI employee, that have had a noteworthy impact on the standard of living and on the peace and prosperity of society."

Beginning in 1950, Noe – then SRI's Assistant Director of Engineering – led the technical team of the ERMA (Electronic Recording Machine, Accounting) Project – a joint venture between SRI and Bank of America that laid the cornerstone of modern electronic banking. These pioneering contributions have been described by



Professor James L. McKenney of the Harvard Business School as "the first successful use of computers in business operations anywhere."

Before the ERMA Project, banks typically closed mid-afternoon to manually process and proof all of the day's transactions. Since the post-WWII era brought with it a dramatic increase in the number of new accounts, processing bankers' transactions was on the verge of becoming completely unmanageable.

Noe's team first performed a feasibility study that determined the requirements of an electronic bookkeeping system. When none of the major electronic system houses of the day would take on building such a system, the bank persuaded SRI to do so. In due course, the project resulted in the following innovations:

- Checks with pre-printed account numbers
- A check reader and sorter that could process ten checks per second with an error probability of less than 0.00001 percent
- The ERMA prototype, which was the first machine to enable multiple workers within a branch bank to determine account status and validate inputs electronically

Today, magnetic ink character recognition (MICR) can be found in the form of the block-style numbers on the bottom of checks, which are still used in check processing all over the globe..

CSE department chair Ed Lazowska notes that the team culture Noe exhibited at SRI is something he instilled at the University of Washington. "In every way, he set the direction that has led to our success."

David Salesin Receives Top Honors at SIGGRAPH

This year's Computer Graphics Achievement Award – the major technical award in the computer graphics field – was presented to CSE Associate Professor David Salesin at the ACM SIGGRAPH Conference in July.

Salesin was honored for his work in non-photorealistic rendering. According to Ed Catmull, chairman of the SIGGRAPH award committee and co-founder of Pixar Animation Studios, "Salesin's work on computer-generated pen-and-ink illustrations and subsequently computer-generated watercolors is considered a landmark in this emerging field ... his publications in this area have been extremely significant and influential." Added UW CSE Department Chair Ed Lazowska: "Salesin is clearly the leading figure in computer graphics in his generation."



outstanding group of undergraduate students, graduate students, and colleagues at UW, Microsoft Research, and elsewhere – tackles the technical and artistic challenges of computer-generated non-photorealistic rendering. For example, some of Salesin's work makes it possible to create detailed pen-and-ink drawings from underlying CAD models, which can better illustrate concepts than a photo. Other work makes it possible to accurately "paint" in watercolors on a computer.

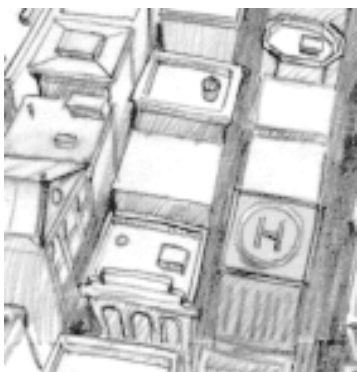
This work involved developing a model for watercolor's two essential behaviors: physical behavior (how watercolor flows), and optical behavior (how watercolor diffuses on paper).

effects, such as paper texture, fluid flow and edge darkening.

Salesin's goal is to make time-intensive highly-skilled work, normally reserved for craftsmen, more widely available. Illustrations, rather than photos, are widely used in technical literature such as

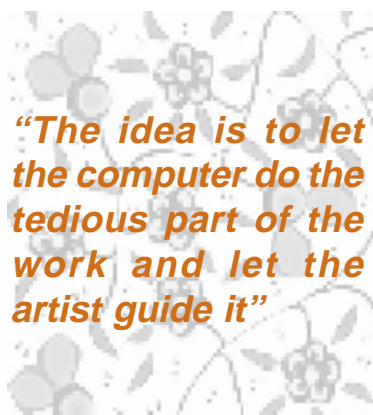
automotive manuals and medical atlases because of their ability to emphasize selected elements of complex structures. "The idea is to let the computer do the tedious part of the work and let the artist guide it," he said. "We also wanted to give non-artists a way to use these kinds of illustrations in a publication."

Salesin admits to being embarrassed by all the attention his work receives. For him, he says, it's just a matter of doing what comes naturally. "Computer graphics has traditionally been about applying ideas from fields such as physics to a computing environment," he said. "I can do physics, but I came to realize that it's not my love. My love is art. I thought it would be just as valuable to take ideas from art and apply them to the computer."



For years, photorealistic rendering – creating computer images that were nearly as realistic as photographs – was the holy grail of computer

graphics. Salesin recognized that in many situations, a non-photorealistic rendering is actually preferable. His research – conducted with an



"The idea is to let the computer do the tedious part of the work and let the artist guide it"

Each painting is represented as a series of washes over a sheet of rough paper, with each wash containing pigments in varying quantities over different parts of the image. Those quantities are stored in data structures called "glazes." The program mathematically accounts for other



CSE Video Lectures Fill Huge Need for Introductory Programming Instruction

The shortage of qualified IT workers has increased the demand for introductory courses in Computer Science, but the resources for teaching these intensive courses are thin. Recognizing this problem, CSE's Richard Anderson devised an experimental method of delivering lectures, assignments, and testing via web-based video and slides.

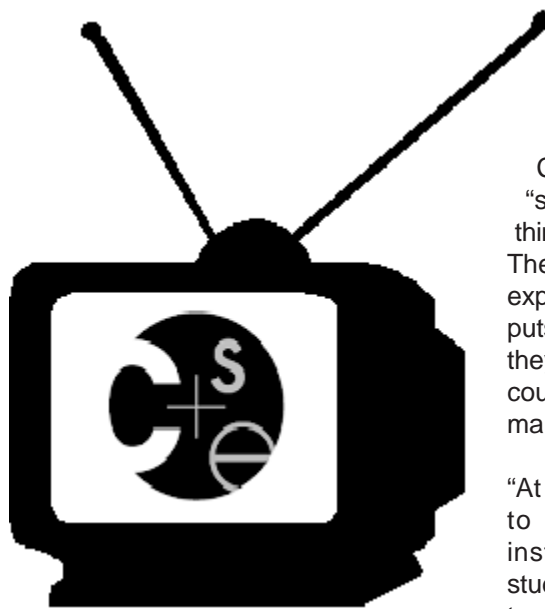
The result is "Tutored Video Instruction" – a term coined by former Dean of Engineering at Stanford University, Jim Gibbons. UW's TVI project is based on Gibbons' work delivering lectures via interactive television to engineers at Hewlett-Packard, and revolves around the theory that students do remarkably well when a facilitator administers pre-recorded content. The TVI project improves on Gibbons' work by using streaming video combined with lecture slides to deliver a truly multimedia presentation. Since the program began in 1998, nearly 200 students have completed the TVI course.

"The reason we were interested in exporting our courses," says Anderson, "is that the State of Washington has a large community college system with many students transferring courses to 4-year institutions. We want to make it possible to offer a course that students can transfer to UW. This is an issue both of course credit, as well as preparation for follow-on work."

The videotaped lectures (which have been delivered by Anderson, as well as professors Martin Dickey and Hal Perkins), as well as homework and exams, have come from our

introductory courses, CSE 142 and 143. All of this material is delivered over the Internet, with the transparencies and video integrated using Microsoft NetShow: the UW lectures are encoded real-time into a streaming digital video format, with URL's encoded in the video stream to

At each remote site, a facilitator guides students through the material. Community college students completing this course receive "no questions asked" course equivalency if they transfer to UW after receiving their 2-year degree.



Response to the program has been quite positive, and student performance is, in many cases, dramatically enhanced. As Matt Weaver of North Seattle Community College puts it, "students are excited to get the 'real thing' — the UW version of the course. They receive a much richer learning experience with all the resources CSE puts into the 142 & 143 classes. And they get a taste of what a university course is like, which is helpful for the many students who plan to transfer."

"At most community colleges it is next to impossible to find qualified instructors for these courses, yet student interest and demand continue to grow," Weaver adds. "For introductory programming, this format fills a huge need."

automatically display the lecture transparencies at the right time.

Educational features of TVI :

- **Tutor and students are free to interrupt the video lecture at any time to ask questions or replay sections**
- **Theless-inhibiting environment encourages students to ask more questions and participate more actively**
- **A group discovery process occurs which enhances learning and builds communication and team skills**
- **Students perform better than academic predictors suggest**

Alon Halevy Honored By White House

Professor Alon Y. Halevy was among 59 young scientists and engineers honored at a White House ceremony in October as winners of the Presidential Early Career Award for Scientists and Engineers.

The PECASE award, established by President Bill Clinton in 1996, is the highest honor bestowed by the United States government on young professionals at the outset of their research careers, according to a news release from the White House. Recipients receive five-year research grants. Halevy reports, however, that the Lincoln bedroom was already booked.

Halevy joined UW in 1998. His work is in database systems and artificial intelligence, with a special interest in building bridges between the two fields. He focuses on building tools that integrate data from multiple disparate databases - from different

sites on the World Wide Web, for example. As part of that focus, he has



CSE's latest PECASE winner, Alon Halevy

developed new techniques for managing data in XML (eXtended Markup Language), an emerging standard for sharing data on the Web. He has also developed techniques for

the flexible and efficient construction and maintenance of Web sites.

Halevy won another major award - a Sloan Research Fellowship - in 1999. He is co-founder of Nimble Technology, a start-up company that is commercializing portions of the research undertaken by UW's database group.

We want to hear from you!

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