

COMPUTING & SOFTWARE SYSTEMS

Bits & Bytes 

W
 BOTHELL


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CSS FOCUS

Learning How to Teach

An in-depth look at how Computer Science education research is changing the way computing is taught.



Dr. Carol Zander

What initially got you interested in Computer Science education research?

As an experienced educator, I have many ideas on best teaching practices and what works and doesn't work, but initially did not have formal evidence of

my theories. In 2002, I applied for and was selected to participate in a National Science Foundation (NSF) funded workshop on Computer Science (CS) education research. The workshop was designed for expert educators to learn how to carry out Computer Science education research. One of the workshop's main objectives was to improve the state of CS education research and, as a result, ultimately improve the state of CS education.

There was a large study done examining how students design software. What was that study about?

At a workshop in 2003, similar to the one I attended in 2002, a study on the understanding of software design and its criteria was conducted. It included 314 subjects from 21 institutions in the US, UK,

Sweden, and New Zealand that looked at several aspects of software design. Subjects were given a one-page "design brief" that described the behavior of a "super alarm clock" for college students.

What were the results of the software design study?

At the workshop, the researchers did an initial analysis of the designs' characteristics, but not looking at the actual design as an answer to a problem. My research group extended this work by conducting a more thorough analysis of the graduating seniors' designs.

Our results of this study answered the question, "Can graduating students design software?" In a nutshell, the answer was "No". A partial design was given by 29%, and only 9% produced "reasonable" designs including understandable system architecture, with parts and their interactions explicitly stated.

How do UW Bothell CSS students compare in their design ability?

Since then, I have used the study problem, in some capacity, each term I have taught CSS 442, Object-Oriented Programming and Design. The first year it became an exam question so I could show students how their results compared with

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Letter from the Director

Dear Alumni and Friends of CSS,



As I write this, summer quarter is drawing to a close and CSS and the UW Bothell campus are ramping up preparations for the start of a new academic year. Some of these preparations are physical infrastructure, some are the comings and goings of faculty and staff, and of course some involve new students arriving. In CSS, we're continuing our work on improving and updating our laboratory spaces, with entirely new workstations (some with up to four monitors) in a redesigned Windows lab. In fall, we will welcome two new faculty as we say a not-quite- goodbye to another who is retiring. Applications for transfer admissions and from native UW Bothell students are stronger than ever, and I expect that fall classes will be lively with the voices of many students.

These and other happenings are covered in this issue of Bits & Bytes. We start with a focus on Prof. Carol Zander, newly promoted to Principal Lecturer (the only Principal Lecturer at UW Bothell, and one of only a handful at all three UW campuses), and her research in computer science education and how students learn to program and design. Work like hers is essential for CSS to continuously improve students' educational experiences and make the computing field -- likely the healthiest profession, in terms of employment opportunities, for the foreseeable future -- accessible to a more diverse population.

We also have had some major faculty transitions. Prof. Frank Cioch has retired, but will still be contributing to CSS in his new role as Professor Emeritus. We welcome two new faces this fall: Prof. David Socha and Prof. Hazeline Asuncion. David and Hazel will help CSS expand the strong thread of software engineering in our degree programs.

Speaking of degree programs, this fall will see the start of the second year of operation of our Master of Science in CSS, with a successful intake of a cohort of MS students and a cohort of Master's Prep students. The MSCSS is unique in this region, not only for the CSS educational philosophy of broad-based computer science with an emphasis on software engineering, but also for providing multiple pathways for students who've just received their bachelor's degrees, students who come back to school mid-career, and students who are looking to switch careers.

As long as I've been at UW Bothell I've been impressed by our students' work. I think you will be, too, as you read a sampling of capstone cooperative education projects presented at our recent colloquia. Our student spotlight illustrates well both the pervasive nature of computing in the modern world and how computer professionals can improve everyday life. In this case, you will meet Steven Staley, who is helping food banks serve more people more efficiently.

We also introduce a new feature to *Bits & Bytes*: Alumni News. We know that graduation is a new beginning, and we want to provide a place for all you alumni to let us and your classmates know about life after graduation.

So, whether you're reading this in hard copy, on our web site, or in an eBook reader, I hope you'll enjoy this newsletter and walk away feeling a little more part of CSS. And, as part of our growing family, I hope you won't hesitate to send us your news, kudos, and suggestions.

Cordially,

Dr. Michael Stiber
Professor and Director

Daniel Dawson

CSS '10

After graduating from UW Bothell with my major in CSS and minor in Business Administration, I am now beginning my career with the company I worked for during my CSS497 capstone internship. I'm presented with both computing and business challenges daily that my experience at UW Bothell has done an outstanding job preparing me for. I love my career. It's a new adventure every day.

Rusty Gerard

CSS '07 (Cum Laude)

I have just completed my M.S. in Computer Science degree at Western Washington University. A paper I have written and co-authored with Dr. Geoffrey Matthews, "Orthogonal Clustering", will be published in the proceedings of the 2010 International Conference on Artificial Intelligence and Pattern Recognition (AIPR-10). I will be presenting my paper at the conference next month in Orlando, FL.

Eric Marquez

CSS '04

My second child, Owen Marquez, was born on September 15, 2009.

Josh Phillips

CSS '07

After 2.5 years working on the Parallel Computing Platform, I decided I wanted to try out the consumer space and switched over to a Program Manager position on the Windows Phone team working with Windows Phone 7 Entertainment. Loving it!

CSS ALUMNI, WE WANT TO HEAR FROM YOU!

Whether you graduated last year or 10 years ago, the CSS department wants to hear from its graduates.

Tell your classmates how life has been after graduation. Share news about a new job, promotion, or finally tying the knot with that special someone.

Send us your updates to cssinfo@uw.edu and thanks for continuing to be a part of the CSS family.

PUBLICATIONS & WORKSHOPS

Prof. Alan Leong

Medarex-Bristol Meyers Squibb company: Realizing Its Potential?

Abstract: Medarex Inc., a Princeton, New Jersey-based development-stage biotechnology company was founded in 1991. Medarex had partnered with Bristol-Myers Squibb for its Phase III product MDX-010 (ipilimumab), and had licensed its technology to other leading industry partners including Pfizer, Johnson & Johnson, Novartis and Amgen for various antibody-based licensing products. This decision-based case assesses the strategic options facing Howard H. Pien, Chairman and Chief Executive Officer of Medarex, on how to respond to a proposed acquisition offer from Bristol-Myers Squibb in 2009.

Ahn, M.J., Leong, A., Wu, W., & Rahman, M. (2010). *Medarex-Bristol Meyers Squibb Company: Realizing Its Potential?* In Ahn, M.J., Alvarez, M., Meyers, A., & York, A. (Eds.) *Building The Case for Biotechnology*. Washington DC: Logos Press.

Prof. Kelvin Sung

Game-Themed Instructional Modules: A Video Case Study

R. Angotti, C. Hillyard, M. Panitz, K. Sung, K. Marino, "Game-Themed Instructional Modules: A Video Case Study," to appear in *FDG 2010*, June 2010.

Game Programming in CS0: A Scaffolded Approach

M. Panitz, K. Sung, R. Reed-Rosenberg, "Game Programming in CS0: A Scaffolded Approach," to appear in *CCSC-NW*, Oct. 2010.

Game-Themed CS Education: Empowering the Faculty

"Game-Themed CS Education: Empowering the Faculty," *Invited Presentation, Penn. State University Educational Gaming Initiative Exploration Meeting with Microsoft Representative, Microsoft Executive Briefing Center, Redmond, Washington, May 27, 2010.*

Games in Engineering and Computer Science (GECS) Workshop

Games in Engineering and Computer Science (GECS) Workshop, served as a panelist on Games in Computer Science panel, Organized by Texas A&M University, Sponsored by NSF (CCLI Grant No. 0938176), Arlington VA, June 3-4, 2010 [Application reviewed, invited participant and panelist].

Northwest Distributed Computer Science Department Spring Workshop

Northwest Distributed Computer Science Department (NWDSCSD) Spring Workshop, Organized jointly by Washington State University Vancouver, Willamette University, and Gonzaga University, Sponsored by NSF (CPATH Grant No. 0829651), Vancouver, WA, May 15, 2010 [Invited Workshop Participant].

NEWS

Prof. Clark Olson Consulting

Prof. Olson has started consulting for Primordial, Inc., a software company that leads the way in off-road navigation. His primary work with them involves computer vision analysis on a new visual navigation project.

Prof. Carol Zander's Promotion

As a founding faculty member of the CSS Program and a distinguished scholar with an international reputation in computer science education, Dr. Carol Zander was promoted to Principal Lecturer in Computing and Software Systems.

Dr. Zander received her B.A. in mathematics from San Diego State University and her M.S. and Ph. D. in computer science from Colorado State University. She has worked for companies such as Hewlett-

Packard and IBM. She is a very active member of the Association for Computing Machinery (ACM) and other professional organizations and research groups through which she has numerous publications.

Before starting her career here at UW Bothell, she spend a number of years teaching mathematics and computer science at the University of Maine, Colorado State University, and Seattle University.

Through her research, she has continued her commitment to enriching students' understanding of computer science. Dr. Zander is highlighted in this newsletter's CSS Focus section where she talks about her research on computer science education.

Prof. Frank Cioch Retires

After 10 years with the CSS Program, Frank Cioch retired this spring and was named Professor Emeritus of Computing and Software Systems. Frank joined UW Bothell CSS in 2000 as an Associate Professor and was promoted to full Professor in 2003. Prior to coming here, he was a faculty member at Oakland University. He received his PhD in Computer and Communication Sciences from the University of Michigan.

We've been fortunate to be the beneficiaries of Frank's expertise and wisdom over these last 10 years. In CSS, he has been one of the leaders in developing our robust software engineering curriculum, in mentoring more junior faculty through their promotion and tenure process, and as Interim Director in calendar years 2003 and 2004. He has been deeply involved in leading the process that created the Science & Technology Program.

As Professor Emeritus, Frank will continue his professional relationship with CSS, mentoring junior faculty, advising faculty and administration, and teaching selected classes.

WELCOME OUR NEW FACULTY



Dr. David Socha

A fellow Husky, Dr. Socha received his Ph.D. in Computer Science and Engineering from the University of Washington. He also received his B.S. in

Zoology from the University of Wisconsin and M.S. in Computer Science from the UW.

He has worked in a variety of software organizations as a programmer, architect, manager, teacher, ScrumMaster, product designer, change agent, and agile coach. His interests have consistently been on how to effectively design software and human

systems, with the focus on the human and social aspects of software development.

"I am a pragmatist. A collaborator. An optimist. I look for simple solutions that address underlying design forces."



Dr. Hazeline Asuncion

Dr. Asuncion received her Ph.D. in computer science from the University of California, Irvine, in 2009. Prior to coming to UW Bothell, she was a

Postdoctoral Researcher in the Institute for Software Research at the University of California, Irvine. She has also worked in

industry in a variety of roles: as a software engineer at Unisys Corporation and as a traceability engineer at Wonderware Corporation where she designed a successful in-house traceability system.

Her research emphasis is on traceability and she has developed a novel software traceability approach that automatically links distributed and heterogeneous information. She has investigated the tracing of software license conflicts in heterogeneously composed software systems. Dr. Asuncion is also interested in investigating the traceability challenges in other domains such as e-Science and health care.

Computing AS A *helping* profession

Steven Staley has helped change the way food banks throughout Washington State help those in need.

Staley explains his project, motivation, and continuing commitment to bettering the lives of many.

Can you describe what your software does for food banks?

ClientCardFB accomplishes the tasks needed to meet the reporting requirements of a typical food bank. This includes tracking family demographics, daily services in pounds, meals, or bags, client data (including duplicate and un-duplicate households), food donations by donor, cash donations by donor, and volunteer hours. Its main goal is to allow the volunteers to make better use of their time by helping them be as efficient as possible.

Before ClientCardFB was created in 2001, processing an existing client at a food bank took upwards of five minutes of a volunteer's time. Now, however, because of ClientCardFB, this time has been cut down to about 30 seconds. This allows for more clients to be seen in a quicker fashion and helps to keep the number of volunteers needed to operate a food bank down to a bare minimum.

ClientCardFB also helps cut down on volunteer hours in its compilation of the monthly statistics. Food banks have multiple agencies that they have to report to and each agency has different types of reports that need to be filled out at the end of the month and year. Compiling the data for these reports used to be a long six-plus hour tedious process. However, with ClientCardFB these reports are now completed in about 10 minutes.

What problem(s) or goals did your project/software help solve or accomplish?

The problem that prompted Ken

Craig—the owner, program manager, and designer of ClientCardFB—to seek out my assistance was that ClientCardFB needed to be updated if food banks were to continue using it. The original project was written in Visual Basic 6 (VB6) using an Access Database for the data-store. Since Microsoft stops supporting older software/languages over time, the VB6 programming environment was no longer compatible with the latest Windows 7 64-bit OS.

Ken understood that he needed to move away from Visual Basic 6 into a language that uses the .NET Framework included in Windows OS. He also saw that the continued use of Access Database for a data-store was not optimal. Although he is a great VB6 programmer, he is not a fluent C# programmer and had never connected to SQL Server 2005 using the .NET Framework. Therefore, my job was to update the database from Access to a SQL Server Express 2005 Database and then learn how to connect, update, delete, and retrieve clients from the database using the .NET Framework and C#. Ken wanted a Dynamically Linked Library (DLL) written that could retrieve data from each table in the database and provide it to the front-end user interface (UI).

Creating a DLL that did all of this was not an easy task. Before I started I did not have any idea of how to accomplish this task and had to learn as I went along. To compound this issue, I did not have anyone to turn to for help on which objects or syntax to use to accomplish my task. My only references were books and the Internet. However, at the end of my internship, we not only had the code necessary to connect to a SQL Server Database but also a methodology on how to do this going forward. Now, when we write the UI, we have simple functions that we can call to handle all our connection needs.

How many food banks use this software/system, where, and are they increasing?

Right now, the program is in use in about 110 food-banks across the state of Washington. And yes, this number is increasing. In fact, 30 new food banks have come on line since the completion of my internship. Although Ken has experienced some hesitation from many food banks that do not use computers, their directors are starting to change their mind as they hear more and more about how much

ClientCardFB helps.

Future plans are to update the front-end of ClientCardFB in C# to use the library, which connects to the database that I created during the internship. Once done, we will begin expanding our software to other food banks in Washington state, Oregon, Idaho, Western Montana, and possibly Northern California.

What interested you most about this project?

Being able to help the people that give up so much of their time and themselves in order to keep families fed was what got me most interested in this project. These volunteers take time away from their own families and jobs; they give up their free time and give freely of themselves year round. They are heroes in my mind and I was just happy to try to make their job a little easier.

This project also enticed me because I knew that I would learn a great deal, not only in technical terms, but also about myself, throughout the process. Finally, I was interested in this project because I knew I would be working with a man who has a great view and understanding of what is important in life and could add a little bit of his outlook on life to mine.

How has the experience been rewarding for you personally and professionally?

This experience has been extremely rewarding for me both personally and



Steven Staley (CSS '10)

Continuous Growth

A BRIEF LOOK AT THE NEW AND EXCITING MASTER OF SCIENCE IN CSS DEGREE

Within its second year, the Master of Science in Computing & Software Systems (MSCSS) has experienced rapid growth as the newest graduate degree program at UW Bothell. With a curriculum focused on coupling theoretical concepts with real-world problems, current graduate students are developing the breadth of skills necessary to succeed in today's competitive software profession.

Enrollment is expected to continue to increase in the coming years as word of the new degree program spreads. With only 45 credits required, the MSCSS is becoming a popular choice for undergraduates straight out of college, CSS alumni, and working professionals looking to take advantage of a work-friendly graduate program.

"Given the struggles of the current economy," writes Megan Jewell, CSS Graduate Advisor, "we are seeing many alumni as well as new graduate students contact us about pursuing their graduate degree. It's clear that this degree is seen as a way for current computing professionals to transition their careers to a whole new level."

As the first student cohort nears completing their degree program, it will also bring the first time a graduate student has enrolled in thesis credit at UW Bothell. As part of their curriculum, MSCSS students must complete 10 credits of either a project or thesis.

"Some of the ideas that students have mentioned," writes Megan, "include possible projects on search algorithms, data recognition, agent based parallel computing middleware; thesis work on software engineering methodologies and simulating neural

networks. There is such a great level of energy from our graduate students. It's an exciting time to be part of this degree program."

Starting in Autumn of 2011, the MS will also be moving to a new full-time curriculum option. Student will be able to choose from either part-time or full-time schedules while still maintaining an evening course load; a change that, for some, would mean cutting their time to a degree down to just 5 quarters. For students who are just starting the CSS undergraduate program, it creates an opportunity of earning both a Bachelor of Science and a Master of Science in just over five full years.

If you are interested in finding out more information on the MSCSS degree, please contact CSS Graduate Advisor, Megan Jewell, at mjewell@uwv.edu.



CSS FOCUS CONT.

students in the study. I gave the exact same design brief with no additional explanation of what they should do. And they did quite well! In subsequent years, the design task was used as a good problem to examine the variety of design solutions.

You have also studied first year programming students. What are some of the things you have learned?

In one study with another research group, we examined how novices go about debugging a program. Students from seven universities completed a programming exercise followed by a debugging task on a buggy version of the same problem. A follow-up interview and survey were then used to assess students' impressions of the exercises and thoughts on debugging.

On average, students found and fixed about 70% of the bugs. This corroborated others' work that locating bugs is more difficult than fixing them. The quality of subjects' debugging strategies relative to their debugging success was mixed. One surprising aspect is the relationship

of students' self-reported assessment of debugging skill to the actual number of bugs fixed. Students who had just found and fixed all bugs in a program frequently scored their debugging ability as average. None of the students rated themselves at the highest debugging skill ranking.

Unlike previous debugging studies, we noticed students using pattern-matching as a key element of debugging. Many noticed errors because code didn't "look right," often because they had a mental pattern of how the code should be structured. This suggests incorporating patterns into novice programming instruction might also have a positive influence on their ability to debug.

In contrast, some students also used patterns unproductively. Some commented out perfectly correct but unfamiliar code or "corrected" things that weren't wrong. This suggests debugging productivity may increase if students are shown examples of programs that do exactly the same thing but look completely different due to formatting or alternative implementations. It also implies exposing students to unfamiliar

code and discussing how to cope with it could be beneficial.

How have you implemented what you've learned from your research into your courses and what were the results?

I incorporate what I have learned from my research into my teaching in a myriad of ways ranging from the concrete to the philosophical. For example, using the design task or giving the buggy programs for practice are concrete uses. On the philosophical side, I constantly reinforce the work of psychologist Carol Dweck from Stanford University. She characterizes students as having fixed or growth mindsets. Students with growth mindsets believe they can grow their intelligence and are more likely to continue working hard despite setbacks. If taught that hard work gets them success, then when they encounter a challenge, they are not afraid of failure. Alternatively, when students are told they do well because they are smart, they develop a fixed mindset and are afraid to fail so they avoid a challenge.

Cooperative Education

HIGHLIGHTS

A capstone project required for all Bachelor of Science students, the Cooperative Education senior project is structured in a way that allows the student to choose the option that best fits his/her educational goals. The following are short synopses of what just a few recent and upcoming graduates have done for their cooperative education experience.



Ronald Cook Predictive Solutions

Ron's internship project was to design and implement a user interface for a file-based database processing system. He updated a system that would accept flat files from clients, check for formatting, and then load the files onto a server to wait for manual entry. The new user interface system streamlined the process by allowing clients to submit the files, which will then correctly update the database without needing manual entry at all.



Michael Xavier Crystal Commerce

Michael developed a price suggestion system which samples the market for known products and enables batch updating and auto-pricing based on this data. He also developed a reporting system for data mining conversions from request logs.



Jesse Bergslien Vertafore

Jesse's internship at Vertafore consisted of working on a current product that is in its next release cycle. The AMS360 product is designed for independent insurance agents. It is designed to run the day to day business of customer and policy tracking, claims, invoicing, receivables, suspense, marketing, etc. He worked with a team in an agile environment consisting of scrum meetings. He initially shadowed the various team members and eventually took on tasks himself.



Eric Nevala Individual project

Draco, Episode 1: "A legend begins"

Eric developed Draco as a casual video game with bi-weekly episodic content. The game genre is "space action shooter" with strong elements/influences from role-playing strategy games. Each game episode is self-contained story, which is a part of a larger story, and has a target game play time of 20-40 minutes--just enough for a lunch break!



Sam Frazier Zetec, Inc

Networking Robot Controllers

Sam's internship involved joining a small software development team working on inspection robots. While under the supervision of the engineering department manager and the senior software developer, he created a new network application between two robot control devices. Sam developed the application from start to finish, from analysis to deployment. During the development process, he briefed design proposals and participated in code reviews with senior Zetec staff.



Kate Phillips Griptonite Games

Kate's internship focused on the job of a technical artist and improving the art pipeline for game production. Improving the art pipeline included implementing format conversion systems for commercial products (e.g. Maya) to support communication between the artists and the programmers, customizing game-production software systems to replicate the capabilities of an in-game environment (e.g. shades, look and feel), developing utility tools (e.g. scripts) to speed up and facilitate repetitive tasks, and trouble-shooting technical art problems.



Bryan McMahon Griptonite Games

Bryan worked as a programming intern at Griptonite Games. He was part of a development team working on a video game that will be published on multiple home consoles. He modified existing code to fix bugs or add new functionality and also programmed new features and wrote scripts for in-game functions.



Summer 2010 Colloquium student presenters

professionally. When I started on this project last summer, Ken Craig and I went to the Washington Food Bank Coalition Meetings in Wenatchee, WA. It was here that I was able to talk with many of the directors of the food banks that spread across our state. In doing so, I was told story after story, not only about the people in need and how food banks change their lives, but also how this program has revolutionized how many of them operate. And even though I had just started to help Ken Craig and did not even have a good idea of what I was going to be doing, the directors were already thanking me for taking the time to help them. It was this level of commitment and gratefulness that really made me want to strive to help. As a result of all this, I was able to understand exactly who I was doing the work for and what I was helping to achieve.

These food banks help people from various backgrounds, ethnicity, and income levels. Although a lot of people think that

food banks only serve homeless people, they also help families just like yours and mine; people who are just down on their luck for any number of reasons and may just need that little extra help to make it through the month. Food is not a luxury, it is a necessity, and everyone, regardless of circumstances, should never go hungry.

The project also gave me a sense of accomplishment. I was able to complete the project without an instructor overseeing my progress. When I had questions, I had to find the answer on my own, using whatever resources were available, such as talking with others in the field, books, or the Internet. It was a great intermediary step that helped me grow and see myself as a professional.

Do you plan on continuing your work on this project?

I absolutely plan on continuing work on this project. Ken Craig wrote the original program as a volunteer himself.

However, in our current circumstances, being volunteers is no longer feasible, so he is looking for funding for both of us to complete ClientCardFB 3.0. Since I have already helped in connecting the library to the database, the 3.0 version would entail a new front-end UI and added functionality.

If funding can be found, I will be working with him for seven months to complete this upgrade. Once complete, I would continue to offer support. Ken has expressed that he would like to retire in the next couple of years but wants someone to continue to make this software available to all the food banks. He is currently looking for a non-profit organization to oversee and distribute the software but would like me to continue being one of the primary programmers; making sure the program stays up-to-date and feasible for all food banks to use. I am more than happy to continue working on this project.



CSS SPEAKER SERIES

Our Speaker Series events provide continuing education and a link to the Computer Science industry to students and the community. The series sponsors guests from a wide range of areas allowing students to explore, experience, and network. Below are abstracts from just a few of the latest Speaker Series events sponsored by the CSS program and UW Bothell Student Services. For upcoming events or to learn more, visit www.uwb.edu/css/newsandevents.

OWNING THE PROBLEM IN WIRELESS RESEARCH

Since the termination of analog TV transmission in 2009, the bandwidth used to transmit the analog signal is now empty. This unused spectrum is known as white space. The reuse of this white space to provide wireless broadband Internet connectivity has been met with both support and opposition.

Dr. Victor Bahl, a Principal Researcher and founding Manager of the Networking Research Group in Microsoft Research Redmond, discussed the evolution of our thinking on this issue with a societal, policy, technical, and business approach.

UBIQUITOUS NETWORKING

Dr. Takashi Watanabe, a professor in the Faculty of Informatics from Shizuoka University in Japan, discussed the topic of ubiquitous networking. Specifically, he talked about smart antenna-based medium controls and routing. Other topics of discussion included data aggregations to reduce network traffic and routing protocols for sustainable sensor networks.

DISTRIBUTED DATA ARCHITECTURE

Matthew Greenway (CSS '99), is a Systems Engineer on Microsoft's CloudDB produced named SQL Azure. Greeway discussed the challenges presented by distributed systems when dealing with data throughout. He also talked about networking, node awareness, and node mapping.



HELP SUPPORT OUR MISSION

Whether you donate \$5 or \$500, every gift helps keep the CSS program a unique and rewarding experience for students and an important resource for computing education in this region.

Support from people like you enables us to grow our activities even in the face of state budget cuts. Become part of our mission by donating whatever you can.

You can direct your giving to CSS by visiting www.uwb.edu/css and clicking on the "Make a Gift" link.

Thank you for your generous support.

GET IN THE LOOP!

Ever wondered what's going on in the CSS program?

Join our Facebook, Twitter, and our newly created YouTube channel to be the first to know about exciting news, upcoming events, and much more.

Visit our website (www.uwb.edu/css) to learn more.



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