



CS@USU

COMPUTER SCIENCE DEPARTMENT NEWSLETTER
UTAH STATE UNIVERSITY

SPRING 2006

Notes from the Department Head



We have now come to the end of another academic year. We accomplished some milestones this past year. The first that comes to mind is that we graduated our first PhD,

Liming Hu. Professor HengDa Cheng was his major professor. Our goal is to graduate 3-4 PhD's per year, and I expect we will reach that goal in another year. Some of you out there probably remember the department when we granted only the BS/CS. That was the case until 1982. It has taken almost 40 years to reach this goal. Many people contributed. Some are here, and some are not. Rex Hurst and Wendell Pope started it all. For ver 30 years, it has been my great privilege to watch as the department has grown and improved until we have reached this milestone. To all of the students, faculty, and staff, we owe a debt of gratitude.

The second milestone is that we awarded 62 BS/CS degrees this past year. That is the most undergraduate degrees we have awarded in one year in over a decade. While they probably did not know it when they started, the job market for computer scientists has improved considerably these last couple of years. While outsourcing is an issue, it really has not significantly impacted these graduates. The important factor is simply the strength of the economy and the quality of our program. All indications are that the future is bright for computer scientists.

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Software Engineering Underpins Research Projects

Dr. Stephen Clyde has been a major player in the National Scenic Byways (NSB) project for ten years. Sponsored by the Federal Highway Administration, the NSB project helps promote the National Scenic Byways through websites that can provide current and well-presented information for tourists, travel writers, byway planners and administrators, as well as provide a

“These websites aren’t an end in and of themselves,” says Clyde. “Rather, they are vehicles for conducting research in software engineering and distributed systems.” The research generated through the NSB project includes new agile project management methods, user-interface design patterns, reusable object-oriented frameworks, generative object-oriented design templates, 3-D



Dr. Stephen Clyde (front) and members of NSB staff.

rendering of the byways, AI-based tools and algorithms for assisting patrons with planning travel itineraries, and image processing algorithms for aiding in the removal duplicates photos and the cluster similar photos.

Another of Clyde’s current major projects is the Child Health Advanced Record Management project – or CHARM, for

short. It integrates otherwise-isolated public health databases to help the state of Utah avoid duplication of health services, such as immunization, and to provide more accurate and complete information to public health care providers. Like the NSB project, the CHARM has serves as an umbrella for many individual research projects. These research projects have resulted in a number of innovations including the *Arms-length Information Broker Architecture* for linking confidential

system of storage and retrieval for the vast NSB digital library. As such, Clyde’s work has been to develop three websites, one for the general public, one for the byway community, and an NSB digital media library to be used by web administrators, travel writers, and the like. The sites receive on average 50,000 visitors a week and serve as a cost-effective marketing medium presenting current, detailed, and attractively presented information.

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heterogeneous information systems; a distributed-systems query mechanism that offers a high level of transparency; fault tolerance, scalability, and openness; a rule-based record matching mechanism; an interactive backend deferred match resolver; a rule-based alert generator, and a probabilistic test-data generator.

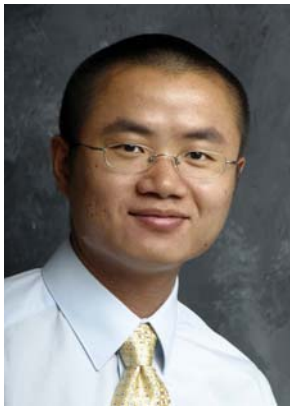
Closely associated with his efforts on the CHARM project, Clyde actively

participates in a national workgroup sponsored by the *Public Health Informatics Institute* (PHII) to sort out the challenges of integrating public health care system and to explore the various technologies that can address these challenges. He has authored a comprehensive guide and several self-assessment checklists for data de-duplication in integrated systems. PHII will publish these materials, this year as a multi-document portfolio on public-health care system integration.

Clyde enjoys contributing to computer science education. His research in this area includes investigations into *Concept-First Instruction* for CS1 and CS2; *Problem-based learning* across the curriculum; *eXtreme Learning*, which is adaptation of *eXtreme Programming* principles to education; and the use of *Design-n-Code Fests* as capstone experiences in graduate courses.

New Faculty

Minghui Jiang, Assistant Professor



Originally from Wuhan China, a city of over 7 million situated at the confluence of the Yangtze and Hansui Rivers, **Minghui Jiang** came

to the USA to pursue an MS degree in physics and computer science at Purdue University. After completing his MS, he spent some time working in Chicago for a software development firm. While he sees the time he spent in the private sector as very beneficial, Jiang's main objective is research. Thus, he left the private sector to pursue a PhD in computer science at Montana State.

Of his research, he says, "I am a theoretician. My research centers in mathematics and computer science broadly connected to algorithms." One current project focuses on discrete and computational geometry as a step in the development of cartographical applications in computing.

Outside of the classroom and laboratory, Jiang and his wife, Whayling Ng who is originally from Malaysia, enjoy hiking and camping.

Jerry James, Assistant Professor

While earned his PhD at University of California Santa Barbara, in his home state, **Jerry James** came to USU via the University of Kansas where he was an assistant professor. James says he enjoys having mountains on the horizon again, "But it is still too far to the beach."



James' primary research interests include improving overall software quality by applying formal methods to programming of operating systems; and concurrent programming in multi-threaded systems. He plans to write a tool to perform source code analysis for multi-threaded software. James is also a part of the Space Software Lab (SSL), headed by Scott Cannon. His projects in the SSL include creating standard software architecture for satellites in order to cut down the overall construction time of satellites.

James' life away from work centers on his wife, Laurie, and their four children. A native of Bakersfield, CA, Jerry James earned his bachelor's and master's degrees at BYU.

J. Dean Mathias, Lecturer

Although he recently joined the computer science department as a permanent instructor, **Dean Mathias** feels at home in the CS department, having completed both his BS and MS degrees here and having taught as a temporary instructor for a couple of years.

Mathias has worked as a consultant in environmental applications of computing since 1992. This work includes system optimization, user interface, and database development.



He returned to USU to complete his MS in 2004.

Mathias likes the mix of consulting and teaching. "The two feed each other," he says. "My

teaching strengthens my consulting, and my consulting makes my teaching relevant to the industry." Mathias also enjoys interacting with students and the university environment in general.

Away from work, Dean is an avid cyclist and is a regular participant in LOTOJA (the Logan, UT to Jackson, WY race).

Changhui Yan, Assistant Professor

Changhui Yan came to USU from Iowa State, where he earned his doctorate in computer science and



bioinformatics & computational biology (BCB). Changhui, who began his academic pursuits as a biologist at Beijing University, became

interested in the new field of bioinformatics about five years ago.

“Although bioinformatics was in its infancy, it showed tremendous potential to solve problems in the areas of genomics and proteomics,” he says. “This whetted my interest, and I began looking for PhD programs in this emerging field.” Iowa State’s interdisciplinary program was exactly what Changhui was looking for. Biologists, such as Changhui, who were coming up to speed in computing worked side-by-side with computer scientists who were coming up to speed in biology. This created many opportunities for collaboration. He hopes to find the same type of collaboration at USU.

Changhui’s research currently focuses on using computational methods to predict protein function and structure.

He and his wife, Lan Hu, who is also a computer scientist, are enjoying Cache Valley’s natural beauty.

Alumni

Li Chen – MS ‘95 Associate Professor (tenured) at the University of the District of Columbia. Leaders in the field (L. Zadeh and J.E. Goodman) have given his self-published book, *Discrete Surfaces and Manifolds*, good reviews. Further, his book is one of three monographs in the Library of Congress under “digital geometry and topology.”

Jack Meyer – BS ‘99 After leaving USU in 1999 with a BS in Computer Science with an emphasis Information Systems, I was hired by Evans & Sutherland to work in their military simulation division, programming and modeling for flight simulators. After 3 years of that (and a transfer to an RAF base in the UK), I left the company to go back to school to study jewelry design at Central Saint Martins in London, England.

After 2 years there, I returned to the states and was hired by MOD Jewelry to bring my combined knowledge of computer-aided design and jewelry design to the field of fashion jewelry design and production. I now design silver jewelry for clients such as Harley-Davidson and the 12-Step Program.

While my degree at USU didn’t necessarily take me directly to where I ended up with my career, it was certainly instrumental in the beginning of my career. The school’s career center sent me to an interview with E&S, and the problem-solving skills and computer training I received from my old department did the rest.

Nathan Tenney – BS ‘01 I have been working as a research scientist for PNNL in Richland, Washington for the last 3 years, 2 of which I was one of the principle scientists building and maintaining the PNNL supercomputer (at the time, the 5th fastest computer in the world). I have since gotten back into writing software for various government agencies, primarily using Java. I’m slowly working on my MS degree in computer science at Washington State University. My wife enjoys the area, and we have 3 beautiful daughters.

Scott Schneiter – BS ‘01 After graduating, I was hired by the Naval Air Warfare Center Weapons Division in China Lake, CA. During my time here, I have written and tested software for the F/A-18 Hornet fighter jet, the AH-1 Cobra attack helicopter, the Tomahawk cruise missile and a project called Digital Precision Strike Suite (DPSS) which is used by special operations forces in the field to guide satellite guided bombs to their targets.

For the last 26 months, I have worked permanently on the F/A-18. Boeing has turned over to us the software upgrades and maintenance for versions A-D of the aircraft. I am currently in charge of upgrading the F/A-18 simulation software used for development and testing.

Last fall, I took some additional training at the Software Engineering Institute in Pittsburgh to become a PSP/TSP instructor and coach. Thus, while programming is still my main job, I’m also in charge of implementing PSP/TSP practices to the group.

Jeff Hillman – BS ‘03 I am a Software Engineer for Equis International, a Reuters Company. I work on their analytics team. We develop all of the technical analysis and graphics (charting) tools for Reuters’ new software products. I am married with a 2-year old son, Jack, and a new daughter, Jane Violet, born in September. We built a house in West Jordan last year.

Two Brainteasers from an Alumnus

Sheldon Teerlink (BS 2002, MS 2004) shared a couple of interesting problems for our readers to solve.

The first is a neural network problem. Sheldon’s mother-in-law suffers from Lupus, a disease highly influenced by diet. Lupus-sufferers typically have good days and bad days – or “flare ups.” Thus, patients keep track of what foods they eat and when they eat them, as well as when the flare ups occur. The aim is to find a correlation between any particular food(s) and flare ups.

Assuming one had sufficient data – a list of the ingredients in all the foods eaten, the quantities of the various foods eaten, the time of day the food was eaten, a list of foods eaten in combination with other foods, the order in which the food was eaten – how would one set up the design of the neural network to solve this problem?

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postal stuff

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The second problem is more philosophical in nature. Sheldon asks our readers this: What kind of work do CS graduates do when they neither want to write code all nor manage people who write code all day? Send your solutions to: myra.cook@usu.edu and we will feature the best solution(s) in the next newsletter.

We want to share with our readers where our alumni are. To contact us with information to include in the newsletter, email myra.cook@usu.edu

Industry Board Meeting

Formed to provide CS faculty with feedback on the undergraduate curriculum, the CS Industrial Board met at the end of February. As representatives from the industry, board members relate their needs regarding the undergraduate training of potential employees. In turn, CS faculty use this feedback to make the curriculum more pertinent to the industry.

Board members include scientific staff, such as software engineers and programmers, and presidents and CEOs. Further, members have included representatives from organizations, such as Hewlett-Packard, Intel, Juniper Systems, Evans and Sutherland, and SWRC. Many board members, both past and current, are USU alumni. Headed by Dan Watson and Hengda Cheng, the board meets every two years.

Notes from the Department Head

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A third milestone is really a passage of time. Professor Greg Jones retired this month after 31 years at USU. As a colleague and a friend, he will be missed by all. Greg and Monti are serving as LDS service missionaries in Brazil for the next couple of years, and we wish them well.

If you have been watching the department website these last few years, you've no doubt noticed that we have changed a lot. This is the last year of the Governor's Computer Science and Engineering 5-Year Initiative, in which we have grown from 12 to 17 faculty. There have been a few retirements, and a few have gone on to other

positions. The net result is that in 2002 we had 12 tenured faculty members. Today we have 8 tenured and 9 untenured faculty members. Research in the department has increased considerably, both among the new faculty and the "old" faculty. This is a very exciting time to be a member of the USU Computer Science Department.

For the last 16 years the department has been housed on the fourth floor of Old Main. This spring, the old Merrill Library was torn down. For now there is only a vacant lot in its place. In fact, at the moment, they have not finished filling in the hole. Under the current plan, and following Legislature approval, we will move into a new building in place of the Merrill building. With all of our growth, we obviously need more space.

In the next year I will be making a few trips to visit alumni in various cities. If you are near one of these visits, I hope we will see you there. My next visit is planned for Seattle, Washington, on July 19. In the meantime, I hope everyone has a great summer, and at least gets a little time to enjoy life away from the mouse and the keyboard.

Donald H. Crowley