Teaching in “The Cloud”
Cudahy 412 Technology is Upgraded

by Thomas Kaczmarek

This summer, MSCS took a major step to increase the flexibility of programs by increasing off campus accessibility to classes via the cloud and distance learning. When first equipped, CU412 was a leading edge facility with student workstations, a digital projector, audio and video capabilities, and instructor computing. (Figure 1).

A small success with distance learning in the Computing program, spurred a discussion about enhanced technology for CU412. In spring 2011, Raynor 320H hosted the delivery of a class to Computing students scattered across four states. It took a bit of jury-rigging with a web cam, a Polycom, and two software packages, but the technology enabled two-way communication and audio and video capture. While the recording was only acceptable, students were able to review materials presented during class times. The system was quirky, but it showed promise. It led to a plan for enhanced capabilities in CU412.

Now in CU412, push-to-talk microphones capture student questions and comments. Control software for two servo-controlled cameras (instructor facing and classroom facing) dynamically selects the proper camera and moves it to capture the correct classroom image. A digital signal processor provides smooth transitions between the classroom microphones and audio from remote students. A large format tablet, (Figure 2), provides a stylus to draw and control applications. Once a session is established, educational conferencing software shares video and audio across the web. Images, video and audio from any computer in the session are available for sharing. Recorded classes are available for later review.

One interesting feature of the system is a low-cost video tracking of the instructor. Proximity sensors mounted in the ceiling detect the instructor’s position and serve as input to the camera control. The department’s infrastructure guru and part time tinkerer, Ross Oldenburg, worked with university media services to design and build this novel feature. Four instructors delivered five classes using this facility this fall. Students have commented, “I think I’m getting close to the same experience as those in the classroom (which I think is the goal),” and, “It definitely makes the class more accessible. While I will come in for some of the classes, it would be very difficult for me to physically attend all the classes. It’s a great option to have.”

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This newsletter is a publication written by students and MSCS faculty for alumni of the Marquette University Department of Mathematics, Statistics and Computer Science

FROM THE CHAIR

I’m often asked how mathematicians, statisticians, and computer scientists fulfill the University’s mission of service in the community. In addition to providing leadership and service to their professions, this newsletter highlights some of the ways MSCS students and faculty live out Marquette’s commitment to service.

On page 2, be sure to read about our new program aptly named START IT. A joint effort with the Milwaukee Area Workforce Investment Board, Aurora Healthcare and Froedtert Hospital, START IT is designed to help dislocated workers and veterans start graduate study in the healthcare Information Technology field. The MSCS Department’s collaboration with the West Allis West Milwaukee School District continues in its third year of working with mathematics teachers. Two highly successful summer institutes are held each year that focus on the study of algebra-related concepts and their corresponding teaching practices. Also, during summer, 2012, we hosted our first Google-funded Computer Science for High School workshop. This intense 3-day workshop featured a basic track geared for non-computer science teachers and a more advanced track for high school computer science teachers. Other faculty efforts include investigating lung injury, determining risk associated with rare events, and other efforts too numerous to detail.

The department’s commitment to service is not limited to its faculty. Samson Kware, a graduate student is working to eliminate the transmission of malaria by developing mathematical models for systems in which adult mosquitoes introduce insecticides into their breeding grounds, thus destroying their larvae. Niharika Jain is one of several graduate students working on “mapping emotional data” with the goal of creating a mobile system to aid in autism screening and follow up training for at-risk children. Casey O’Brien is working on a smartphone-based assessment tool used by rehabilitation therapists to track individual patient rehab programs, and assess their progress and Munirul Haque is developing a mobile phone-based breast cancer monitoring system.

These are just a few highlights of work that MSCS students and faculty are performing that directly affect various aspects of society and our world. Take a moment to look inside for more details on these and other important projects.

Wishing you a healthy and fulfilling new year.

Gary Krenz
Chair
FACULTY NEWS

Faculty Research Awards

Sheikh Iqbal Ahamed, Associate Professor, will serve as the Principle Investigator for two four-year National Institutes of Health RO1 grants. The first, will fund the study entitled “Efficacy of an m-Health Self-Management Intervention” and the second grant will fund the project, “American Indian m-Health Smoking Dependence Study.”

Dr. Ahamed also received funding for two one-year projects from the International Breast Cancer Research Foundation. The first award is for conducting a project entitled “Cross Sectional Study of Cell Phone Assessments of Symptoms in Patients with Advanced Cancer.” The second award is to conduct “Breast Cancer Palliation Study Phase III.”

He is also part of a Marquette/Medical College of Wisconsin/University of Wisconsin-Milwaukee/Zablocki Veterans Affairs Medical Center team awarded a Haithcin Wisconsin Partnership Program (HWPP) grant entitled “DryHoitch iPeer: A Social & Technology Support Program for Veteran Mental Health.” The project plans to enhance integration of civilian health systems, particularly on college campuses where large numbers of young veterans attend school, with informal, community-based veteran peer mentor programs and existing VA healthcare services; with the goal of increasing continuity in care and enhanced awareness of the needs of veterans. In addition to the above research grants, Dr. Ahamed was elected as a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE). This appointment recognizes his high level of performance and includes only 8% of the institute’s membership.

Elaine Spiller, Assistant Professor, received an award from the National Science Foundation for the two-year project entitled “Collaborative Research: Statistical and Computational Models and Methods for Extracting Knowledge from Massive Disparate Data for Quantifying Uncertain Hazards.” The research team plans to develop new mathematical, statistical, and computational methods to address the problem of making statistical inferences on the basis of massive data sets. The new methods are expected to be applied to quantitatively assess risk associated with volcanic activity.

Anne Clough, Professor, is part of a Medical College of Wisconsin five-year grant from the National Institutes of Health’s National Institute of Allergy and Infectious Diseases to study methods for diagnosing radiation lung injuries before symptoms develop.

Marta Magiera, Assistant Professor and Dr. Leigh Van den Kieboom, Assistant Professor, Department of Education, received a one-year grant extension, with additional funding for the Mathematics and Science Partnership, “Raising Achievement in Mathematics through Fostering Algebraic Thinking (RAM t-FAT).”

MSCS Updates

MS in Computing Program

The MS in Computing program is planning to provide a new opportunity, called START IT, to help dislocated workers and returning veterans. START IT is a joint effort with the Milwaukee Area Workforce Investment Board (MAWIB) and information technology (IT) leadership at Aurora Healthcare and Froedtert Hospital. Although START IT students will pay for their courses, a free Boot Camp experience will be made available to dislocated workers to get them started with graduate study in healthcare IT. In addition, Wisconsin economic development training funds are available through MAWIB via the Workforce Investment Act to help the students defray educational costs. Healthcare Training Institute (HCI) caseworkers (HCI is an arm of MAWIB) will invite qualified clients to an information session at the HCI offices on November 29, 2012. We anticipate a small START IT cohort to begin the semester-long Boot Camp in spring 2013. Participants would work full-time in the IT department of a health organization in summer 2014 and graduate with an MS degree in December 2014.

Bill Venables Lead R Workshops

From June 18-19, 2012, the internationally renowned statistician Bill Venables (left) offered two R workshops co-hosted by American Statistical Association’s Milwaukee Chapter, the Medical College of Wisconsin and MSCS. The workshops surveyed modern data analysis, graphics and statistical modeling in the style of Modern Applied Statistics with S. Venables’ classic textbook with co-author Brian Ripley.

Summer 2012 Workshop for Math Educators

MSCS and EDPL faculty continues their work with West Allis West Milwaukee School District Mathematics Teachers! Two Summer Institutes held in Cutaby Hall in June and August this past summer, culminated second year of Mathematics Partnership between MU and West Allis West Milwaukee School District. Thirty middle and secondary mathematics teachers spent part of their summer studying algebra-related concepts and corresponding teaching practices for supporting students in learning mathematics with understanding. Directed by Dr. Magiera (MSCS) and van den Kieboom (EDPL) program was funded by U.S. Department of Education via Wisconsin Department of Public Instruction and it is currently in its third year.

Computer Science for High School Workshop (CS4HS)

This past July, high school teachers from all over Wisconsin converged on Marquette campus for CS4HS @ MU (http://www.mscs.mu.edu/~brylow/cs4hs/), a three-day workshop promoting Computer Science education for high schools. Funded by a grant from Google’s CS4HS program, Marquette’s workshop offered two parallel curricula at no cost to teachers, including both a basic track targeted to non-CS STEM (science, technology, engineering and mathematics) teachers, and an advanced track for current high school CS teachers.

The basic track concentrated on computational thinking concepts, aspects of the new Exploring Computer Science (http://www.exploringsc.org/) curriculum, and practical ideas for working more computing-centric modules and motivations into existing high school STEM courses while still addressing relevant state standards.

The advanced track concentrated on the newly proposed Advanced Placement course, AP Computer Science Principles (http://www.csprinciples.org/), with sessions dedicated to the big ideas and learning outcomes that our local pilot site leaders reported were showing the biggest gap between university and high school sites.

A total of 28 high school teachers participated in the workshop, and it is estimated that a third of all of Wisconsin’s active AP Computer Science high school teachers attended – the largest such gathering in our state that anyone was aware of. An additional ten university faculty and students from Marquette and other schools helped to organize and lead aspects of the workshop, including Marquette MSCS department faculty Dennis Brylow and Rong Ge, MSCS Computational Sciences graduate student Heather Bort, and department alum Aaron Gember (COSC ’09). Session leaders joined us from University of Wisconsin - Madison, University of Wisconsin - La Crosse, Purdue University, and Elizabethtown College, as well as Wisconsin high schools Madison West, Fort Atkinson, and University School of Milwaukee.

By all early measures the workshop was successful and well-received; while organizers will continue to collect data on the long-term effects of this workshop into the next academic year, there is little question that this event served as a catalyst to effect positive changes for high school computer science in Wisconsin. Planning for a summer 2013 workshop is already underway.
Using Math to Conquer Malaria

Samson Kiware, Computational Sciences graduate student, was featured in the Fall 2012 edition of Marquette Magazine. Samson is currently working with the Ifakara Health Institute in Tanzania where he is developing mathematical models for a system in which mosquito larvae are destroyed via the adult transmission of insecticides to their breeding sites. In Tanzania, these models will be used to guide field trials and provide a predictive prototype to use for malaria elimination.

The goal of Samson’s research is to decrease the threat of malaria to such a low level that he will “…work myself out of a job as soon as possible.”

His doctoral research is supported by the Bill and Melinda Gates Foundation, the MSCS department, and the College of Engineering.

2012 Summer REU: A Second Year of Computation Across the Disciplines

In this second year of the 3-year NSF grant awarded to Drs. Dennis Brylow and Kim Factor, 10 more undergraduate students were brought into Marquette from the end of May until the beginning of August to experience the joy and pain of research. This Research Experience for Undergraduates (REU) had mentors who involved their mentees in topics involving computational aspects of mathematics, engineering, and computer science.

Two of our participants were Marquette students. The other eight students came from institutions in Arkansas, Illinois, Massachusetts, Missouri, New Jersey, Ohio, and Pennsylvania. It was a great mix of people involved in computer science, physics, and mathematics. Together they spent about 40 hours every week working on individual or group research projects. They met each week for a working lunch where they shared ideas as well as food. Sometimes there was a research talk for them to listen to while they ate.

To finish up the 10-week REU, the students prepared individual posters for a poster session. Then they gave formal talks and prepared technical papers based upon what they did. It was quite a productive summer for all involved.

We are hoping that the experience helps those involved determine whether they would like to get involved in research and go on to graduate school once they graduate with their bachelor degrees.

ACM Programming Competition

On Saturday, November 3, 2012, Marquette sent teams to the 2012 Mid-Central USA Regional Programming Contest sponsored by the Association for Computing Machinery (ACM) and IBM. The contest consists of writing computer programs within a limited time frame to solve various puzzle-like problems. The programs are written in Java or C/C++. Michael Stattery served as the team advisor. For examples of the training sessions, please see http://www.mscs.mu.edu/-mikes/icpc/

Putnam Mathematical Competition

On Saturday, December 1, 2012, four students participated in the William Lowell Putnam Mathematical Competition administered by the Mathematical Association of America. The Putnam Competition is an annual mathematics competition for undergraduate college students enrolled at institutions of higher learning in the United States and Canada. The examination consists of two three-hour sittings separated by a lunch break. The examination is constructed to test student originality as well as their technical competence in mathematics. The William Lowell Putnam Mathematical Competition is a challenging examination, where the median score is typically one or two points out of the 120 possible. Wim Ruitenburg served as the faculty mentor for the Marquette Putnam team.

Spooktacular Ugrad Halloween Party

Room CU 401 was filled with laughter, food, and camaraderie on Halloween as the undergraduates of our department came to have some fun. We host an undergraduate party each semester for our undergraduates where they can stop and get a bite to eat, talk with friends and with their professors who also like to drop by. There are door prizes (such as t-shirts and pizza cutters) as well as prizes for costumes. This year’s food came from Beans and Barley, which was a fantastic success! Thanks to the Department of Mathematics, Statistics and Computer Science for supporting the undergraduates with this great party!!

Pi Mu Epsilon Fall 2012 Induction

The Wisconsin Alpha Chapter of Pi Mu Epsilon Induction Ceremony was held on December 3 at 6:30 p.m. in Cudahy 401. The meeting started with dinner. Dr. Wim Ruitenburg was the featured speaker. Following the presentation the initiates took their pledge. The following are new members:

David Anaya
Kevin Gray
Ryan Haberkorn
Angela Harder
Paige Herrmann
Kaitlyn Monteer
Anna Peris
Mark Ruedinger
Andrew Tadin

Jesse Borges
Hannah Guth
Joel Haberkorn
Farzane Haranani
Lawrence Kimmel
Rebecca Pachuta
Nicholas Roussakis
Sonia Shah
Kylie White

Experiencing HPC for Undergraduates

Alex Becherer, a computer science major/mathematics minor was selected to attend the Supercomputing 2012 (SC2012) Student Program: Experiencing HPC for Undergraduates. The program is designed to introduce undergraduates to current research in high performance computing and included several elements tailored for undergraduates. Program details are available at http://sc12.supercomputing.org/content/experiencing-hpc-undergraduates

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The manuscript by Michael Zwijsonski, Electrical and Computer Engineering graduate student, and Dr. Dennis Brylow, Associate Professor, “BareMichael: A Minimalistic Bare-metal Framework for the Intel SCC,” Proceedings of the 6th Many-Core Applications Research Community (ARCC) Symposium, Toulouse, France, July 2012 was recognized with a Best Paper Award, 2nd place, at the ARCC Symposium.

Munirul M. Hague, a Computational Sciences graduate student, received a conference travel award to present his paper entitled, “A Mobile Based Remote Symptom Monitoring System (RSMS) for Breast Cancer Patients in Rural Bangladesh” at the International Network for Postgraduate Students in the Area of ICT4D (IPID) Annual Symposium inKristiansand, Norway.
**GRADUATIONS**

**August 2012**

**M.S. Bioinformatics**
Sib Kiblawi
Snehal Ballasaheb Patil

**M.S. Computing**
Janet John  Andrew Lize
Amitav Panda  Kotian Madhusen
Weiqiang Wei
Sheikh Hasib Bin Zaman

**M.S. MSCS**
(Physics for Secondary School Teachers)
Kiersten Purves

**M.S. MSCS**
(Computational Sciences)
Grant Retke
Md. Tanviruzzaman

**December 2012**

**Ph.D. MSCS (Algebra)**
Justin Albert

**M.S. Computing**
Rui Zhang  Aaron Pittenger
Sapna Sumath  David VanKampen
Dale Henry Klein

**B.S. Computer Science**
Katherine Zagorski

**B.S. Elementary/Middle Education and B.A. Mathematics for Elementary School Teachers**
Jamie Cirella  Casey Ford
Kateri Leis  Wesley Schaff
Craig Sormrude

**B.S. Middle/Secondary Education and B.A. Mathematics for Secondary School Teachers**
Elizabeth Alexander
Anthony Miers

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**FACULTY FOCUS**

**Welcome for New MSCS Faculty**

Dr. Serdar Bozdag

Dr. Serdar Bozdag received his undergraduate degree in Computer Engineering from Marmara University in his hometown, Istanbul, Turkey. In 2003, he began his PhD studies in Computer Science at the University of California, Riverside. His research area is Computational Biology and Bioinformatics. During his PhD, he developed software to build a physical map of the barley genome. In 2008, Dr. Bozdag moved to Maryland for his post-doc research at the National Cancer Institute within The National Institute of Health where he developed computational tools to analyze genomic and clinical data obtained from brain cancer patients. He also worked as Adjunct Faculty at the University of Maryland University College where he taught graduate courses in Bioinformatics. Dr. Bozdag was attracted to Marquette because there is a good mix of both research and teaching, and the Milwaukee area offers several opportunities for collaboration for research in bioinformatics. Dr. Bozdag's current research interest is to develop algorithms to infer gene regulatory networks of genomes from high-throughput biological data. Dr. Bozdag will be teaching courses such as programming, data mining, and bioinformatics.

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**ALUMNI NEWS**

**Charlotte Barnich Arendt**

**B.S. Mathematics ‘54**

Memories and Reflections
I’d be lost at MU today. Back in the 1950s there were no computers (at least one not accessible by under grads). The department was quite small. It was somewhat daunting to be the only female math major in my class. Most of the males were either physics or math majors. I taught for one year at an all-girl academy and a half year in an Alabama school. What a contrast!! Much later I attained an Industrial Engineering diploma from our local technical college which I really enjoyed. So...58 years later, it’s all memories

**Tiffani Williams**

**B.S. Computer Science ‘94**

She is currently serving as an Associate Professor of Computer Science and Engineering at Texas A&M University where she has created new algorithmic tools for reconstructing the Tree of Life, which depicts the evolutionary connections among the world's species. As a scientist in bioinformatics and high-performance computing, she works with a multidisciplinary team to build the Open Tree of Life. This project will produce the first comprehensive draft tree of all 1.8 million named species and enable community-driven updates and revisions to the tree. She has been a Radcliffe Institute Fellow, has been funded by the National Science Foundation, and has published in Science, Evolutionary Bioinformatics, and the Journal of Computational Biology. By helping identify how species are related to each other, Williams is providing a framework for a new understanding of the diversity of life and its implications in areas such as ecological health, environmental change, and human disease.

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**We would like to know where you are and what you are doing. Please send news and current address updates to:**

newslet@mscs.mu.edu