Doug’s Dialogue

It’s November and the fall semester is in full swing. As the new chair of the University of Montana’s Computer Science department, I feel a strong responsibility to make sure we provide our students with a quality education and an enjoyable, sociable, study-environment. To achieve the first, our program undergoes a rigorous continuous improvement process that is certified by ABET, a prestigious accreditation agency. We recently underwent a site visit by ABET, and our accreditation was renewed all the way through 2020. This is an awesome achievement, and my thanks go out to the entire faculty and staff whose hard work made this possible. To facilitate the second, the department has done a number of things. We upgraded our student lounge area with indirect lighting, comfy chairs, and big monitors into which they can plug their laptops. We have an active Computer Science Club and numerous student get-togethers, including weekly CS club meetings, LAN parties (don’t ask), Halloween costume parties, Christmas parties, picnics, etc. None of this could happen without the active involvement and participation of the student body and CS Department Staff. I thank them, one and all.

These are exciting times for the field of Computer Science. Industry is realizing the incredible value that persons with data-analysis skills can bring to their operation. It is difficult to find a business- or news-publication these days that isn’t touting the need for “Big Data” and “Cyber Security” experts. And while this might be a new revelation for industry, we in the biz have long known the importance of these skills. To that end, we have been quietly building a curriculum that will prepare our students to face these challenges. From Data Mining to Data Visualization, from Machine Learning to Pattern Recognition, from Artificial Intelligence to Applied Parallel Computing Techniques, we’ve got it. And where we don’t, we try to bring in someone who does. For instance, we ran a Cyber Security course this semester that was delivered by an MIT grad who is a GIAC-certified forensic examiner (GCFA) and penetration tester (GPEN). We also offer students a build-your-own-course option where they can find online courses (MOOCs) in topics that really excite them, and work with one of our instructors to insure that they master the subject matter. Add to this our strength in cross-disciplinary work (four faculty members have research, and therefore, courses, that crossover into other scientific domains), and we have the makings of a world class program.

As with many endeavors, I find the Department Chair job is like conducting a war, and that the war boils down to the battle in the 50 feet around me. It is a constant struggle, but I hope to keep my eye on the big picture, and keep the best interests of our students at the forefront. We’ve got a great crop of seniors getting ready to graduate, and the last few incoming classes have been increasing in size. We had to add an extra “Intro to Programming I” section this semester (we ran it overloaded the previous three semesters), and we have nearly 200 Computer Science majors enrolled, overall. We have close to 50 students in our Data Structures and Software Science courses. These are our upper division gateway courses, and are good indicators of future graduating class sizes. All in all, this is a good time to be in the business of building Computer Scientists.
UM Conference of Undergraduate Research (UMCUR)

UMCUR provides a great opportunity for undergraduates of all majors to present their research and creative scholarship in a public forum. The day-long conference offered opportunities for students to present their research and creative scholarship through oral presentations, posters, performances, and exhibits. Last spring, many Computer Science Department students participated in this event.

Some of our students at this event:

- Evan Cummings
- George Lesica
- Kevin Scott
- Kyle Doyle
- Megan Oswalt
- Russell Kaehler
- Scott Halstvedt
- Tyler Davis
- William Lyon
Stephanie Fitzgerald

How did you become interested in Computer Science?
I have always been a technology geek. I always wanted to know how things worked and what made things tick. This created a huge interest in science and technology. I would take apart and tinker with just about every electronic device I had access to and taught myself Basic and about binary when I was in third grade. I learned about computer science as a career when my school held a Computer Camp in 1989. I spent the next decade competing heavily academically being a Mathlete and Science Olympian. I knew I wanted to be a scientist but also was very creative and artistic. This led me to studying Evolutionary Biology and being a professional artist for a while but I never felt challenged enough. Then after years of hopping around multiple side jobs, I realized that all the positions I held had something in common: computers. I then came back to school to finish my degree and received a BS in Computer Information Systems. This is where I discovered my joy for programming and software development. While finishing my BS, I joined the CS Department to start my path towards Computer Science.

What is it like being a woman in Computer Science?
Computer Science is a pretty male dominated field. At times, it’s like being an apple in an orange tree and, other times, it’s like I have a hundred brothers. I am a woman so I look different, I think differently, I learn differently, and I program differently but, overall, I am a computer scientist. I am interested in many of the same things the guys are interested in and have developed great relationships with them all. At times, it can feel a little isolating and lonely being the minority but I am lucky to have some very strong women computer scientist in the department. They remind me that it can be done and I can succeed. I love hanging out with my computer science brethren and learning about them. I have become close friends with many of them and love all of them very much. Sometimes it can be rough but to be perfectly honest I only feel truly comfortable in our department. I find being a woman in computer science a benefit. It allows me to be able to solve problems differently and look at code in ways the guys do not.

What do you plan to do after graduation?
I have two main goals in my mind when it comes to my future. I want to get real world experience programming and would love it to be applied to bioinformatics/human computer interfacing in some way. Then after I have been in the “real world,” I want to continue my education by getting my Ph.D. My goal is to teach computer science at the collegiate level. I have been very lucky and had the ability to TA/grade about 8 CS courses now and I love it. I love getting the freshmen excited about computer science, I love helping students learn more about the different fields of computer science, and I really love designing projects and helping improve the courses to assure the students are really learning everything they can. My dream job is teaching the future of computer science but I know I need some real world experience before I can be the best professor I can be. So, my first step is to get a “real” job!
Emily Palmieri

How did you decide to pursue a major in Computer Science?
I’ve always had a very broad set of interests and hobbies. I’ve been writing stories and play scripts for most of my life. I spent years maintaining a Yahoo! GeoCities website. I’ve been video editing and making films for more than a decade. I created two video games using RPGMaker that had hours of gameplay, and I’ve spent the past seven years volunteering for a theater company where I operate a light and sound board and help the owners with their computer.

When I got out of high school, I was split between pursuing video editing and pursuing video game programming. Rather than getting a specialized degree in one or the other, I decided to keep it broad with computer science and media arts degrees so that I had the basic knowledge to do whatever I wanted. I expected to eventually drop one when I narrowed my interests, but that never happened.

What are your plans for after you finish your graduate coursework?
I don’t plan to get a PhD, but that’s my only plan. I’ll do whatever I can that takes my fancy. Perhaps my small regret that I didn’t also get a minor in technical theater is an indicator that I have yet to decide what exactly I want to do!

What are you working on as a graduate student?
In August, I started working for Joel Henry. I’m implementing the GUI of an application that searches documents for content and keywords related to legal disputes. Last summer, I volunteered for Team KAIZEN games in Great Falls, which was a cool experience. As a computer scientist, I designed and implemented a major system in one of their games, and as a media artist, I created a storyboard for a promotional motion comic.

I still do a lot of work outside computer science. Over the summer, I volunteered for the Port Polson Players’ theater as the light board, special effects, and sound board operator and sound effects designer. In October, I volunteered for the Cheeky Geeky Vaudeville variety show as the sound board and projector operator and video editor.

Do you have any projects you do for fun?
I have a project idea dealing with experimental e-books and have been doing some preliminary research. I’m hoping to use it as a graduate project, but I don’t expect I’ll have much time to explore the possibility until winter break. Besides that, my current personal projects are outside computer science. My most recent endeavor consists of watching lesser-known, full-CGI movies and creating video reviews of them for YouTube. This is a bit off topic, but it’s made me realize how young the CGI medium is. There are only a handful of full-CGI films I’ve found outside the safety of the children and family film genre and the Pixar art style. Most of them show the potential of the medium but are also very flawed in telling coherent, compelling stories. Filmmakers are still figuring out how to use it!
Angela Gross

How did you become interested in Computer Science?
When I was in high school, I had no idea what degree I wanted to pursue in college. I had thought about becoming a doctor or possibly even studying music. I found that I had a wide range of skill sets so it was hard for me to decide what to do. Then, my pre-calculus teacher, Kristi Kappes, who was a female engineer at one point, recognized my skills in math and science and encouraged me to study Computer Science in college. I really respected this teacher so I thought I’d give it a shot!

What have been your favorite classes in the Computer Science program so far?
I really liked taking Data Structures as well as Algorithms which were both taught by Mike Rosulek during the same semester. Taking both classes at the same time was extremely helpful and was also a lot of fun. I was able to learn so much, especially about the software side of algorithms. The architecture aspect was also very interesting because I got to learn what computers actually do.

Are there any fun side projects you are working on this semester?
Unfortunately I am extremely busy this semester so I don’t have a lot of time to work on personal side projects. However, I currently am working for IT Central here at The University and we are developing a web technology service which is a web app for UofM students. The app will allow students to search for open labs around campus. You will have the option to see what time the labs are open as well as how to access them. You can think of the app as something similar to Academic Planner which we currently have. It’s planned to roll out next spring and I’m really excited!

What do you plan to do after you graduate?
Right now I am seriously considering going to Graduate School for Computer Science. I feel like it will give me a chance to really explore what I like and what aspects of computer science I am truly interested in. The Computer Science department sets you up on one track where you learn all of the basic information required but I feel like with Grad-School I will be able to have other options. This will really let me focus on one aspect that I am mainly interested in.
CS Faculty co-Founds "Snow and Ice Computational Group"

CS faculty member Jesse Johnson has partnered with Geoscience faculty Joel Harper to found the Snow and Ice Computational Group (SIC-G). In January, the group moved into a custom designed 3500 square foot space housing a computational facility, an electronics lab, an area for staging deployments to ice-sheets, a light weight machine shop, and space for faculty, post-docs, and graduate students. Framed by commanding views of the Bitterroot valley, the facility brings together UM CS and Geoscience research groups for cutting edge research in ice-sheet dynamics. Field remote sensed data is assimilated into ice-sheet models, and used to test hypotheses related to the primary controls on ice motion and ice-sheet stability. Ultimately, efforts carried out by the SIC-G will aid in assessment of threats posed to the Earth's ice masses, or cryosphere, by a warming climate. Johnson reports that the new facility represents "colossal change for the better" in terms of collaborative research. For years the groups have been working together but on opposite sides of campus. Having a shared space has accelerated progress immeasurably. The group currently consists of 1 undergraduate, 4 graduate students, 2 post-docs, 1 full-time scientific programmer, and 2 faculty. They are supported by external grants from NASA, the NSF, and a collection of private interests.
New Faculty Member—Robert Smith

Rob Smith obtained his Master’s and Ph.D. in computer science from Brigham Young University. His Ph.D. research focused on algorithms for analysis of mass spectrometry (MS) data. MS data output is comprised of signals generated based on the physico-chemical properties of the liquid, solid, or gaseous sample under analysis. However, raw MS data must be correctly segmented and interpreted against theoretical standards in order to yield information about the composition of the sample under analysis. Rob has published algorithms on a variety of MS data processing tasks from signal segmentation to data simulation. His Master’s research focused on feature selection for applied machine learning, specifically in the domain of medical informatics. Between obtaining his B.S. in computer science from the University of Maryland Baltimore County and returning to school, Rob worked as a research programmer, software engineer, and product manager at the University of Maryland Medical Center, Aprimo Incorporated, and Franklin Estimating Systems, respectively.
Travis Wheeler was raised (mostly) in the mountainous desert of Tucson, Arizona, where he learned to appreciate plentiful hiking and open spaces. He earned a Bachelors in Evolutionary Biology at the University of Arizona (Tucson '95), then worked as a software developer at Intuit for several years. He returned to academia to earn a Ph.D. in Computer Science, also at the University of Arizona ('09), then spent 5 years at HHMI Janelia Research Campus in Northern Virginia. His research involves development of algorithms aimed at analyzing biological data, mostly related to finding common but obscured patterns in proteins and DNA sequences. Travis has two young children, Elliot and Allison, with his wife Karen Tempkin. As a family, they love to ride bikes, go for hikes, snuggle their dogs, and (these days) marvel at the vibrant outdoor life that Missoula has to offer.
Commercialization of CS Department Research: The story of Agile Legal Technology

In 2009, when computer science professor Joel Henry asked then Provost Royce Engstrom if he could use his sabbatical to earn a law degree, he never dreamed five years later he would be managing a startup company. Joel already had teaching and administration duties at UM. He had, in short, enough on his plate. But he was intrigued by the intersection of computer science and the law.

Two and a half years later, Henry had his law degree. The options as to what to do with two doctorate degrees were, well, more than plentiful. Focusing on research that would lead to commercial opportunities seemed to be the best way to combine his computer science skills with law, and be incredibly beneficial to UM. Once he had passed the bar exam, he set to work exploring the field that had interested him most — electronic discovery.

Electronic discovery requires merging legal discovery rules with the retrieval of digital information — emails, Word documents, PDFs, texts, social media posts and such — for the purposes of a court case. Typically the amount of digital information amounts to dozens or even hundreds of gigabytes of data.

“No human can ever read every single one of those in any time that meets a legal schedule,” Henry says. “Plus, that would be a terrible thing to sentence someone to.”

Joel turned his successful research experience as well as his expertise in software development toward the development of research into how to utilize natural language processing and information theory to search, sort, and categorize textual data. He spent more than a year perfecting the algorithm. When he had it, he filed for a patent and opened a company — Agile Legal Technology (AgileLT).

AgileLT licensed the algorithm from UM and currently sells a set of software tools under the trade name START (Smart Technology Assisted Review Tools) it has three components — first it collects all the necessary data from servers and other data sources, then analyzes and categorizes the data based on equivalent content, and finally it organizes the content allowing users to quickly and accurately find content of interest without worrying about a list of keywords, misspellings, or slang.

Henry’s company isn’t the only one out there offering a smart way to search troves of textual data. The industry leaders use a machine learning technique called predictive coding. In this process, for every 100,000 emails, a user picks 5,000 at random and marks them relevant or irrelevant. The computer uses that information to sort the rest of the emails and picks out another 5,000 for a user to check its accuracy. These cycles continue until the computer learns to hone in on the right information. The method is laborious and expensive, costing up to $100,000 per project.

Henry’s technique, on the other hand, is more linear. It works like this: a user reads an email and marks it relevant or irrelevant. The software then immediately marks every email like it in the same way by comparing their content. For example, if one email says “Let’s meet for a beer after work,” and another says “See you at Draught Works at 5,” the software is smart enough to understand that they have an equivalent meaning. It even works with acronyms and abbreviations. For every email the user marks, the computer marks many more on its own, greatly speeding up the review process.

“I tell our clients the computer is making them into a super user,” Henry says. “They start marking emails, and it’s as if they’re marking hundreds of them, thousands at the same time.”

It’s also small enough to be installed on a laptop or desktop at a legal firm. So far the software is in use in legal firms in Missoula, Portland, and Spokane. He also sells it to businesses with in-house legal counsel.

One of the best facts about AgileLT is that the software has been built entirely by UM students and alumni. In fact, every employee ever employed at AgileLT has been or is a UM student. AgileLT currently employs a staff of eight. They don’t have an office; instead they meet in an online meeting space, and their main business line is directed to the cell phone of whoever is on duty.
CS Department Heads to Chile

UM Computer Science graduate students George Lesica and William Lyon were recently accepted into the Startup Chile startup accelerator program for their startup Datamaglia. Datamaglia is a data solutions platform targeting mobile developers. The platform provides a hybrid data market and data analytics backend that powers data driven mobile applications. Startup Chile is a 6 month startup accelerator program in Santiago, Chile focused on technology startups that provides a grant of $40,000 and a 1 year temporary resident visa. Starting in November, Will and George will be able to work on Datamaglia full time for six months while enjoying summer in the Andes Mountains of Chile.

For more information check out Datamaglia.com and follow us on twitter for updates on our adventure in Chile: @datamaglia, @lyonwj and @glesica.
CS Department Awards New Scholarships

This past year the Computer Science Department was unexpectedly endowed with the arrival of two generous scholarship opportunities for our students. The first scholarship, the Mike McGinley scholarship was a gift that funds 10 students with $1,000 scholarships per year for 5 years. This scholarship encourages students to go through computer science readiness programs as a preparatory bridge into our department. The second is the J.R. Scholarship for Montana Graduates which provides 5 students with $10,000 scholarships per year for 4 years. This scholarship is meant to encourage Montana high school students to stay in state and study Computer Science, as well as give back to their community through service. These scholarships have provided an incredible opportunity for our students to thrive in our department and give them a jump start on their careers. The recipients this year were absolutely outstanding. Two students who received scholarships gave short bios on themselves and their goals.

Cheyenne Goetz

Cheyenne comes from Meridian, Idaho she enjoys landscape photography and camping when she has time. She graduated from high school with a cumulative GPA of 4.0, completed the College Readiness Curriculum and is a declared double major in Computer Science and Creative Writing. Writing was her first love, but has recently “found” Computer Science. She has already proven to be an excellent student in our Fundamentals of Computer Science course, and we are excited to see her succeed in our department.
Justin Kelly

Justin hails from Helena, Montana and found his passion for Computer Science in high school when he enrolled in an elective course that focused not only on programming, but also logical reasoning. It was this problem solving that influenced his decision to go into Computer Science. As a new Computer Science major, he is also enrolled in the Fundamentals of Computer Science course where he is not only an exemplary student, but also an engaged learner whose willingness to help others is remarkable.
We are thankful to have all of these students join us this year. Their positive impact on the department will certainly influence the next generation of computer scientists for years to come.

Department of Computer Science

Donations to the department can be made through the UM Foundation at The University of Montana Foundation, P.O. Box 7159, Missoula, MT 59807-7159, or online at http://www.umt.edu/UMf/. Please use the words SUM 141 when making a donation to our account. Donations can be used to set up scholarships for students or support the department, its resources, and its students in many other ways. We thank you!

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