



Computer Science Department Student News

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Dr Wright Prepares for Retirement



Retirement isn't what it used to be. At least not to our current Chair Dr Alden Wright. Alden is as strong as ever and is probably in better shape than a lot of us could hope to be.

Alden how long have you been in the CS Department?

Alden: I have been here twenty five years as a faculty member, five of those as Chair. Including other universities I have been a faculty member for a total of thirty nine years. I spent thirteen years at West Michigan (1/2 time math and 1/2 time CS) and one year at the University of Utah as a visiting professor.

When did you come back to Missoula?

Alden: I came back to Montana in 1983 when there was a high demand for CS professors. Back then there were really high enrollments and departments were struggling to find CS instructors.

Why did you come back to Missoula?

Alden: I had family here in Missoula and one of my long term goals was to live in the west, Missoula in particular. My father was a professor here. He was the Chair of Zoology. When I moved back he was retiring and my sons were around 11 and 13 years old. It was a hard decision at the time because I was successful in Mathematics at West Michigan and had a lot of friends. My wife liked Missoula. We came back as a family every summer and she liked the summers better here than in the Midwest. It was about location and family.

(Read the rest of Alden's interview on Page 7)

Tim's research is being funded by CS Faculty member Dr Jesse Johnson.

Find out more about Dr Johnson by clicking on the following link:

[Jesse](#)



Tim Bocek and Glimmer

Tim Bocek one of our brightest graduate students came to the Computer Science Department's Master's program a little less than one year ago. Tim came to us from Pullman Washington where he received his undergraduate degree at Washington State University.

Tim, when did you get interested in Computer Science?

Tim: It was the summer between 3rd and 4th grade. I was about 8 years old. I picked up a magazine in my parents' house on Basic programming and discovered that we had a Basic Interpreter on our computer. I started working with it and made improvements to the program. My math teacher didn't like me putting lines through all my zeros which I had learned from working with Basic. I have been programming ever since.

Tim, why did you come to Missoula to get your graduate degree?

Tim: Two reasons really, the first one was the faculty. I was really interested in working with specific faculty members here on their research. The second reason is I wanted to be able to attend the same Graduate School as my girlfriend who is studying Geology. We both wanted to come here.

What do you think of Missoula?

Tim: It really is a fun town. There is a lot more to do here than in Pullman. Missoula has a great atmosphere. You are really only five minutes from a great hike. There is a lot more going on here than just the college. For example at Washington State if there was a football game the whole town shut down. Here you can get away from it. There are a lot of cultural things going on.

Please describe your research activities with Dr Johnson.

Tim: At a high level it is improving on an ice sheet modeling program called Glimmer. Ice Sheet Modeling came to the public's attention when a large chunk of Antarctica broke off a few years ago. The models could not recreate the behavior because of simplified assumptions. Models of a higher order have fewer simplifying assumptions. They capture the physics of ice sheets. What I am doing is integrating open community models such as Glimmer with higher order models to get closer to the real effects and behavior of glaciers. We are still using Glimmer because it takes into account a lot of physics, and atmospheric conditions.

What do you plan on doing after you get your Master's degree?

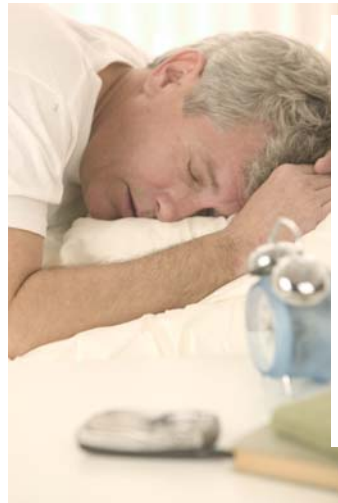
Tim: I am leaning toward working before I get my PhD. I would like to get some practical experience in Software Engineering before I get my doctorate.

Where would you like to work?

Tim: My thesis is involved with numerical computation. I would like to work for a company that is scientifically oriented like Boeing with their flight simulators.

Do you have an ideal place you would like to live?

Tim: It isn't important where I live. I would just like to have a challenging career with interesting work. I am not completely career oriented but I really want a challenge. Depending on where my girlfriend starts her career I think I can get a job wherever she goes.



An interview with Pete McCauley about his Sleep Research

Pete McCauley is a familiar face in the Computer Science Department. Pete has been taking Master's classes and was a Teaching Assistant for the department last semester. Pete currently holds an MA in Mathematics, and Bachelor's degrees in physics and math. Pete has been married 27 years to Alice who is finishing her Medical Degree in Washington State. They have three children, Mark 22 pursuing a degree in physics at UM, Paul 20 is living in Colorado and is a junior in college working toward a medical degree, and Sarah 17 who is finishing high school and has the state record in swimming. Pete owned his own business (McCauley Sound) for 22 years before he decided to come back to college. Pete loves fishing and will tell you so, a lot. His main research focus is on the correlation between sleep and performance

Pete has created a model that shows a mathematical representation of data showing the qualitative change in performance when the normal sleep baseline is disturbed or altered. His model correctly predicted at what point lack of sleep will begin having an effect on cognitive alertness and performance.

Pete, tell us a little bit about your sleep research.

Pete:

Basically, test subjects responses to stimulus are measured with a computer. For example

how long does it take them to respond to stimulus by pushing a button after different levels of sleep?

Science is tricky, dolphins sleep with half of their brain which may be due to evolution. Fruit-flies take naps. Humans have to sleep in order to regenerate; they can't just sit and chill for awhile. They actually need to sleep in order to become more alert. This is hard to model mathematically. Every individual has different reactions with reduced sleep.

For instance my wife who is in medical school sometimes works 30 hour shifts during which she is expected to be alert and to perform procedures on patients. A lot of major accidents have happened due to sleep deprivation, Chernobyl, Valdez, a major plane crash in Guantanamo.

Who is funding your project?

Pete:

The project is funded by industries looking at the impact on employee scheduling like the mining industry, airlines, trains, and medicine. They really are trying to develop an understanding of work schedules on individuals.

What types of experiments are involved?

Pete:

There are basically two types of experiments. One is a sleep lab in which a test subject lives in a controlled environment for up to two weeks. The labs are like a small apartment but with no windows or outside influence. Once a baseline of 8 hours of normal sleep is established the subjects are then given up to 10 days of a varying sleep schedule. For instance 10 days of 4 hours of sleep and then the subjects are tested for their alertness. There are not a lot of data points because we try to reduce the number of variables in the environment. Some components of these types of experiments involve probes on the subject's brains or subjective tests like asking them how they feel.

A second type of experiment involves giving the test subjects watches to wear to measure their daily sleep and response time. For instance we may give an airline pilot a device to wear during his normal work day and measure his performance before and after the flight.

We really want to measure how long you can work without s degradation of performance.

This research endeavors to reduce the possibilities and probabilities of an accident occurring due to a lack of alertness.

My mathematical model correctly predicted at what level of sleep deprivation performance would diminish significantly. At about the level of only 4 hours of sleep alertness and performance significantly drop. These tests are hard to carry out on human subjects because with as little as 3 days of no sleep subjects could die.

What do you want to do in the future?

Pete:

I really would like to live in Alaska because it is not a soft place to live. Alaska is extreme. There is a wilderness connection with the environment. Most of it is undisturbed and is 95% remote.

Really all I want to do is research and publish. That is what I enjoy doing. It is all about my kids right now. Look at gas prices. It is really a hardship on teenagers. When I was a kid I could put a buck in the tank and go. Now that won't get you anywhere. Kids really

need help these days financially. It is a vulnerable place to be. College is expensive and the wages they get are pathetic.



Meet Mr. Wolf

Current record holder of 7 A's last semester and recent winner of the Computer Science Touch America Award

Peter Wolf is a senior in Computer Science. He came to Missoula after finishing half of his undergraduate degree at Flathead Valley Community College. Peter is from Whitefish Montana. He is interested in politics, history, economics, and of course computers. Peter likes to fish and play computer games. He is currently seeking a better game than WOW.

Peter, when did you first get interested in computers?

Peter: At age 10, the first time I saw a computer. I was in elementary school and they had them in the library. It just clicked for me. It made sense. I always liked math and science, CS is a part of that.

What do you want to do when you grow up?

Peter: (Laughs) I would like to be a professor, a PhD. The economy is horrible now; staying in school is a smart move for me.

What appeals to you about teaching?

Peter: A lot of it has to do with showing people how to use computers. A lot of people are really scared at first and they need more courage to try it.

What do you think is exciting about CS?

Peter: The endless possibilities. There are a lot of problems in today's world. The energy crisis, untapped resources, the ability to communicate all over the world will benefit humanity.

What do you think the downsides of technology are?

Peter: There is a tendency to make people solitary. There is no reason to call or even to walk down the hall to say hi. Communication with others solely on the computer isn't really healthy. There are also security issues. There are unethical people who would use it for their own means.

Tell me about the research you are doing with Dr Wright this summer.

Peter: We are examining the effects of evolution on the modular structure of networks. We use simulations as pseudo biological networks, there are cues from biology.

We are using software that simulates a neuro-network design. We study how modularity

changes over time. Will we lose modularity or gain it. It is similar to biology in the respects of breeding, mutation, individuals, predetermined natural selection. Generally, the top three are guaranteed to move on.

Once you start the program it won't stop. It is limited by the scope of the software. It will only evolve so far before it ends/plateaus.

Good News from the US Bureau of Labor for Computer Science Students:

Median annual earnings of computer and information scientists, research, were \$93,950 in May 2006. The middle 50 percent earned between \$71,930 and \$118,100. The lowest 10 percent earned less than \$53,590, and the highest 10 percent earned more than \$144,880. Median annual earnings of computer and information scientists employed in computer systems design and related services in May 2006 were \$95,340.

Median annual earnings of database administrators were \$64,670 in May 2006. The middle 50 percent earned between \$48,560 and \$84,830. The lowest 10 percent earned less than \$37,350, and the highest 10 percent earned more than \$103,010. In May 2006, median annual earnings of database administrators employed in computer systems design and related services were \$72,510, and for those in management of companies and enterprises, earnings were \$67,680.

Median annual earnings of network systems and data communication analysts were \$64,600 in May 2006. The middle 50 percent earned between \$49,510 and \$82,630. The lowest 10 percent earned less than \$38,410, and the highest 10 percent earned more than \$101,740.

Computer scientists and database administrators are projected to be one of the fastest growing occupations over the next decade. Strong employment growth combined with a limited supply of qualified workers will result in excellent employment prospects for this occupation and a high demand for their skills.

Employment change. The computer scientists and database administrators occupation is expected to grow 37 percent from 2006 to 2016, **much faster than average** for all occupations. Employment of these computer specialists is expected to grow as organizations continue to adopt and integrate increasingly sophisticated technologies. Job increases will be driven by very rapid growth in computer systems design and related services, which is projected to be one of the fastest growing industries in the U.S. economy.

The demand for networking to facilitate the sharing of information, the expansion of client-server environments, and the need for computer specialists to use their knowledge and skills in a problem-solving capacity will be major factors in the rising demand for computer scientists and database administrators. Firms will continue to seek out computer specialists who are able to implement the latest technologies and are able to apply them to meet the needs of businesses as they struggle to maintain a competitive advantage.

As computers continue to become more central to business functions, more

sophisticated and complex technology is being implemented across all organizations, fueling demand for computer scientists and database administrators. There is growing demand for network systems and data communication analysts to help firms maximize their efficiency with available technology. Expansion of electronic commerce—doing business on the Internet—and the continuing need to build and maintain databases that store critical information on customers, inventory, and projects are fueling demand for database administrators familiar with the latest technology. Because of the increasing reliance on the Internet among businesses, information security is an increasing concern.

The development of new technologies leads to demand for various kinds of workers. The expanding integration of Internet technologies into businesses, for example, has resulted in a growing need for specialists who can develop and support Internet and intranet applications. The growth of electronic commerce means that more establishments use the Internet to conduct their business online. It also means more security specialists are needed to protect their systems. The spread of such new technologies translates into a need for information technology professionals who can help organizations use technology to communicate with employees, clients, and consumers. Explosive growth in these areas also is expected to fuel demand for specialists who are knowledgeable about network, data, and communications security.

Job prospects. Computer scientists and database administrators should continue to enjoy [excellent job prospects](#). As technology becomes more sophisticated and complex, however, these positions will demand a higher level of skill and expertise from their employees. Individuals with an advanced degree in computer science or computer engineering or with an MBA with a concentration in information systems should enjoy favorable employment prospects. College graduates with a bachelor's degree in computer science, computer engineering, information science, or MIS also should enjoy favorable prospects, particularly if they have supplemented their formal education with practical experience. Because employers continue to seek computer specialists who can combine strong technical skills with good business skills, individuals with a combination of experience inside and outside the IT arena will have the best job prospects.

In addition to growth, many job openings will arise from the need to replace workers who move into managerial positions or other occupations or who leave the labor force.

(Dr Wright's interview Continued from page1-)

Where did you and your wife get your degrees?

Alden: My wife Sally and I both attended the University of Wisconsin Madison where I got my Math PhD and Sally got her Masters degree in Special Education. When we were moving here she got a job in Special Education at Hellgate.

What did you start out researching?

Alden: My main research focus when I began was Applied Math in the area of Homotopy X Points. When I came to UM I switched my focus to Artificial Intelligence.

What was it like when you first started teaching at UM?

Alden: When I first started teaching here I taught 131, 132, and 133. There were 200 students in once section of 131. I think the recent decline in students is due to the mistaken

perception that job prospects in CS are not so good.

Were there a lot of computers in the department back then?

Alden: Computers have changed a lot since then. Back then we had a grant for \$250,000 and we bought a MAC 750. The University only had a few computers mostly for data processing. Most PCs were not business standard. A few more faculty got PCs in 1984 and we bought a MAC 750 Ethernet card for \$20,000. We taught more advanced courses on a PDP 11/70 and a 11/40.

Was there a lot of software available at the time?

Alden: There was a structured programming movement at the time. PASCAL programming language just came out. I was on the University's Computer Users Advisory Committee or CUAC (sounds like quack). At that time spreadsheets were invented and word processors were coming out.

How did the classes differ?

Alden: Topics then were very similar to what we have now. Software Engineering, Programming Languages. Math was still an obstacle to students. It was a hard curriculum with long hours.

Was the University quick to adopt computers?

Alden: When IBM PCs came out they legitimized their use in Business. They lost control to Apple with PC clones. They were no longer IBMs they were PCs. In 1985 the University created its first computer lab. It was a symbol that the University felt it was essential to teach Business students that PCs would be standard in business. But, I think it is really only in the last 5 years that the number of people who do not have a PC are the minority.

Computers in Science are tremendously important. Historically it has been first and foremost for computation. Many of the hard problems in hard science, non linear mathematical models were impossible to solve mathematically. Computers enable models to be simulated. One of the most important areas is chaos theory, fractals. Numerical computation is essential. This month in Scientific American they talk about quantum gravity and how it is based on computational models.

I had a computer class in 1962, it was a math course on numerical analysis. The motivation was to simulate mathematical models. Pure math is least affected by computers. It is all theory and computers are not much help.

Computers have really transformed Science through the internet, communications, e-mail, search engines. You could credit computer science with all of that. Years ago scientists had to search for papers published through reviews. You had to go to the library and hope they had what you were looking for or get an interlibrary loan. Now you have search engines and you can collaborate.

Do you think the average American uses the computer for collaboration?

Alden: I think the average person collaborates to live life Communication is what

differentiates us from animals. Digital technology has transformed everyday life. Go back 100 years ago before telephones. People either had to go in person or send a letter. I don't think this has made people smarter (not in innate intelligence) on the whole. If you asked someone from the fifties all of the countries of the world and someone from now, there person from the fifties might do better. It has broadened things though. People now have unlimited access to every topic. They have the opportunity to interact with different social groups.

What do you see interesting happening in the future with technology?

Alden: The future is what is really interesting. I am interested in something called the "singularity" which is the progress in information technology which has been and will be exponential. In 30 years the rate of change is going to be astounding. It will be the most revolutionary combination of understanding. We will understand the human brain, nano technology, genetic engineering, artificial intelligence, robotics, and bioinformatics. In the short term we already have robotic vacuums, lawn mowers, janitors, hospital workers. There are going to be a lot of spin off areas.

What advice do you have to our beginning CS students?

Alden: My advice is you need to stay interested in the subject and keep up. Not because you ought to but because you want to. You need to find new things that keep you excited. From the time I was 6, I was driven by curiosity about how things work. Learning about new things. That is my core philosophy of life. I am curious and I like to learn new things-like science.

Do you see yourself as a Scientist?

Alden: I have always considered myself a scientist. My interest began at 6 or 7 years old. I was always good at math and really liked it. If I had it to do over again I would of worked toward a more applied math like mathematical biology.

How do you keep in such good shape?

Alden: This is the 40th anniversary of the publication of Aerobics by Ken Cooper. It was published in 1968 and pushed the benefits of more systematic physical activity. When I read this book I decided it would become part of my life.

I am not particularly better than anyone at physical activities. I really have no innate special ability. I have just been doing it consistently for 40 years. At first running was my primary activity. I did that for about 10 years along with biking, canoeing, kayaking and hiking. I was training for a marathon and discovered I had some serious back problems. After seeing the x-rays I decided that running really wasn't the best thing for me so I switched my focus to biking, hiking, canoeing, rafting, and kayaking.

I have actually been biking for 60 years. It has always been something I enjoyed. I remember taking my son to the doctor in the wire baskets on the back of my bike and the receptionist called my wife and told her I shouldn't really do that. I ride my bike to work every day it is around 7 miles round trip. I meet with my mountain bike group every Thursday and we do rides. Most weekends I either ride my bike or hike. I am a member of the Rocky Mountaineers. In the winter I cross country ski that is where I do serious

riding. I usually do around 3 or 4 races a year which includes a 50k. I've done some long bike rides to prepare for the marathons. We did one from Deer Lodge to George Town Lake and then back to Deer Lodge.

What are your plans for retirement?

Alden: I will stay on at the University as a Research Professor. I will keep my office and keep working. I won't have any more 8 O'clock classes so I can sleep in once in a while. My wife wants me to play duplicate Bridge. I will have a lot more time to read and might even have time for a novel or two. I'm really fascinated by what is going to happen in the future and I think my curiosity will keep things interesting. I like to try new things so I am looking forward to it.