

# CSNews2010

Western Washington University Department of Computer Science



## SWIFT CREEK OBSERVATORY MINING DATA IN THE GREAT OUTDOORS

As a field of study, computer science provides a wide range of research applications and CS faculty are often involved in interesting projects that provide unique professional challenges that go beyond the more apparent responsibilities of classroom lecturing, grading and advising. Currently, Dr. Martin Granier, from the CS Department is pleased to be working with Dr. Scott Linneman from the WWU Geology Department on a WA State Department of Ecology grant entitled “Establishing the Swift Creek Landslide Observatory.”



The goal of this project is to provide a mechanism for remotely photographing and monitoring the erosion of a Sumas Mountain landslide located near the headwaters of Swift Creek, a small torrent on the flanks of Mount Baker. This particular landslide, located in northwestern Washington, is of special interest because it releases up to 120,000 cubic yards of excess sediment into Swift Creek each year. Interestingly, the slide material contains deposits of naturally occurring asbestos, and once in the Creek, the sediment flows down into the Sumas River near the town of Nooksack in Whatcom County, Washington, then to the town of Sumas, and finally, across the border into Canada.

Dr. Scott Linneman, Associate Professor of Geology at WWU, has studied the Sumas Mountain landslide for several years. Furthermore, since 2009, the EPA has been working with local, state, and federal agencies on a safe, long-term management plan for sediments coming from Sumas Mountain. It is now well understood that when asbestos becomes airborne, it can be breathed into the lungs thereby increasing the risk of developing asbestos-related diseases. Unfortunately, measurements have confirmed that elevated asbestos levels bordering the creek reach from Sumas Mountain to as far as the Canadian border.



The risks associated with asbestos needs to be monitored by many agencies, and Dr. Granier is working with his students to provide a useful web-based interface designed to help all responsible parties receive and interpret the data coming from the landslide in a useful and timely fashion. Utilizing photographic images to document the erosion, the ultimate goal is to provide federal, state, provincial and local agencies with the necessary information to help manage the problem and seek solutions for issues related to the Sumas Mountain landslide.

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### Keeping in touch!

This 2010 Edition of the CS Newsletter is our means of keeping you abreast of some of the activities taking place within the CS Department of Western Washington University. If you would like to share news for upcoming issues, please send a note to [csnews@cs.wwu.edu](mailto:csnews@cs.wwu.edu).

Your continued involvement helps to make our programs stronger and the CS Newsletter is our primary way of keeping in touch with you.

Letter from the Outgoing Chair, 2010

With my term as department chair ending in June, I find it interesting to reflect on the past eight years that I have served in that position. The department has changed significantly during that time. The most significant change has been the move from Bond Hall to the Communications Facility during the summer of 2004, providing a wonderful work environment for faculty, staff and students. The curriculum has undergone continuous change during that period as we strive to improve the program to meet the needs of students and their future employers. The department's personnel situation has been very stable. We have had just one change among the staff and one change among the faculty, with Gary Eerkes retiring after 21 years of service and replaced by Perry Fizzano.

Looking to the future, the department faces serious challenges. With the retirements of Saim Ural this year and Martin Osborne next year, the department loses not only their personal knowledge and experience but also loses at least one of those faculty positions. We will need to accomplish more with fewer resources. Employer demand for our graduates is increasing without a matching increase in student interest in the Computer Science major. We need to find ways to attract more students into the program. We value our ABET accreditation as a stamp of quality on the program but need to implement systemic program assessment to help us identify opportunities for improvement and to meet the increasingly stringent requirements of accreditation.

As outgoing chair, I thank the faculty, staff, and members of our external advisory board for their cooperation, help and advice, and I offer my best wishes and support to the incoming chair, Geoffrey Matthews.



Dr. David Bover, Outgoing  
Dr. Geoffrey Matthews, Incoming

COMPUTER SCIENCE FACULTY

The Computer Science Department currently has 13 faculty members. In the future issues of this newsletter, faculty profiles will introduce all of them.



Phillip Nordwall has been involved with the CS Department for the last 12 years. He initially completed his BS in Computer Science with minors in Physics, Mathematics, and Chemistry and is currently completing signal processing research for his Masters in Computer Science. Phillip served as the CS Department's Systems Administrator for 7 years, and has been the Systems Manager for the last 3 years. When asked about his involvement with the CS Department Phillip replied: "I love the challenges of running a team, to support such an actively changing and technical curriculum. It also enjoy the fact that I am contributing to public education and hopefully making the future a better place for my three children."



Sam Hansen currently holds the position of Systems Administrator for the CS Department. In June of 2008, he graduated from Western with a double major in Computer Science and Electronic Engineering Technology. He has been working as a full time employee for the Computer Science Department since October of 2007. When asked about his work Sam replied: "I absolutely love what I do! Systems administration requires a substantial breadth of knowledge and is constantly putting my analytic abilities to the test. I provide direct support for the students, faculty and other staff members on an ongoing basis. Working for the department has been a real pleasure and I look forward to the unique challenges my job places on me."

Letter from the Chair-Elect, 2010



Department Chair and  
Incoming Department Chair

David Bover has done an excellent job chairing our department for the last eight years. We wish him well in his new career as a full-time faculty member, and I know the students will be well served by him in class. It is with a great deal of excitement that I take on the job of chair. I have been a faculty member here for twenty-five years, and I look forward to the chairmanship and the opportunities it will provide. Some of the challenges I see for the immediate future include:

- First, make the CS major more flexible, by reducing the size of the core and providing more electives. I hope that this will provide a more attractive program for potential students, and also make it easier for them to finish the program within four years. It should also give the faculty more time to teach the topics that engage them most.
- Second, attract more women and minorities. Making the major more flexible should help, but we also need to get out into the community colleges, high schools, and community events to increase our presence.
- Third, attract more graduate students. The best way to accomplish this is to give our faculty research programs more publicity, so that undergraduates in other institutions hear about us and want to come here for graduate work.
- And finally, attract more funding. The current budget crunch shows us we need to look outside of the university for money to expand the program.

None of this will happen without a lot of dedicated work by our faculty, our staff, and our students, and a commitment from all of us to a growing, vital computer science department.

I will do everything I can to help bring this vision to reality.

## FACULTY AND STAFF PROFILES

members, plus four administrative staffers who keep the place running.  
of the CS Department employees. See below for this year's installment.



**D**r. Geoffrey Matthews is engaged in research in two major areas. First, he does research in applied data analysis, machine learning, and data mining. He focuses on making the results of data analysis simple and intuitive. Many modern techniques, such as neural nets and support vector machines, result in models that may have good performance stats, but are inherently incomprehensible. They are black boxes; they do not lead to a deeper understanding of the phenomena they are intended to model. Dr. Matthews believes that machine analysis of data should be an aid to scientists, and enable better understanding of the phenomena, or point the way to further research. He and his students have developed algorithms using this philosophy, or adapted existing algorithms to fit this philosophy, and applied them to real world problems in data analysis.

Second, Dr. Matthews does research in procedural generation for graphics and games. Procedural generation involves creating artistic or realistic phenomena by computer. Rather than an artist or an actor creating the backgrounds and motions for computer avatars, an algorithm can create interesting images or actions by following rules. Fractal Brownian motion is a well-known example for creating mountainous terrain, or adding a dusty, dirty look to a texture. Ragdoll physics is an established way of making a game character fall to the ground in a realistic manner. Dr. Matthews and his students are using ideas like these to create buildings: castles, houses and infinite dungeons. They have also generated Celtic knots, and are beginning to study rule-based animation, with a test bed of Latin dance motion as our first case.



Dr. Perry Fizzano is involved in research related to Information Retrieval and Computer Science Education. Three students earned their Masters degree under his supervision in 2009. Pedro Huitema built a crawler for a Bellingham specific search engine. Adam Burkepille implemented a machine learning technique to automatically judge stories from RSS feeds as relevant or not based on a reader's past interests. Matt Mullins built a system called Treelicious which was aimed at helping users to semantically navigate web pages using tags from the Delicious website.

Dr. Fizzano is currently working with a colleague at the University of Washington on an educational research project aimed at increasing the retention rates of women and minority students in the discipline. He implemented some of the techniques developed in this research project when he taught CSCI 141 in Spring 2010. He also took part in an innovative teaching workshop in the summer of 2009 which he feels had a positive influence on his teaching style because it gave him a number of strategies to effectively engage students in the classroom.

Apart from school, this was a busy year for Dr. Fizzano. He's been involved in creating a cooperative housing project with some old and new friends. They purchased a piece of property in the Happy Valley neighborhood in 2008 and have successfully worked their way through the city's labyrinth of permitting rules and should be breaking ground on the project this spring. He also serves on the Board of Directors for the Community Boating Center and he continues to regularly sail and kayak the waters of Bellingham Bay and beyond.



Dr. Martin Granier has been a faculty member at Western for over 12 years and has been Director of the interdisciplinary Internet Studies Center (ISC) since 2000. His primary areas of interest are in Web technologies and Web development. Above all, he loves teaching, advising and interacting with the students who keep him in touch with our ever-changing world.

Since 2000, Dr. Granier has been helping business, governmental agencies and non-profit organizations meet their Web related challenges with the assistance of student interns from the ISC. This program enables the students to gain professional experience using Web-based technology and methodologies as content developers, Web programmers and Web site managers. Locally, and in locations as far away as New York and Hawaii, more than 300 students have pursued internship projects in art, commerce, legal, medical, engineering and other fields. It never ceases to amaze Dr. Granier how quickly the technology evolves and how eager the students are to meet the challenges. Their enthusiasm and eagerness to gain hands-on experience is a great source of motivation, pride and satisfaction for Dr. Granier.



Looking back over his 40-year professional career, Dr. James Johnson sees a truly tortuous road. As a young electrical engineer, he worked on guidance systems for the Apollo space mission, but decrying the practitioner's lack of theoretical foundation, he soon returned to graduate school. There he vacillated among Physics, Engineering, and Mathematics, finally taking a mathematics Ph.D. in the mid-1970s. Dr. Johnson became Assistant Professor Johnson in the Mathematics Department at Western Washington University, taking up his initial duties in the fall of 1981. Computer Science, such as it was in those days, was housed in the Mathematics Department, and the associated courses dealt almost exclusively with programming. There was a rapidly growing body of theory underpinning the subject, and Dr. Johnson

set about learning the details. It happens that mathematics is good training for learning computer science, and a great many other subjects as well.

In the present day, Professor Johnson finds precious little discretionary time beyond his teaching duties. It seems as though a time warp has transformed 100-hour days into 10-hour days. In any case, he teaches courses that need an instructor, while preferring the theoretical offerings. He continues to offer the occasional course in probabilistic methods, primarily randomized algorithms, although finding an enthusiastic audience has proved difficult. He is currently probing a probabilistic characterization of relational normal forms as an entropy-maximizing process. He continues to accumulate notes, thousands of pages at this point, with the intent of writing a second probability theory textbook, although, with apologies to Marvell, time's winged chariot hurries near, and the day continues to disappear...



During the current academic year, Dr. David Bover has been very involved in program assessment, not only in his role as an ABET program evaluator, but also in formulating and implementing a program assessment methodology for the department and in advising several other departments on how they may meet the increasing assessment requirements for institution accreditation.

He has initiated contacts with several industry partners, community groups and non-profit organizations with the aim of identifying projects suitable for the CS Department senior project courses. This has been very successful in the industry sector, which is now the source of most of our projects, but more work is still needed with the non-profit sector.

In the spring quarter, Dr. Bover will be presenting the new required graduate course on operating system internals. The aim of this course is to expose students to the inner workings of an operating system and have them work on kernel modifications. In considering alternative operating systems for such intensive study, he was initially attracted to OpenSolaris because of its advanced features and excellent dynamic trace capabilities. However, he now plans to use FreeBSD, as it is completely open source, more amenable to this type of study and contains open source versions of the advanced features from OpenSolaris.

Dr. Bover looks forward to more time for teaching and research as he steps down after 8 years as the CS Department Chair.

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Dr. Ural came to Western's Mathematics and Computer Science Department in 1979 from Middle East Technical University, Ankara, Turkey, where he was an Assistant Professor of Computer Engineering. He was hired to teach Numerical Analysis courses. Since then he has taught a wide variety of courses including Data Structures, Database Theory, Programming Languages, Modeling and Simulation, Computer Graphics, Image Processing, Computer Animation and Cryptography.

During his 30 years at Western he started some of these courses amongst which Computer Graphics (with Dr. Fred Ives), Image Processing, Computer Animation, Cryptography, and various versions of Windows Software Development should be mentioned. Since he came to Western he published a number of articles and papers and a Modula-2 programming book that he co-authored with his wife Suzan Ural.

He supervised many students who completed theses/projects on subjects such as Fractals and Hypercomplex Numbers, Dynamic Cloth Simulation, Steganographics Techniques in Cryptography, The Application of Chaotic Functions to Cryptography, Perceptual Photon Mapping, and so on. Although he will be retiring at the end of the 2009-2010 academic year he plans to be active in the field, and he is one of the investigators of "Artists Using Mathematics and Computer Science to Create Art: Getting High School Students Excited About Computer Science", a \$250,000 project proposed to NFS at the beginning of this academic year.

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Dr. Martin Osborne is speeding up after a mere 33 years at WWU (sort of a sprint to the finish). He continues to collaborate with Dr. Ken Lambert of Washington and Lee University on language textbooks, the most recent of which, published in 2009, is "Fundamentals of Python: From First Programs Through Data Structures."

For the last eight months, he has collaborated with Cody Baxter (a computer science major) and Christopher Niar (a friend) in building a large HO scale model railroad in one of the Department's labs. This year students in our senior level software development sequence (491, 492, and 492) are analyzing, designing, and implementing a real time software system to control trains that run on the layout (fingers crossed). Once the system is operational, the Department plans to use it as a test bed for students writing concurrent systems and as a framework for graduate research projects.

So far, this year's teaching highlights have been a graduate course on automata theory (which actually is useful) and 492 (systems design). When he is not getting ready for class, Dr. Osborne likes to work out on the climbing wall in the Wade King Recreation Center, where despite his years, he can still keep up with students who have had up to two weeks of climbing experience.

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# Playing with Trains

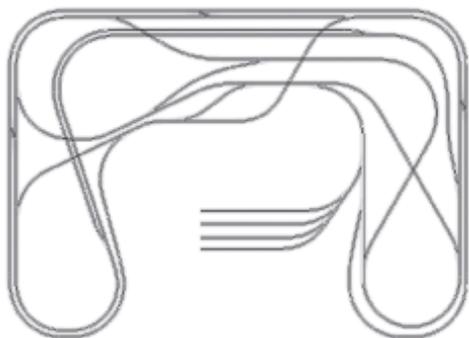


From left to right: Chris Austin, Robert Bjerke, and Thomas Beirne

When you think about all the ways students could practice real-world software design skills, one might first think of the hottest new video games, or exciting new concepts from the local aerospace industry. One might not immediately think of model trains, but that is exactly what some Computer Science seniors are working on this year at WWU. As part of the 490 series (a series of classes designed to replace the *Senior Project*), a team of students are collaborating over a period of three quarters on the analysis, design, and implementation of a software project.

One of this year's projects is called AdaRail, and is intended to be a train safety management system for model trains. Specifically, it is designed to allow for the safe operation of any sort of model train system, from the simplest to the most complex. It will act as a sort of safety net for the train operator, controlling the various switches on the track, ensuring that the various trains traveling on the tracks do not get damaged, by halting any impending collisions and limiting the speed a train is capable of traveling. To this end, the Ada language has been selected to implement the project, as it is a language specifically designed for embedded and real-time use. Indeed, it is very important to make sure that no errors or bugs be introduced during the programming phase which could result in potentially disastrous operational problems.

This project started Fall quarter 2009, in CSCI 491, *Software Project Analysis*. In that class, Aaron Brendehl, Johnathon Mohr, and Warren Weber worked together to analyze the requirements of AdaRail, in order to create a requirements specification document for the project. This document was then passed on to the students in CSCI 492, *Software Project Design*. Chris Austin, Thomas Beirne, and Robert Bjerke (pictured) developed a software design document working from the requirements specification created in CSCI 491. In Spring quarter, the design document was passed on to the students in CSCI 493, *Software Implementation*. At this stage, the system is being implemented, based on the analysis and design documents provided by the students from the two previous quarters.



The final product of this whole endeavor, however, is not simply a train safety management system. Building a test track is a large investment of time, space, and money. An entire classroom is occupied by the test track, and 9 students over a period of three quarters have been working on the implementation of this project. The hope of this project, beyond preparing seniors for real-world development, is to create a highly modular in-house code base that can be extended, modified, and built upon by future students in the 490 series, or as projects in classes such as CSCI 322, *Principles of Concurrent Programming*. In addition, it can be used as a marketing tool by the Computer Science Department to attract students to WWU.

## AWARDS AND SCHOLARSHIPS

*Congratulations to all the  
2010 CS Scholarship Winners!*

*Boeing Award*  
Thomas Beirne

*Oscar Olson Award*  
Spencer Hutchinson

*Kaiser-Borsari Computer Science  
Graduate Fellowship*  
Phillip Nordwall

*Kaiser-Borsari Computer Science  
Graduate Fellowship*  
Jeffrey Wimpee

*Alumni/Friends (TAG) Scholarship*  
Mai Nakadachi

*David Cole Endowment Award*  
Mai Nakadachi

*CS Department Citizenship*  
Megan Ferland

*David Massey  
Computer Science Scholarship*  
James Jensen

*Lars and Elaine Guisti  
Scholarship*  
Kellen Rosburg

*Logos Bible Software*  
Rebecca Smith

*Track Global Graduate Scholarship*  
Rusty Gerard

*Scottish Rite Foundation Scholarship*  
Luke See

*Scottish Rite Foundation Scholarship*  
Ruiko Wada



*Ruiko Wada*



*Spencer Hutchinson*



*Phillip Nordwall*



*Jeffrey Wimpee*



*Mai Nakadachi*



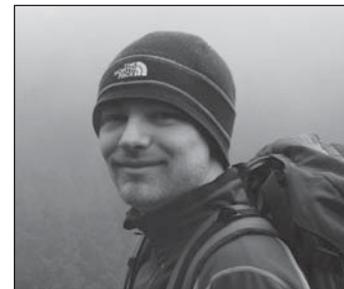
*Rusty Gerard*



*Rebecca Smith*



*James Jensen*



*Kellen Rosburg*



*Megan Ferland*



*Luke See*



*Dr. Perry Fizzano*

**Congratulations**

**Dr. Perry Fizzano!**

During the annual student faculty picnic, the ACM Student Chapter recognized Dr. Perry Fizzano as their choice for the 2009 Annual Outstanding Computer Science Instructor Award.

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*Continued from page 1*



“It is a very interesting study” says Dr. Granier, “not only because the landslide is located in a remote and seemingly pristine environment that makes hiking to the site both exhilarating and challenging, but also because of the potential importance of the data being gathered. It is absolutely critical that the information be provided to the right people in the best way possible. Outside of the obvious technical challenges posed by the

remote location, we also deal with a variety of users, and we need to provide meaningful information to very different groups, from the EPA and the sheriff’s office, to government agencies in British Columbia.”

Dr. Granier’s students share with him the excitement generated by observing these powerful flood hazards. Senior Tad Harris, who works on the user interface observes that “this valuable project offers a number of opportunities to students who are trying to grab the data and present it in a timely and user-friendly fashion.” While the technical challenges are great, those involved in the project never lose sight of the fact that people’s health and well being, as well as the potential implications for things like forestry and salmon habitats, are the real motivators behind this particular study.

## CREDITS

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