



Dr. Daniela Damian leader of the Software Engineering Global interAction Lab (SEGAL)

IN THIS ISSUE

Dr. Daniela Damian looks past the computers to the computer scientists

Ten years ago, teams of software developers cooperating from around the globe would take 2.5 times longer to resolve issues when developing a product than similar teams gathered in one office. These days, globally distributed software groups are much more efficient than they used to be. Still, they are not as fast at developing software as a group of people who can pop their heads over cubicle walls to talk to each other.

This is the sort of thing that Dr. Daniela Damian measures. Damian is an Associate Professor in the Department of Computer Science, and an IBM Visiting Fellow. Her research has a unique multi-disciplinary twist: not only does she study and develop software-development programs meant to help computer scientists cooperate on projects, she studies the computer scientists themselves. She's interested in how programmers work – and how they could work more effectively.

To do this, she uses the sociology techniques of social network analysis to characterize communication behaviour in groups. For example, in one recent project, Damian

tracked and “mined” the threads of communication between programmers in different countries, who were building IBM's Jazz™, a piece of software that helps programmers cooperate in geographically distributed software teams. Damian used the records of communication in Jazz™ to ask such questions as: are there patterns in their coordination across teams and geographical locations? Do people from same culture start forming local communication clusters? What kind of communication gaps lead to bugs?

Damian's goal is to help programmers develop skills that would overcome natural communication problems that tend to worsen across time zones, skills that are becoming critical in today's software global industry. Her research has immediate benefit to UVic's students. For instance, in one of Damian's graduate courses, Global Software Development, students joined two international software projects spread between Canada, Italy and Australia. The course exposed students to the challenges of working with other cultures and time zones.

- 1 Dr. Daniela Damian looks past the computers to the computer scientists
- 2 Message from the Dean
- 2 Software Engineering: Insights to-go
- 2 Views from the Subatomic Universe
- 3 Alumni Profile: Dr. Michael McGuire develops a way to locate cell phones indoors
- 4 Student Team Success
- 4 Perhaps FIFA requires a logician?
- 4 Faculty News



Welcome to the fall 2009 edition of "EngineeRing" the Faculty of Engineering Alumni Newsletter. We hope you enjoy the opportunity that this publication provides to keep you up to date on what is happening in the Faculty. Another way to stay in touch is to attend an alumni event in Victoria, or less frequently in other major cities in Canada. I can recommend these events based on my own experience.

Last spring we had the inaugural meeting of our new External Advisory Committee consisting of senior representatives from industry and government. Representatives of the Faculty had a lively discussion with the committee and as a direct result of this meeting we are planning a mentoring program similar to an existing program in the Faculty of Business in which fourth year undergraduates are matched up with volunteers from the community with shared career interests, who have "been there already".

Also new this year is a first year design and communication course in which first year English is integrated with engineering design. This gives students an opportunity to improve their writing skills while working on a design project. We are optimistic that this new approach to learning design and communication, which will start in January, will be more enjoyable and a better learning experience than the traditional format. We have an enthusiastic team working on the development of the new course, led by Dr. Peter Wild of Mechanical Engineering and Dr. Susan Doyle from the Department of English.

Continue reading for more news!

- Tom Tiedje
P.L.D., FRSC, P.Eng.

Software Engineering: Insights to-go

You can now listen to some of the UVic Software Engineering professors and course highlights on your mp3 player or internet browser.

Software Engineering has started a podcast program to capture various software engineering related topics and discussions, and what it is like to study and live in Victoria. Hence, the podcast is named, "SEng on the Beach". The podcasts kicked off with a course series that includes an introduction to software development methods, games, security, web applications, design principles, quality assurance and project management.

Professors and students featured on the podcast discuss how the degree program offers hands-on experience to build large industry-scale software, while coordinating with teams; what kind of transferable skills students can bring from their academic learning directly into their post-graduation employment, or help them find the type of employment they want.

According to the US Department of Labour, computer software engineers are projected to grow the fastest among all engineering disciplines and add the most new jobs over the 2006-16 decade.

Do you have a story to contribute to SEng on the Beach? Please email engralum@uvic.ca to get involved with the podcasts.

To listen to the podcast, please visit <http://podcast.seng.uvic.ca>.



Views from the Subatomic Universe

The highest resolution microscope in the world will soon make its home in the Bob Wright Centre – Ocean, Earth and Atmospheric Sciences Building at the Advanced Microscopy Facility (AMF). Jointly funded by Hitachi High-Technologies, the Canada Foundation for Innovation, the BC Knowledge Development Fund, and the University of Victoria, the Scanning Transmission Electron Holography Microscope (STEHM) will take three years to build with a completion date of spring 2011. Manager, Dr. Elaine Humphrey, and principle trainer and operator, Adam Schuetze, will be offering training workshops and technical services to researchers from a range of fields including biology and materials engineering.

Dr. Michael McGuire develops a way to locate cell phones indoors

It is touted as the next big thing for smart phone users, and indeed, it is hard to imagine how it hasn't taken off already: Internet services that use geographical information to tailor information based on a cell phone's location.

UVic engineering alumni and signal processing expert Dr. Michael McGuire is working on the technical challenges of pinpointing cell phones indoors, which would extend location-based services that are already starting to proliferate for iPhones and Blackberries.

McGuire is an Assistant Professor with the Digital Signal Processing Group in UVic's Department of Electrical and Computing Engineering. McGuire, who did his PhD at the University of Toronto (designing algorithms to overcome blocked GPS signals) says he was drawn back to UVic because ECE was so "quick out of the gate" to tie together research in signal processing and new communication systems.

McGuire is focusing on indoors localization because outdoors, the challenge of locating phones is essentially done through the use of GPS receivers. Indoors is a different story, however, because walls and ceilings block radio signals between the phone and the satellites so effectively. The best that current GPS technology can do is pinpoint a cell phone to a particular building, even if that building is the size of a multilevel shopping mall.

Part of the challenge indoors is the uniqueness of how signals are blocked in each room, McGuire explains. Thus, McGuire and his students are using that uniqueness to their advantage. They are experimenting with creating maps of rooms based on collecting radio signal strength patterns, which can then be used to identify and locate a radio signal from a user's phone. Initial results show that it is feasible to create an indoor map that would allow a system to locate a phone within three to four metres.

This is would be a huge improvement and perfectly adequate for one important application of locating cell phones indoors: finding people in medical distress.

"Three to four metres would allow medical personnel to know what room you are in, which makes them happy and you safe," says McGuire.

Installed to date is a scanning electron microscope (Hitachi S-4800 FESEM) with one nanometer resolution for looking at the surfaces of specimens, complete with a backscatter detector for topographical and elemental imaging and an X-ray spectroscopy detector for chemical analysis. Also installed for specimen preparation are a focused ion beam system (Hitachi FB-2100 FIB) to selectively cut nanoscale specimens from bulk samples and a plasma cleaner to remove contaminants from specimens. The specially constructed laboratory maximizes image quality by isolating the instruments from mechanical and acoustic vibrations and from stray electrical and magnetic fields.

See the AMF's website at <http://www.stehm.uvic.ca> for further information.



Photo: K. Hollefreund

Dr. Michael McGuire in the Digital Signal Processing Lab

What does location mean for Internet services?

Dr. Michael McGuire gives it a year before Internet content providers fully take advantage of the latest technologies that allow them to target information to outdoor cell phone locations

“ The capabilities of this microscope are awesome—it's really like having 100 microscopes in one ”

*- Dr. Rodney Herring
UVic associate professor and lead researcher*



Dr. Yang Shi, Department of Mechanical Engineering

Dr. Yang Shi joined the Department of Mechanical Engineering and the Applied Control and Information Processing Lab in August '09.

The Faculty welcomes Dr. LillAnne Jackson and Dr. Hausi Muller to their new roles as Associate Deans of Undergraduate Programs and Research, respectively.

Correction: In the last newsletter, Dr. Jianping Pan was credited with the new title for our Alumni Newsletter, *EngineerRing*. Dr. Pan's suggestion was "Engineer:Ring" which was later modified by the editorial committee. Thanks to Dr. Pan for pointing this out. Dr. Pan donated his prize to the Engineering Students' Society, Order of Pi, benefiting the Queen Alexandra Foundation for Children.



Were you or someone you know involved in Science Venture?

In 2010, Science Venture turns 20! Please contact sciealum@uvic.ca with your stories and photos as a camper, instructor or parent.

Student Team Success

Last spring, media across Canada celebrated UVic's EcoCAR Team, who earned the right to design a green-vehicle architecture for EcoCAR: The NeXt Challenge.

The media was most excited by the car itself and what it means for future fuel-efficiency, The team was second place overall among 17 teams from Canada and the US, with three first prizes in MathWorks modeling, electrical systems and technical reports

For such a prestigious international competition, this is a spectacular success for the 25 person team led by Jeremy Wise. The competition runs for three years, so the team is now working hard on the next challenge: integrating new technology into a Saturn Vue.

In another area, our six-person Autonomous Underwater Vehicle (AUVic) team won second place at the 12th annual AUV Competition this summer in San Diego.

To put this in perspective, they beat 28 teams and were only bested by Cornell University.

Winning these prizes will give our students confidence that the design skills they are learning now at UVic are top level. We expect we'll see more prizes to come. Keep up the good work.

Perhaps FIFA requires a logician?

It was one of those quirky stories that hit a humorous chord. Computer Science graduate student Aaron Williams informed the Fédération Internationale de Football Association (FIFA) that they had some ambiguous logic in their tournament rules that could create a potentially riotous situation given the right tie-breaking scenario.

He first presented the soccer scenario to students in his third year computational logics class, who couldn't agree on an outcome. "They were completely divided, passionate with each stance," says Williams. He then consulted with both the Canadian Soccer Association and FIFA themselves – and got back two different answers. FIFA maintains there is no problem, because the organization has its own interpretation of the rules. Williams finds this response unsatisfying. He cringes at logical ambiguities in the same way an editor disdains a misplaced apostrophe. "It stands out. It is terrible – dreadful," he says. However, it does present a good learning opportunity for his students.

Try the scenario yourself at William's website.

<http://webhome.csc.uvic.ca/~haron/FIFA/index.html>



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