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UNIVERSITY OF WASHINGTON BOTHELL

COMPUTING & SOFTWARE SYSTEMS

Bits & Bytes

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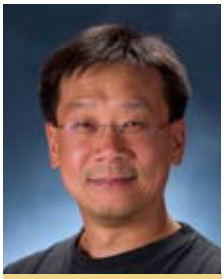
How to Put the Fun (Back) Into Programming



Kelvin Sung

As part of their responsibilities, Computing & Software Systems faculty pursue a wide variety of research topics. Prof. Kevin Sung has been awarded two grants to fund his research, From Microsoft Research (MR) and the National Science Foundation (NSF). Recently, we had him answer a few questions about his current work integrating gaming into basic programming education, and how he's trying to change the face of computer science education.

How does integrating gaming into a basic programming course work? What would students be doing?

Computer video games are complex, but they are built based on foundational computer science concepts. Instructors can use two basic and opposite approaches to integrating gaming and programming course work: computer games perspective, vs. computer science concept perspective.

In the first case, designing and building video games become the central theme of a programming course. Students examine the requirements of a video game, study the computer science concepts required, and finally design/implement the concepts in to fulfill the video game requirements. This approach has great appeal to younger generation of students.

In the second case, students study computer science concepts within the context of computer video games. The curriculum of the traditional programming courses remain the same, but the instructor utilizes new and "more interesting" gaming examples to illustrate a lesson.

How does this improve a student's programming abilities?

The ultimate goal of a teacher is to excite and motivate students. My hope is that students will enjoy doing the computer-gaming assignments more than they would a 'traditional' assignment. I am of the opinion that, integrating computer gaming in classes actually makes programming more difficult – but it also makes it more interesting. And because they end up investing more time in the work, they learn more as a result.

What if the instructor of a programming course doesn't have a strong background in gamming?

For faculty members with no computer graphics or gaming background, it can be especially challenging to adopt the "computer gaming perspective" approach to integrating video games in programming

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Letter from the Director

Dear Alumni and Friends of CSS,

On behalf of the Computing & Software Systems Program, I'd like to extend our warmest greetings and share with you some of the Program's major news. Let me start out by introducing myself. I'm Mike Stiber, an Associate Professor who has been in CSS since 1997 — almost its start. Before coming here, I was at the Hong Kong University of Science and Technology and the University of California, Berkeley. My research areas focus in the intersection of Biology and Computer Science, investigating how biological systems (like us) can perform everyday computations (like seeing, walking, or even digesting food). I live only a few miles south of UWB — close enough to easily commute by bicycle — with my wife, two daughters (ages 9 and 10; my daughters, that is), and small dog.

A new academic year has started here at UWB, bringing with it the promise of big changes to the campus and to the CSS Program. You may have heard of the UWB 21st Century Campus Initiative. Parts of the initiative — the creation of a Science and Technology Program and an Electrical Engineering degree — are well underway as I write. We in CSS are deeply involved in this exciting work: it isn't often that a university gets to create such a large part of its curriculum from scratch. These events will also bring great changes to CSS (new students and new classes, to just scratch the surface).

I also want to take a moment to recognize and thank Chuck Jackels for work he has done these past eight years as Director of the Computing & Software Systems Program. Under his leadership, we have seen growth in enrollment, the creation of our exciting new Applied Computing degree the creation of our Masters of Science in CSS, and our successful review by the University of Washington graduate school. I know Chuck is looking forward to new challenges as he assumes the position of Vice Chair of the General Faculty Organization for our campus. He has done an amazing job in the top spot for the last several years; it will be a great challenge for me to try to fill his shoes.

As you read the rest of Bits & Bytes, keep in mind that these four pages are just a taste of what we're up to. We want you to think of CSS as your Program, whether you're a former, current, or future student one of our industrial, community, government, or educational partners. Don't hesitate to contact us with your comments, questions, or news for fellow classmates. As "the new guy", I hope that I will be able to look to you as a friend of CSS to help me, and the whole program, with advice, inspiration, and support as we create a new program to educate the computing professionals of the 21st century.

Sincerely,

Dr. Michael Stiber
Director and Professor

Congratulations to Our Most Recent Graduates!

Bachelor of Science in Computing & Software Systems

Kevin Archer
Ryan Bergan
Ralph Blakely III
Zachary Brownell
Aaron Burke
Evan Bruce
Bouhan Chu
David Cichy
Kevin Erickson
Dan Frost
Daniel Geller
Kenneth Goodhope
Jana Harper
Michael Hoak
Benjamin Jurecic
Daniel Kiepfer
Henry James Lyons
Dmitriy Lakhter
Tri Minh Le
Ryan McMillan
Anloc Luong Nguyen
Celia Parker
Roxanne Pascua
Howard Ramsdell
Nathaniel Schmoll
Camden Thatcher
Darlene Van Damme
Kim Volz
Jesse White
Nathan Wolke

Bachelor of Arts in Applied Computing

Christian Alexander Setiadi

CSS Updates | *A quick snapshot of what your CSS Faculty, Staff, Alumni and students are doing!*

CSS Alum Fumitaka Kawasaki recently journeyed to Montevideo, Uruguay to present his work in the 7th Annual International Neural Coding Workshop. At the conference, Fumitaka was able to discuss his cooperative education project, "Liquid state Machines as Models of Cortical Neuron Cultures"

Fumitaka chose the faculty research option for his cooperative education requirement. His research with Dr. Michael Stiber studied the effects of individual neuron activity, cell culture development, and neural network behavior into a liquid state machine. As part of Dr. Stiber's grant from the National Science Foundation, Fumitaka was able to journey to Uruguay to take part in the Neural Coding Workshop.

"The biological topics discussed in the workshop, were a little unfamiliar to a computer science student like me" admitted Fumitaka, "However, because of the interdisciplinary nature of the subject, some topics were very interesting. I'm interested in the way mathematical analysis is adopted in biology. The experience of the workshop gave me a motivation for my academic quest."

Fumitaka hopes to continue his research in graduate school, where he will study computation neuro-science.

Professor Clark Olson is on sabbatical for the academic year. During his time on leave, he will be collaborating with researchers at the Jet Propulsion Laboratory (JPL) on computer vision research. JPL has

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Spotlight on CSS 497 Cooperative Education

Cooperative Education is a capstone senior project required for all Bachelor of Science students by their senior year. The cooperative education requirement is structured in a way that allows the student to choose the option that best fits his/her educational goals. The following is a short synopsis of what just a few recent and upcoming graduates are doing to complete their cooperative education experience.

Ryan Bergen | Boeing

Unmanned Areal Vehicle Trajectory System

Ryan's senior project was to develop a system that allows the user to view and configure the flight paths of Unmanned Aerial Vehicles (UAV) within a currently existing graphical command and control interface. The system graphically displays analyzed flight data and approximate trajectories for each vehicle.

Michael Glover | RealNetworks

Glasschord: A musical alternative to the IPhone

Michael's project was to develop a music client for a mobile device that would provide a rich music experience using mobile web services. Goals of the project included the ability to browse and search for artists, albums, tracks and radio stations, and to purchase tracks and albums for download to the device.

Michael Hoak | Google

Exploring Social Search at Google

Michael worked as a software developer to prototype new features for future Google development.

Jakob Homan | Yahoo!

Interning with Yahoo's Hadoop Team: Creating a Cluster-Health Monitoring Framework

Jakob worked with an internal computing team at Yahoo which is developing the Hadoop system for large-scale, distributed computing across very large datasets. Jakob's work focused on extending the distributed file system.

Ryan McMillan | Nintendo

Handheld Games, Nintendo Wii Game Development

Ryan worked on a demo for a Wii system by learning and implement solutions involving animations, 2D and 3D graphics, and file I/O.

Henry Lyons

Faculty Research with Olson, Projective Clustering and Computer Vision

Henry chose to pursue the faculty research option for his senior project. His research focused on projective clustering techniques and algorithms.

courses. We have developed simple tools and identified straightforward path ways for faculty interested in integrating "game-themed" materials into their existing classes. Our materials allow faculty members to pick and choose curriculum modules and integrate them into their existing classes without modification to the rest of their curriculum. As faculty members become familiar with our modules, and become comfortable with using these modules, we have tutorials that guide the faculty members in developing their own "game-themed" materials.

You mentioned 'we' – who are you working with on producing these materials?

I work closely with Professor Michael Panitz at Cascadia community college, Becky Reed Rosenberg and David Goldstein, the Directors of our Teaching and Learning Center, Professor Ruth Anderson at Computer Science and Engineering in UW Seattle, and Professor Scott Wallace at WSU Vancouver.

What will be the final outcome of your research project?

Currently in our NSF sponsored "Top-Down" computer graphics project, where computer graphics concepts are presented in the context of computer games, we have developed over 150 concept demonstration applications. In these applications, the same concepts are presented in C#, C++, Java, based on MFC, WinForm, Java Swing, and in OpenGL, Direct3D, and XNA Framework. These results demonstrated the feasibility of the "Top-Down" framework and we have developed a new textbook that presents these results in a coherent framework.

Our MSR sponsored "Game-Themed Introductory Programming Courses" project is on-going with many exciting results, assignments and concept demonstration applications, implemented based on C# and XNA Framework. Our results are well received by the community.

In the long term, we plan to generalize these results based on a language independent framework so that faculty members teaching introductory level programming courses can take advantage of our work independent from the underlying technology they adopt.

been developing a system for aerial mapping and recognition using multiple high-resolution cameras. Dr. Olson's research helps make it possible to construct three-dimensional maps and to perform recognition and tracking in the images. The results of this joint research venture will impact many various fields including geographical information systems, environmental management, consumer mapping web sites, and aerial surveillance.

During his sabbatical, **Prof. Munehiro Fukuda** is visiting four research organizations in Portugal, Japan, Switzerland, and United States in order to pursue two research goals: (1) parallelizing various applications on top of his grid-computing middleware named AgentTeamwork and (2) exploring new collaborative research projects on software environments that support multi-core processors. At Lisbon, Prof. Fukuda enabled an online war game to run its different strategic scenarios in parallel, using AgentTeamwork, and designed a multithreading library for computer simulations toward a proposal submission to funding programs.

At Keio University in Japan, he is parallelizing the data search and analyzing components of his collaborators' multimedia database system, and currently shaping up an idea to offload such data analysis of a server onto multi-core clients. From January 2009, Prof. Fukuda will work with the computer networks group at University of Basel, Switzerland, and thereafter in April visit the mobile-agent research team at University of California, Irvine.

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