GEORGE MASON UNIVERSITY
The Volgenau School of Information Technology and Engineering

Computing News

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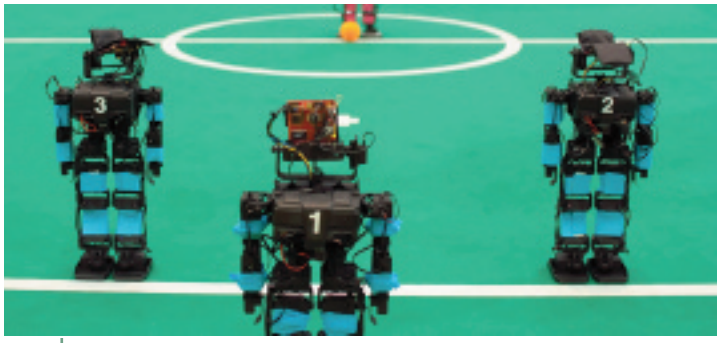
▼ What's Inside

RoboPatriot #1

George Mason Enters RoboCup Competition



The RoboPatriot's electronic team members. Photo courtesy of RoboPatriots team.

If you cheer for the George Mason Patriots, you must cheer for the RoboPatriots! That's right, this year George Mason University sent a team of humanoid robots, dubbed the RoboPatriots, to compete in the ultimate robotics competition, RoboCup. The competition, which took place June 29 - July 5, 2009 in Graz, Austria, is an annual event, bringing together robot teams from all over the world to compete for championship titles in several different programs.

Mason was well represented by PhD students Brian Hrolenok, Keith Sullivan, Chris Vo and their advisor, computer science professor Sean Luke. The team entered four intelligent robots in the kid-size Humanoid League. It marked the first time ever that George Mason was present at the competition.

In the humanoid league, autonomous robots with a human-like body and human-like senses play soccer against each other and have to demonstrate their technical abilities by performing specific challenges. Judges investigate the robots' abilities in several areas, including: dynamic walking, running, and kicking the ball while maintaining balance; visual perception of the ball, other players, and the field; self-localization; and team play.

The RoboPatriots were knocked out of the competition in the second round, but placed well for a rookie team. "As first time participants, we had to work very hard to catch up to the expectations set over the years by much larger, more experienced teams," Vo said.

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Now Open!

If you've been part of the Mason community for the past two years you've been watching first hand the transformation taking place on campus with new buildings and upgraded facilities. While there always seems to be something under construction, the CS department is happy to announce that we've settled into our new home in the Engineering Building. We spent the summer semester

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***Robocup Competition**, from page 1*

The qualification process is demanding and difficult. Teams are required to submit a research paper along with a video of their robots demonstrating certain skills.

Vo said the Mason team began building their robots in 2007. The construction alone involved more than 1,000 screws. "We purchased and assembled a Japanese robot kit called the Kondo KHR-1HV. We modified the kit in several ways, such as adding a tiny computer for autonomy, and a pan/tilt head with a camera for sensing," he said.

Teaching a robot to play soccer is not an easy task, the students said. "RoboCup synthesizes many difficult problems in computer science," Vo explained. "These include localization (knowing where you are), computer vision (being able to sense the ball, goal, and other players), and motion (being able to walk and kick). "For the robot to sense, think, and act intelligently," he continued, "all of these elements must work together robustly, in both software and hardware."

A typical robot is built with a sensor that uses sound waves or a laser scanner to "sense" distance. Using the pan/tilt head and camera for sensing, a humanoid robot processes information differently - taking pictures every few seconds and deciding what to do next based on where the robot is in the game. In order to do that, the robot has to be programmed to act in every single scenario the students could possibly imagine.

"As we participated in RoboCup, we found that the struggles we faced in all of these aspects of the competition are shared by even the most experienced and well-funded teams. For us, this perspective is profound because it highlights the need for more intelligent and robust approaches, and provides us with the sense that we belong in the competition," said Vo.

From left, RoboPatriots team members Brian Hrolenok, Chris Vo and Keith Sullivan with their advisor, computer science professor Sean Luke, at the Robocup Championships in Austria. Photo courtesy of RoboPatriots team.

The RoboPatriots team qualified for RoboCup 2008 with a working prototype, but could not attend the competition due to a lack of funding. But the team did not give up.

"In the mean time, we worked on some other projects related to the robot, such as a 3D simulation of the robot," Vo said. "We used this simulation system to research the use of evolutionary computation for creating robot motions like walking and kicking. We also constructed a sturdier pan-tilt head for the robot and made some other hardware modifications."

The team qualified again in late 2008, early 2009, and for the next few months leading up to the competition, Vo said, "RoboCup was our highest priority." This year, the Volgenau School of Information Technology and Engineering provided funding, and the team was off to Europe!

After five matches, the RoboPatriots lost to Chiba Institute of Technology, a Japanese team, and did not advance to the semi-finals. "We hope to qualify and compete again next year with an upgraded robot platform and more advanced techniques," Vo said. "However, we are still in need of significant funding for the robot hardware and travel to the competition venue."

RoboCup 2010 will be held in Singapore.

***Now Open**, from page 1*

moving boxes and furniture and working out some phone and Internet bugs and now we are excited to welcome new and old students and visitors alike.

This state-of-the-art facility is the first LEED's certified building on campus. It has been designed for energy efficiency and outfitted with electronic classrooms and modern equipment. While classes will continue to be held around campus, the entire CS staff is all under one roof. We know that you'll find the beautiful new glass atrium, meeting rooms, and facilities a great new upgrade to our world-class programs.

See more photos of the Engineering Building on page 8.

▾ Faculty Spotlights

CS Congratulates Sanjeev Setia As He is Promoted To Full Professor

Professor Sanjeev Setia

The Department of Computer Science congratulates Sanjeev Setia who has been promoted to a full professor. Setia joined the Mason faculty in 1993 as an assistant professor after receiving his PhD in Computer Science from the University of Maryland at College Park.

Setia says the academic world appealed to him early in his career because it allows him to pursue his research. He also says that watching his students succeed after they leave his class is one of the most rewarding parts of his job.

He says, "Computer science changes so fast that one has to continuously learn new topics in order to be an effective teacher. I like that."

Setia enjoys living in the Washington, D.C. area and says he was drawn to Mason because it is a "relatively young university whose reputation has been improving steadily over the years," adding, "I like being part of that and contributing towards that."

This semester Setia is teaching Quantitative Methods & Experimental Design in CS. He is also starting several research projects with colleagues.

Computer Science Department Welcomes Jan Allbeck

Professor Jan Allbeck

The Computer Science department welcomes Jan Allbeck as its newest Assistant Professor and computer game design expert. Allbeck will be teaching CS 425, Game Programming I, along with helping to develop the school's new concentration in computer game design, which is part of the new BS degree in Applied Computer Science.

Allbeck comes to George Mason from the University of Pennsylvania, where she earned her PhD from the department of Computer and Information Science and served as the Associate Director of the Center for Human Modeling and Simulation. Allbeck said she was drawn to Mason because of the school's focus on both academics and research.

"The people that I met when I interviewed really seemed to be trying," she said. "They were not just sitting back treading time or going through the motions. They work hard on behalf of the students and to advance research."

Allbeck enjoys working with students and "seeing their varied perspectives and approaches." She said she is looking forward to meeting and getting to know the staff and students in her first semester here.

Allbeck received her Bachelor's degrees in Mathematics and Computer Science from Bloomsburg University and a Master's degree in Computer Science from the University of Pennsylvania. She enjoys photography in general and particularly nature photography.

President Obama Speaks to the Next Generation of Future GI Graduates

On August 3, 2009, at George Mason University, President Obama announced that the Post 9-11 GI bill had become law. This greatly expanded GI bill will provide men and women in all branches of the armed forces, their families, and surviving children of fallen soldiers with financial support to help them earn college degrees.

President Obama said: "The contributions that our servicemen and -women can make to this nation do not end when they take off that uniform. We owe a debt to all who serve. And when we repay that debt to those bravest Americans among us, then we are investing in our

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Gregory Rice, First Applied CS Degree Recipient

The CS department's first Applied CS degree graduate, Gregory Rice, speaks of the value that computer science education provides to other professions. Rice started the degree because of his interest in bioinformatics spurred by the untimely death of his father in 2004 from colon cancer. He says, "The role of information technology in molecular biology can't be overstated. Having an understanding in both fields greatly enhances the ability of the researcher to know what realistically can be accomplished by the technology and to cull information from the vast amount of noise."

"With the explosion of information related to molecular biology in the last decade or so, there are a host of problems and solutions waiting to be uncovered."

Rice's degree, a BS in Applied Computer Science (biology concentration) and a BS in Biology (biotechnology concentration) shows how different sciences can fit together. He says that two classes that stand out were ones taught by Associate Professor (Bioinformatics and Computational Biology) Losif Vaisman, and Assistant Professor (Chemistry) Timothy Born.

Rice, a Northern Virginia native chose Mason because it was a great fit for his educational needs. "No other four year universities in the D.C. metro region have the same price/performance bang for your buck. In fact, I don't think it's even close." Rice's interest is specialized. The field of bioinformatics is growing as the scientific community has a greater understanding of how biology, computer science, and information technology can work together. The term bioinformatics was first coined in the late 1970s. This also corresponds to one of the first big surges in computer science degree candidates.

Gregory Rice

Rice says that he hasn't found his ideal job yet, but "with the explosion of information related to molecular biology in the last decade or so, there are a host of problems and solutions waiting to be uncovered."

Currently Rice works as a programmer for Business Management Systems in Fairfax and hopes to begin an MS degree in Bioinformatics at Mason next spring. He sees a future with this degree and says, "I imagine that any field that would benefit from the application of IT algorithms and methods for problem solving would profit from a similar combination, particularly fields that deal with large data sets — mathematics, economics, and physics."

***President Obama**, from page 4*

future — not just their future, but also the future of our own country."

In his remarks, the President stated that the post WWII economy has been "transformed by revolutions in communication and technology." As a state university, Mason, and the CS department in particular, hope to welcome hundreds of service men and women into our classrooms.

As a state university, Mason, and the CS department in particular, hope to welcome hundreds of service men and women into our classrooms.

Our undergraduate CS and ACS degrees and graduate degrees are tuned to the needs of the IT community, new research initiatives with public and private sponsors such as government and corporate partners ensure that students will receive cutting-edge training and future employment. Our school fulfills the government's mission to "give today's veterans the skills and training they need to fill the jobs of tomorrow."

▼ CS Accolades

The Department is pleased to announce that several of the Faculty have received acknowledgement of their work from funding agencies and conferences

Fei Li, an Assistant Professor in the Computer Science Department, has received an NSF grant for a project titled:"Online Scheduling Algorithms for Networked Systems & Applications."

Assistant Professor **Michael Locasto** organized the working group "Hacker Curriculum" for The 13th Colloquium for Information Systems Security Education (CISSE) in Seattle, Washington on June 1-3, 2009. He also presented a paper "An Experience Report on Undergraduate Cyber-Security Education and Outreach at The Second Annual Conference on Education in Information Security (ACEIS 2009) in February. The paper won the best paper award.

Professor Michael Locasto Receives U.S. Patent
The Trustees of Columbia University in the City of New York were granted a U.S. patent (#7,490,268) for "Methods and systems for repairing applications," with the named inventors being Michael E. Locasto, Assistant Professor in the Computer Science Department, and Angelos D. Keromytis and Stylianos Sidiroglou. The patent application was filed in June 2004 and June 2005 and granted on February 10, 2009.

Amarda Shehu, Assistant Professor in the Computer Science Department, presented a paper "An Ab-initio Tree-based Exploration to Enhance Sampling of Low-energy Protein Conformations" at the Robotics: Science and Systems conference on July 1, 2009 at the University of Washington in Seattle. She also presented a paper titled "Computational Aspects of Sequence, Structure, and Function in Protein Molecules" at the NCBI CBB Seminar of the NIH on MD, June 18, 2009. She has also been invited to speak at the Eighth International Conference on Parallel Processing and Applied Mathematics (PPAM) in Wroclaw, Poland. Professor Shehu co-authored the paper "Restriction vs. Guidance: Fragment Assembly and Associative Memory Hamiltonians for Protein Structure Prediction," which was published in the Proceedings of the National Academy of Sciences. She also published a chapter on "Conformational Search for the Protein Native State" in Protein Structure Prediction, of the Wiley Book Series in Bioinformatics.

The Networking and Simulation Lab of the GMU C4I Center presented a workshop for prospective users of Network EducationWare (NEW)at the 25th Annual Conference on Distance Teaching and Learning in Madison, Wisconsin on August 2009. NEW was developed by Professor **Mark Pullen** of the Computer Science Department and has been used by the department for several years to teach graduate courses online. The workshop showed attendees how to use NEW, which consists of open source software, to teach classes to in-class and on-line students at the same time. Attendees also were introduced to advanced features recently added to NEW; these included porting NEW to operate on Macintosh computers.

Jyh-Ming Lien has received funding from the National Science Foundation for his project titled "Shape Representation of Large Geometricies via Convex Approximation" The project duration is three years.

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Mason Team Places Third in Usenix Security Grand Challenge Competition

Mason students Rhandi Martin, Zhaohui Wang and Fox Chambers received the third place prize ($1000) in the USENIX Security Grand Challenge held at the USENIX Security conference (August 12-14, 2009, in Montreal, Canada). The team was advised by Angelos Stavrou.

The participant teams had to use their science and technical skills to create an environment where a server can function with integrity and minimum required service levels even when under attack. On the day of the competition, each participant team received a virtualized server, with a number of services. The services were implemented in different languages (e.g., C, Java, or Python) and were both web-based and stand-alone. However, each service had a number of hidden security flaws, which were implanted by the organizers.

The task of the participants was to modify and improve their servers so that they become resilient to attacks. The teams were able to operate on their servers for a limited amount of time, after which the only possible interaction with the server would be a reboot operation — this was a "hands-off" competition.

During the competition, an automated scoring system kept track of what services were functional. At the same time, an automated attack system performed disruptive attacks against the services. At the end of the game, the team whose server was able to provide the highest service level won.

CS Department Recognizes Student and Faculty Excellence

On May 13, 2009 the Computer Science Department hosted its annual department awards ceremony. The school is extremely proud of all the 2009 graduates and all that they have achieved.

Graduates by the numbers:

54 BS degrees in Computer Science
60 MS degrees in Computer Science
27 MS degrees in Information and Security and Assurance
56 MS degrees in Information Systems
38 MS degrees in Software Engineering
11 PhD CS and PhD IT degrees
1 Engineer Degree in Information Technology

Computer Science Departmental Awards for 2009

Distinguished Academic Achievement – Graduate

Computer Science
Daniel Ramey
Matthew Revelle

Information Security and Assurance
Timothy Rock

Information Systems
Lavanya Lingala
Sean North

Software Engineering
Andrew Festa
Jae Hyuk Kwak

Outstanding Academic Achievement – Graduate

Computer Science
Lindley French
Joseph Harrison
Nathan Heminger
Brian Hrolenok
Jacob Kaufman-Osborn
Aparna Nagargadde
Faisal Mansoor
Matthew Schneider
Todd Smith
Michael Sullivan
Israa Taha

Information Security and Assurance
Michael Cervone
Mikle Makowka
Jonathan Ruark
Jason Stern

Information Systems
Sri Manasa Kankipati
Mayank Mehta
Kirk Milligan

Software Engineering
Benjamin Arrington
Stephen Cox

Distinguished Academic Achievement –Undergraduate

Computer Science
Emlyn Pratt

Outstanding Academic Achievement-Undergraduate

Computer Science
Jonathan Amburn
Matthew Brown
Christopher Earle
Hai Le
Quan Pham
Randy Williams

First ACS BS graduate (Biology concentration)
Gregory Rice

Outstanding Undergraduate Teaching Assistant
Gaurav Singh

Outstanding Graduate Teaching Assistant Awards
Sudheendra Bhat
Hanjo Jeong
Huaming Liu
Cody Narber
Chun-Kit Ngan
Upsorn Praphamontripong
Min Xu

Volgenau School Outstanding Graduate Student Award
Dr. Mark Hartong

Outstanding Teaching Award
Dr. Hakan Aydin

Outstanding Adjunct Professor Award
Professor William Ellis

Volgenau School Outstanding Research Award
Dr. Daniel Menasce

George Mason Emerging Researcher/Scholar Award
Dr. Carlotta Domeniconi

Computer Science Faculty Research Award
Dr. Songqing Chen
Dr. Frank Wang

Outstanding Service Award
Dr. Pearl Wang

Outstanding Staff Award
Michele Pieper

Accolades, from page 5

Angelos Stavrou has received funding from the National Science Foundation for his project titled "Scalable Malware Analysis Using Lightweight Virtualization." The project start date is 9/1/2009 and the duration is three years.

Robert Simon has received funding from the Department of Defense for his project titled "Energy Harvesting Techniques for Deeply Embedded Wireless Sensor Systems".

Huzefa Rangwala has received funding from the National Science Foundation for his project titled "Computational Methods to Advance Chemical Genetics by Bridging Chemical & Biological Spaces". The project start date is 9/1/2009 and the duration is four years.

For additional accolades please visit the department online at http://www.cs.gmu.edu/

▾ CS Alumni Spotlight

Dr. Anhtuan Dinh

Anhtuan Dinh is a busy man. This thrice degreed Mason Alumnus, former Mason Adjunct Professor, Mitre Corporation Software Systems Engineering Director, and CS Department Advisory Board member has a determined spirit and personal mission to contribute to the Mason community and to his adopted homeland, America.

Dinh, originally from Vietnam, came to the United States in late 1994 as he says in his own words, "a bare-foot refugee." He knew as a young boy that education was his way to have a better life and a way to contribute effectively to society. Therefore, right after his arrival in the US, he started taking classes at Northern Virginia Community College, beginning with ESL (English as Second Language) courses. He eventual transferred to Mason where he earned his BS degree in Computer Science in 1989. In the 1990s, he says, due to the so-called "software crisis", the need for formal training in software increased significantly. "I was about to start an MS in computer science when the school introduced a new program, an MS in Software Systems Engineering. I switched to that."

When Dinh talks about Software Systems Engineering, there's a change in his tone, measured and animated, this is where his technical passion flourishes. He says, "I view the development and integration of software as similar in nature and scale to the performance of an orchestra. A conductor applies his/her deep and broad knowledge, background, and experience in music to orchestrate and integrate product pieces provided by numerous teams, including musicians, singers, instrument players, etc. to ensure the success of their performance. I like to consider myself a conductor." When he graduated in 1991, he says, he felt prepared to enter the workforce. But Dinh's technical curiosity did not stop with his MS and he began his PhD in Information Technology, which he completed in 1994.

> "I view the development and integration of software as similar in nature and scale to the performance of an orchestra."

After completing his PhD, Dinh took a position at Mason as an adjunct professor, a post he held for ten years. During that time, he also began his professional career, working first as an Engineering Specialist at Stanford Telecommunications, Inc. He also worked at MITRETEK, where he served as Technical Lead on several software projects using Object-Oriented Software Development Approach. Dinh joined Mitre in 1996 and today serves as the company's Associate Technical Director of E540 (Information and Computing Technologies Division.) "When I received more responsibilities at Mitre in 2004," Dinh says sadly, "I had to stop teaching. It was too much to keep up." Dinh now is part of the E540 three-person division management team overseeing eleven departments located at various locations in the US and spanning several areas of Information and Computing. When asked if he considers himself to be a scientist he says, "No, I like to say I'm a professor," then he pauses, considering his role and all that he does and says, "I'm a scientist-engineer too."

Dinh's role in teaching INFS 612 (Computer Networks & Distributed Processing), SWSE 619 (Software Construction) earned him an Outstanding Adjunct Professor Award in 2003 and an Outstanding Alumnus award in 2005. His work at Mitre this year has earned him a MITRE Program Distinction Award.

Dinh has served as an Advisory Board member for Mason since 2005. He says, "I owe George Mason a lot. Because of Mason I was able to fulfill my life-long dream of getting an education. With my experience and understanding in the industry, I can help refine the curriculum." He further explains how he is able to work with the school and his company by having Mason professors share their skills and knowledge with Mitre. He likes to invite professors to speak, encourages Mitre to hire student interns, and also to hire graduates as full-time employees. He says, "Mason students are well prepared for the workforce."

Dinh is enthusiastic about his feelings about education. He says, "Education is very important. I want to contribute to the education system so that we can create a technical leap for this country." He feels that the future of technology is in software systems development and integration but that there are also a lot of other emerging areas in Information Technology, too. "I'm proud to be able to work in the software systems engineering field and to make impactful contributions to many government programs," he says. "I understand the sense of urgency and mission the country now faces." With his experience in working on several challenging real-world projects, Anhtuan Dinh is an ideal advisor for the Mason community as it prepares students for the nation's current technical challenges.

Engineering Building inside and out. Left, glass Atrium welcomes students and natural light. At right, new building adds a modern look to campus.

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▼ Chair's Message

Welcome back to a new semester and welcome to our new home base. The CS Department had a busy summer moving boxes and getting settled into the new Engineering Building. We're proud to have this amazing new building on campus. It's the campus' first LEED certified (energy efficient) building and one suited to our technology focused school. We invite you to come by and visit us and to keep an eye out for events to be held here throughout the year.

This new semester began with an important speech given by President Obama right here at Mason in August about changes to the GI Bill. As our department, and the education and research we provide, represent the jobs of tomorrow, we expect to welcome hundreds of men and women who have served this country through the doors of this new building.

I would also like to welcome our new faculty member, Dr. Jan Allbeck, who comes to us from the University of Pennsylvania and who will be teaching in the Computer Game Design concentration of our BS degree in Applied Computer Science. We also extend our congratulations to Dr. Setia, former Chair of the CS Dept., who has just been promoted to full professor.

Our faculty continue to be highly successful in receiving research awards. Of special note are NSF awards received by several of our junior faculty: Drs. Fei Li, Jyh-Ming Lien, Huzefa Rangwala, and Angelos Stavrou.

I am also pleased to inform you that our enrollments are up this semester, particularly at the undergraduate level. We are delighted to see that the national downward trend in undergraduate computer science

enrollments has reversed - this is strongly reflected in the big increase in our undergraduate freshman and transfer student numbers this fall. Our PhD program in Computer Science is also growing – we have now over 100 students enrolled in the program. Our faculty also advise several students in the PhD IT program.

We are also pleased to let you know about the latest concentration in our BS Applied Computer Science degree, which is in Software Engineering. This concentration has several innovative features, including being the first Volgenau School program to require an industrial internship.

Over the summer, our student teams did very well in international competitions. Their exploits in the RoboCup competition are described in this newsletter. In addition, our students were placed third in the Usenix Security Challenge.

We are looking forward to this new semester and new academic year.

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