UTSA Computer Science

VOLUME 1, ISSUE 2

CS KICKSTART

DECEMBER 15, 2016

INSIDE THIS ISSUE:

UTSA STUDENTS PRESENT RESEARCH AT 2016 CS POSTERS AND COOKIES EVENT

UTSA Computer Science Ph.D. student Sam Silvestro explains his research titled “Sampler: A sampler-based approach for Detecting Memory Vulnerabilities in Production Software.”

UTSA COMPUTER SCIENCE RESEARCH: THE SAVE LAB

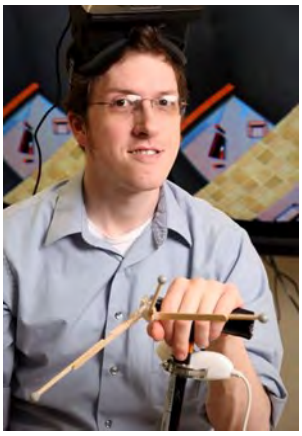
BY AIMEE CARDENAS

SAVE Lab Research Update

Led by Dr. John Quarles, Associate Professor of Computer Science, the San Antonio Virtual Environments (SAVE) Lab conducts basic and applied research towards saving the world through improving human computer interaction in immersive virtual reality. Currently, the SAVE Lab is working on innovative Virtual Reality (VR) games, interventions, and application for physical rehabilitation, exercise, and medical training.

Physical Rehabilitation

Although many studies have shown that virtual reality based physical rehabilitation can be very motivating and effective, there are few systems in general use at rehabilitation clinics, traditionally due to prohibitive costs. Because the overall cost of VR is quickly reaching the consumer level (e.g., the Oculus Rift), virtual reality in rehabilitation is on the rise and the SAVE lab is at the cutting edge. For example, SAVE lab member, Gayani Samaraweera, PhD student, recently presented her work on latency at the premier academic conference in virtual reality, *IEEE Virtual Reality*. Latency is the time it takes between a user moving and the movement being shown on a virtual reality display (e.g., a head mounted display, a 3D projector). All VR systems have latency in them. Classically, latency has been the enemy of VR—often significantly hindering user performance. However, Samaraweera found that in some cases, extra latency can potentially be used for the user's benefit in areas such as



Dr. John Quarles

Continued on page 2

“SAVE Lab”

DID YOU KNOW…?

A computer as powerful as the human brain would be able to perform about 38 thousand trillion operations per second and hold about 3,584 terabytes of memory.

Graphic Courtesy of:
Tangient LLC
Source Data:
Scientific American

SAVE LAB: CONT'D FROM PAGE 1

stroke rehabilitation. In her work, she intentionally applied an extra

200ms of latency to the user's virtual body, but only half of the body, which made the unaffected half of the users body try to compensate for the latent half. Based on her promising results, Samaraweera is now conducting a study on the benefits of this one sided latency for stroke patients who commonly have increased weakness on one side. The ultimate goal is to apply her technique to help rehabilitate asymmetric walking patterns in these patients.

Exercise

There has been a significant amount of research that has demonstrated the motivating effects of video games for exercise - exergames. So, why are there so few exergames on the market? Dr. Quarles thinks it is because exercise games are usually designed for a specific exercise, which has classically limited the genres and acceptability of exergames. Dr. Quarles aims to enable any traditional sedentary game to be used as an exergame, simply by adding a Microsoft Kinect and a visual overlay on top of the screen. The visual overlay flashes a semi-transparent window over the screen when the user is performing an exercise more poorly. One might expect that this would be annoying. However, recent research recently accepted to CHI Play 2016, suggested that it actually made the game more fun, especially in a competitive setting. The hope is that in the future, gamers will be able to choose any commercial game to play as an exergame.

Medical Training

Through a generous grant from SALSI, the SAVE lab is collaborating with doctors at UTHSCSA and Dr. Yusheng Feng of the Department of Mechanical Engineering to create a next generation of virtual reality based surgical simulators. Surgical skills simulators have been shown to be effective for training basic medical skills. However, most critical medical errors are decision making errors (e.g., chose the wrong surgical tool) rather than motor errors (e.g., poor stitching skills), and most simulators focus on these basic motor skills. For this reason, simulators are primarily used early in basic surgical skills training, but they are rarely used after residency, largely due to time and space constraints. Instead the SAVE lab is creating surgical simulators that focus on decision making skills and use off the shelf hardware. The hope is that these next generation simulators can make training decision skills more accessible to practicing doctors.

SAVE
SAN ANTONIO VIRTUAL ENVIRONMENTS

Read more about this exciting project at: save.cs.utsa.edu

A screenshot of one of the SAVE Lab's "exer-games" featuring soccer.

A screenshot from Quarles' VR game, "Shark punch."

Quarles demonstrates a VR game for aquatic physical therapy.

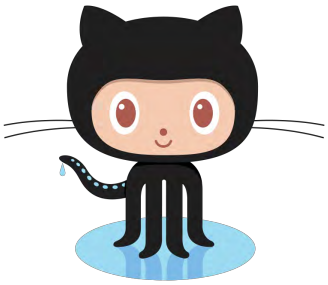
APROPOS: WHAT ARE GIT AND GITHUB AND WHY SHOULD I BE USING THEM?

BY MARK ROBINSON

Git is a free-to-use distributed version control system. Version control systems have two major benefits for software developers. Firstly, they provide an historical back-up of all changes to a codebase. Secondly, they allow members of a development team to share their changes with other members by merging them into a single, shared codebase. If you plan to work on a software development team, you absolutely must be familiar with the use of a modern version control system like Git. Because Git is free to use, lightweight, and powerful, it is very popular today among developers, making it a plus on a programmer's resume.

Github is a freemium web-based service that provides Git hosting for developers to share their projects with individuals, teams, and/or the public. Github provides free publicly accessible Git hosting and low-cost private Git hosting. Additionally, their online tools are easy to use and a good supplement to Git's command line interface. Many developers who don't want to host their own Git server or just want access to Github's great web tools use Github. Github also has great educational discounts for students and teachers.

— Dr. Mark Robinson, Computer Science Lecturer II



Introducing OCTOCAT! Octocat is the official mascot for Github! Check out Github at:

https://github.com

NEW STUDENT ORGANIZATION PROVIDES COMMUNITY FOR WOMEN IN COMPUTING

BY KIMBERLY WARD

Universities across the world are working to increase female representation in computational and data science programs. UTSA junior Computer Science majors Bridget Rios and Alifya Musa have joined this initiative by launching UTSA's first Association for Computing Machinery Women's Chapter (ACM-W).

Last year's "ACM chapter president Danny Tsang commented how few girls spoke out in Computer Science the way I did," Rios said. "That is about the time I met Alifya and we began discussing how we can increase female representation."

ACM-W was created to provide an academic, professional, and social network for female students studying technology fields. As part of a national network of chapters, ACM-W members are informed about current research, scholarship opportunities, and become acquainted with researchers in their field.

"ACM-W is focused on creating a voice for women in the department and the major," Musa said. "Our goal is to create an interactive environment in the department to where girls do not feel intimidated."

ACM-W will engage in partner activities with the main ACM chapter, including volunteer work in the community and campus events such as the upcoming RowdyHacks hackathon scheduled for Spring 2017.

Additionally, the chapter will focus on activities that will connect students with career development opportunities and network with leaders in the computing field. UTSA associate professor Dr. Jianwei Niu is faculty advisor for ACM-W, and helps coordinate these efforts to connect students with academic and professional mentors.

"Thanks to our professors, we have met some wonderful women with different backgrounds that have stable jobs in the computer science field," Rios said. "I think these connections will encourage our members to continue their pursuit in the computer science field."

For Musa, the supportive environment of ACM-W has greatly aided her pursuit in computer science despite the presumption that the field belongs to men.

"I found that after meeting other female friends in computer science and studying with them, I began to feel more comfortable in the classroom environment," Musa said. "As a result, I got better grades and was happier. I now look forward to programming and solving problems with my friends."

Currently the ACM-W chapter has 14 student members, but Rios and Musa are optimistic for more recruits as news spreads across the university of their group.

"I believe ACM-W will eventually gain attention from computing companies in a positive manner," Musa said. "[ACM-W] will help highlight UTSA's computer science department's diversity and inclusive environment."

Junior Computer Science major and ACM-W Co-Founder Alifya Musa explains to visiting high school students about the importance of encouraging female participation in the computer science field.

Want more information?

For more information on the ACM-W chapter at UTSA, visit their webpage on RowdyLink or email them at acmw.utsa@gmail.com

Students who are interested in joining are welcome to attend one of the ACM-W meetings held every Thursday in room NPB 4.140.

ALUMNI SPOTLIGHT: A DAY IN THE LIFE OF A PROGRAM MANAGER IN SPACE SCIENCE

BY AIMEE CARDENAS

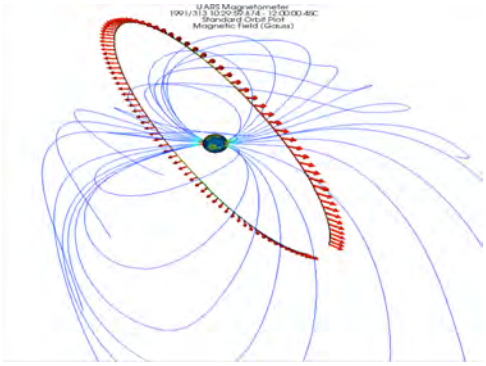
Joey Mukherjee, Program Manager in the Space Science Division at Southwest Research Institute

Aimee Cardenas (AM): Hi Joey! Good to have you here. To get started, tell us a little about yourself, your education, and what you do professionally.

Joey Mukherjee (JM): I was born and raised in San Antonio and went to school at Alamo Heights High School, graduating from there in 1990. After that, I went to UTSA and got my Bachelor of Science in Computer Science in 1995. Right after college, I joined Southwest Research Institute as an Analyst in the Space Science and Engineering Division. I've been here ever since coming on 20 years in July. Professionally, I started as a typical junior level programmer, being assigned a task of writing software that drew Contour maps of space physics data. As I advanced, I got more into managing the output of other programmers and designing software for others to develop. I realized early on that I enjoyed the visualization aspects of data a great deal and would consider that to be my specialty.

AC: What are the major tasks associated with being a Program Manager in Space Science?

JM: Program managers are responsible for bringing in projects for others to be a part of. I still stay current in software development and Computer Science, but spend time doing things like marketing and presenting to others to get them interested in the work we do and create collaborations for the future. In space science, the projects tend to be very long so people you talk to today as students may end up being very successful scientists in the field. It's really all about networking.



An example graphic representation of magnetometer readings using a standard orbit plot.

AC: What tools do you often use for data processing and data analysis?

JM: We develop our own software for data analysis and is available at http://www.sddas.org . All of our software is written using a combination of C, C++, SQL, Tcl/Tk, Perl, Python, and Lua. For data processing, we use a similar language set, but almost always, this code is customized for the project for which we are involved.

AC: And what about web development? What are your most crucial tools?

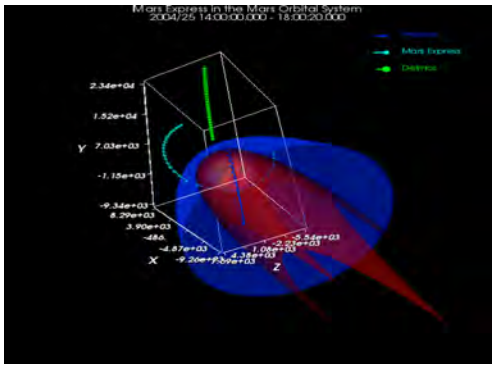
JM: We use CakePHP almost exclusively for the sites we develop. Personally, I develop using "vi", the ancient UNIX editor. I've used Dreamweaver a bit and it has some advantages, but I still go back to using a regular text editor. Language wise, we are using primarily PHP and JavaScript, with a combination of HTML and CSS. Significantly, one of the tools we find most valuable is Subversion, which we use for source control. There are other (some would argue better) source control packages, but any source control is invaluable for group development.

AC: How would you describe a typical work day for a Program Manager?

JM: Personally, I split my time 50/50 between managing people/projects and developing software. As any kind of manager, you are primarily setting "direction". You have to hire good people, and then get out of their way. If they get off track, it is your responsibility to set them back on track and move forward. For my development work, I design software and do most of the implementation as well.

AC: What do you like most about being a Project Manager?

JM: The best part of being a program manager is working on the different projects and being able to see them from cradle to grave. For the more development side of my job, I really like to see my software being used. In our case with space science, being able to see the software used to solve some difficult space issues is really rewarding.



A graphical trajectory of the Mars Express spacecraft in proximity to the two satellite moons, Phobos and Delmos.

AiC: What skills would you say are most important for someone who wants to become a Program Manager?

JM: At our facility, being able to network is probably the most valuable skill for being a project manager. It is our responsibility to meet clients and potential clients and convince them to allow us to do the work. This involves setting up contracts and making sure we are all working together for a common goal.

AC: What do you see in the near future for data processing, data analysis, and web programming?

JM: For data processing and data analysis, being really good at a scripting language I think would be the most beneficial. Scripting languages are doing more now than ever before, and will only do more in the future. Being able to interface a low level language like C with a scripting language will make a very powerful solution.

AC: What advice do you have for upcoming CS graduates from UTSA?

JM: Maybe unconventional, but have a portfolio! Take the best work you've done and bring it to interviews! Sometimes software is truly an art, and having a portfolio of your work can be used to show the hiring manager your elite coding skills. Even having a personal web site can be useful if you have some artistic ability. Furthermore, there is no reason why CS students should not be already familiar with Linux and/or other open-source projects. The code is all out there on the Internet waiting to be studied.

FACULTY SPOTLIGHT: JIANWEI NIU

BY KIMBERLY WARD

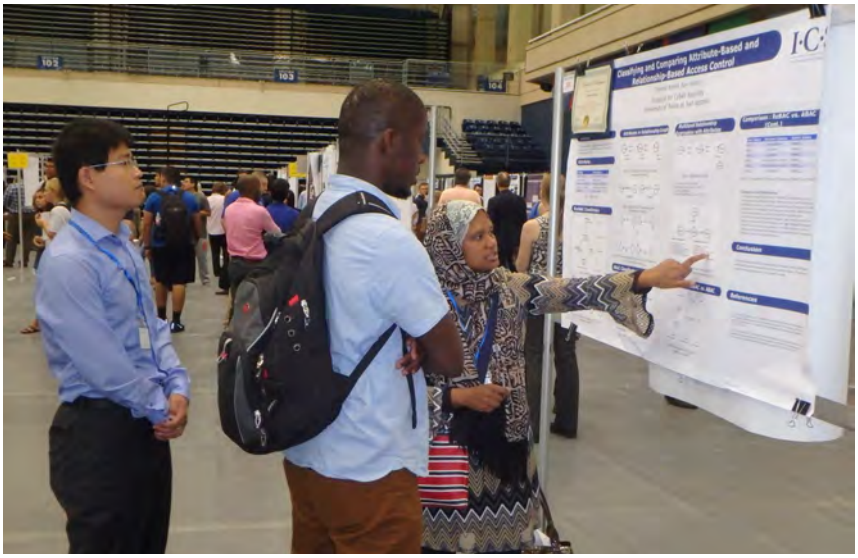
Dr. Jianwei Niu joined UTSA's computer science faculty in 2005, and became associate professor in Fall 2012. She received her Ph.D. degree from the University of Waterloo in 2005.

Her primary research interest is in applying mathematically rigorous specification and verification techniques (formal methods) to improve software dependability.

Her second research area concerns formalizing the semantics of modeling notations that provide software practitioners the ability to generate specifications that can be verified. The modeling notations she studies are used commonly to describe the dynamic behavior of software systems, including statechart variants, process algebras, UML state machine diagrams, and UML sequence diagrams. Given that it is difficult to assess the properties of models constructed using notations that either have so many variants with subtle differences or have no precise semantics, she seeks to address this problem by providing formal templates to structure their semantics systematically, thus enabling properties of software models to be formally verified.

Her research has been supported by funding agencies such as National Science Foundation, Norman Hackerman Advanced Research Program, Microsoft, National Security Agency (through CMU subcontract), and UTSA Tenure-Track Research Awards Competition awards. She also participates in many synergistic activities, such as serving on conference committees, reviewing for peer-review journals, and acting as faculty advisor for the ACM and ACM-W student chapters at UTSA.

FEATURED PHOTO:
COLLEGE OF SCIENCES 2016 CONFERENCE



UTSA Computer Science Ph.D. student Tahmina Ahmed explains her research poster to fellow students at the College of Sciences Research Conference 2016. 39 students from the Department of Computer Science presented posters at the conference.

Department News and Awards

◊ College of Science Teaching Excellence for Tenured-Track Faculty Award 2016

Dr. Matthew Gibson, Assistant Professor

◊ College of Science Teaching Excellence for Non-Tenured Track Faculty Award 2016

Dr. Mark Robinson, Lecturer II

◊ College of Science Outstanding Staff Service Award

Cindy Murphy, Administrative Services Officer II

◊ College of Science Research Achievement Award

Dr. Shouhuai Xu, Professor

◊ UTSA Innovation Award: Recipient of Issued Patent

Dr. Rajendra Boppana, Department Chair

U.S. Patent 8,868,630 for "Verification of Pseudorandom Number Streams".

◊ UTSA Innovation Award: Recipient of Issued Patent

Dr. Qi Tian, Professor

U.S. Patent 9,412,020 for "Geometric Coding for Billion-Scale Partial-Duplicate Image Search".

◊ UTSA Innovation Award: Recipients of Issued Patent

Dr. Steve Robbins, Professor Emeritus
&
Dr. Kay Robbins, Professor

U.S. Patent 9,111,459 for a "Classroom Response System".

◊ Ph.D. Dissertation Defense

Mohammad S. Islam

Dissertation Topic: Simulated Machines

◊ Ph.D. Dissertation Defense

Yun Zhang

Dissertation Topic: Cloud IaaS

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for all archived newsletters >>>

Featured Job Opportunities!

#	Employer	Job Title	Type	Application Deadline	How to Apply
1	Accenture	Federal - SAP Development Associate	Full Time	December 30, 2016 at 12:59am	Apply via UTSA Handshake job board
2	Mozilla	Software Engineering Internships — Various positions	Internship	January 11, 2017 at 12:00pm	Apply at https://careers.mozilla.org/university/
3	Kaplan	Part-time MCAT Teacher-Tutor	Part Time	January 14, 2017 at 12:00pm	Apply via UTSA Handshake job board
4	Texas A&M Transportation Institute	Data Processing and Development of Macros and Windows Applications	Part Time	January 23, 2017 at 11:00am	Apply via UTSA Handshake job board
5	Frost Bank	Mobile App Development College Intern	Internship	January 30, 2017 at 5:00pm	Apply via UTSA Handshake
6	Tesoro	Summer 2017 Intern — Information Technology	Internship	January 31, 2017	Apply at http://tsocorp.com/tesoro-careers/
7	Apple	AppleCare College Program - University of Texas-San Antonio	Full Time and Part Time	February 1, 2017 at 1:00am	Apply at https://jobs.apple.com/us/
8	AT&T	Senior Specialist – Technology Development Program (Cybersecurity)	Full Time	April 30, 2017 at 9:00am	Apply at https://connect.att.jobs/category/cybersecurity-development-program-jobs/117/39769/1
9	Citrix — Technology	Software Development Engineer—Microsoft Solutions (Graduate)	Full Time	June 01, 2017 at 2:00am	Apply at jobs.citrix.com
10	Citrix — Technology	Software Engineer Intern	Internship	June 01, 2017 at 2:00am	Apply at jobs.citrix.com

VISIT UTSA'S CAREEREDGE WEBSITE

http://careercenter.utsa.edu/

FOR MORE GREAT OPPORTUNITIES LIKE THESE!!!

UTSA University Career Center
Career Events

FEBRUARY

06 Veterans' Networking Reception
6:00 p.m. – 8:00 p.m.
Omni Colonnade Hotel

07 S.T.E.M. Career Fair
8:30 a.m. – 11:30 a.m.
HUC Ballroom

07 All-Majors Career Fair
1:30 p.m. – 4:30 p.m.
HUC Ballroom

MARCH

01 Professional Etiquette Dinner
5:30 p.m. – 8:00 p.m.
Denman Ballroom

22 March Into Your Major
10:00 a.m. – 2:00 p.m.
HUC Ballroom

28 Summer Jobs Fair
9:00 a.m. – 1:00 p.m.
UC North 1st & 2nd Floors

Have Questions?
Story Ideas?
Photos?

Email the editor at
cs@utsa.edu

Kimberly Ward