VOLUME 1, ISSUE 1

CS KICKSTART

SEPTEMBER 19, 2016

UTSA Computer Science

INSIDE THIS ISSUE:

DID YOU KNOW…?

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LETTER FROM THE DEAN

Dr. George Perry

Dr. Craig Jordan

The College of Sciences welcomes **CS Kickstart** as an valuable addition to the Department of Computer Science's initiatives to improve student success at UTSA, prepare students for post-graduate opportunities, assist them in selecting a career path and in securing rewarding academic and professional placements. I hope that you will take full advantage of this publication and I encourage you to share it with your families to give them an opportunity to better appreciate your experience at UTSA. I wish you the greatest success in your collegiate explorations and assure you that the door to the Dean's office is always open for you.

George Perry Ph.D.

Dean, College of Sciences

Craig T. Jordan, Ph.D., J.D.

Senior Associate Dean, College of Sciences

LETTER FROM THE DEPARTMENT CHAIR

Dr. Rajendra Boppana

I am pleased to welcome **CS Kickstart** as the official newsletter for the Department of Computer Science. The department has grown significantly in the last four years with over 1,000 students currently in the BS, MS, and PhD programs. This newsletter aims to connect students, faculty, staff, alumni, sponsors, and external organizations with department's news, upcoming events, faculty research, informative articles, and job and internship opportunities for students. I encourage readers to actively participate in this newsletter by submitting ideas, stories, or photos to cs@utsa.edu. My hope is that this newsletter becomes an indispensable communication medium for the computer science community at UTSA.

Rajendra V. Boppana, Ph.D.

Chair, Computer Science

WHITE INDUCTED INTO SA CYBER HALL OF HONOR

BY KIMBERLY WARD

Dr. Gregory White, UTSA professor and director of the Center for Infrastructure Assurance and Security (CIAS), has been selected for induction into the San Antonio Cyber Hall of Honor.

The CyberTexas Foundation, a Texas-based cybersecurity advocacy and development organization, established the Hall of Honor to recognize leaders in the cybersecurity industry in San Antonio.

White and three other recipients were the inaugural inductees slated to be recognized during the CyberTexas Summit at the Henry B. Gonzalez Convention Center

The new Hall of Honor is expected to continue in the coming years due to the "multitude of men and women in this critical sector from the military, government agencies at all levels and industry and academia," CyberTexas Executive Director Joe Sanchez said in a news release.

From left: Brigadier General Mitchel H. Butikofer, Dr. Greg White, and Colonel James R. Cluff

FACULTY SPOTLIGHT: DR. MENG YU

BY KIMBERLY WARD

Dr. Meng Yu became an associate professor at the University of Texas at San Antonio in the fall of 2015. He received his Ph.D. degree from Nanjing University in 2001.

His research interests include systems and network security, visualization and security, and cloud computing. His primary research goal is to build more secure and trustworthy system software.

He has been working on security problems such as privacy protection in cloud computing, self-healing problem after attacks, and the protection of applications against untrusted operating systems. The key method is to protect the target using a small trusted software component at higher privileged level while maintaining a small trusted computing base (TCB).

He has also worked on projects seeking to protect users' privacy in clouds. His research studies new mechanisms that enable the consumer of the service to reduce the visibility of consumer computations to the service provider, thereby reducing the trust that the consumer places in the provider. Simultaneously, the mechanisms allow security of cloud computing environments to be monitored by a trusted third party. The work also develops a quantified method to evaluate the degree to which a user's privacy is disclosed and tools for monitoring causality relationships.

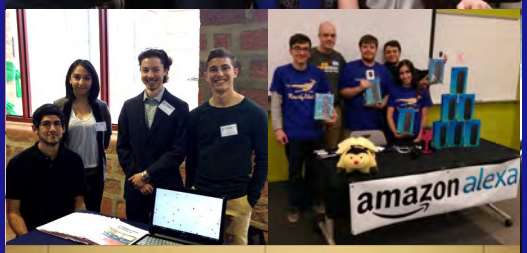
His research has been supported by funding agencies such as National Science Foundation. He has served on many conference program committees and also organized several international conferences and workshops.

Dr. Yu looks forward to opportunities for collaboration and career development at UTSA.

FEATURED PHOTO:

UTSA CS DEPT WELCOMES CLASS OF 2020

UTSA's Computer Science Department Chair, Dr. Rajendra Boppana, welcomed first time students during the Fall 2016 Roadrunner Days. Over 100 students attended the information session to find out more about classes, lab resources, and other department opportunities. After the session concluded, students were invited to tour the main CS computer lab to see the facilities available for use.



UTSA COMPUTER SCIENCE STUDENT ORGANIZATIONS

- **ACM (Association for Computing Machinery)**
- **CSA (Computer Security Association)**
- **CSGSA (Computer Science Graduate Student Association)**
- **UPE (Upsilon Pi Epsilon)**

For more information,
visit http://www.cs.utsa.edu/

UTSA COMPUTER SCIENCE RESEARCH: AN OVERVIEW

In the UTSA Computer Science Department, we're doing some fascinating research! In the issues to come, we will delve more deeply into each research endeavor within the department. For now, let's look at the birds-eye view of what's going on in UTSA Computer Science research:

Bioinformatics Research & Development Group (BRDG) With the BRDG (pronounced BRiDGe), Dr. Jianhua Ruan and his group are committed to developing state-of-the-art data-analytical algorithms and tools to make complex and massive biological data more understandable and useful. Their research combines data mining, machine learning, and graph theoretical methods and they collaborate frequently with biologists for applications on real data addressing important biomedical research problems. The research has been supported by funds from the National Science Foundation, National Institutes of Health, and San Antonio Life Science Institute (SALSI).

CloudSys At the CLOUDSys Lab, Dr. Palden Lama and his group aim to conduct transformative research on the Cloud ecosystem and develop innovative technologies to efficiently solve Big Data and Big Compute problems of today and the next generation.

Center for Infrastructure Assurance and Security At CIAS, Dr. Greg White and his group are conducting research in two main areas: cyber security information sharing and incident detection/response in communities. They have implemented the concept of a Honey-Community as part of this research. The CIAS also hosts cyber security training programs and cyber defense competitions for industry professionals and college/high school students.

Cybersecurity Education & Gaming Lab (CEAGL) At CEAGL, Dr. Greg White and his group are dedicated to the development of methods to provide cybersecurity training and education. In particular, the lab is exploring methods to utilize games and gaming technology to enhance the cybersecurity training and education experience.

Data Science & Technology Laboratory (DSTL) At the DSTL, Dr. Weining Zhang and his group are on a direct and dedicated mission to advance research on data management and data mining.

Institute for Cyber Security (ICS) At the ICS, Dr. Ravi Sandhu and his team conducts basic and applied research in partnership with academia, government, and industry. ICS research leaders bring a deep knowledge of cyber security models, architectures, mechanisms and protocols, as well as cyber technologies to their research. ICS has built and operates two world-class academic research laboratories dedicated to studying current and emerging cyber security issues.

Laboratory for Cybersecurity Dynamics (LCD) At the LCD, Dr. Shouhuai Xu and his team are on a mission to systematically explore the notion/abstraction of Cybersecurity Dynamics as the Foundation for the ultimately-wanted Science of Cyber Security. The lab believes Cybersecurity Dynamics is the right abstraction because it not only can deepen our understanding and knowledge base, but also can guide the practice of cyber defense operations (including quantitative risk-management and decision making). The abstraction has led to three orthogonal research thrusts: First-principle modeling (the "x" axis), cybersecurity data analysis (the "y" axis), and security metrics (the "z" axis).

Laboratory for Systems Research (LSR) Dr. Ali Tosun and his group's research focus is in storage systems, networks, security, multimedia systems and databases. The lab investigates emerging problems typically spanning multiple systems research areas.

LArge-scale System Optimization Research Lab (LASOR) The goal of Dr. Wei Wang's lab is to make future large-scale data-intensive systems faster and greener. Their research falls in the intersections of Cloud Computing, system software, computer architecture and software engineering. Their current investigations include redesigning data centers with novel energy-efficient hardware, improving hardware management and data management in system software, and inventing new software development techniques to help users write and execute large-scale applications efficiently on Clouds.

Multimedia & Vision Lab Dr. Qi Tian and his team's research interests are in computer vision and multimedia content analysis. They are especially interested in large-scale image/video indexing and retrieval, visual object detection and recognition, image segmentation and classification, person re-identification and face recognition.

Next Generation Networks Laboratory (NGNL) At the NGNL, Dr. Turgay Korkmaz and his group conduct research in the general area of computer networks. They are specifically interested in quality-of-services (QoS)-based networking issues in both wireline and wireless networks. They are also working on network security, network measurement and modeling, Internet related technologies, cloud networking, information networks and graph mining.

Parallel Processing & High Performance Computing Lab Dr. Anthony Chronopoulos works with parallel and distributed computing, cloud and grid computing, networks and security. Some of the aspects of his lab include: developing new scalable algorithms for the parallel solution of large sparse linear systems, implementing new methods in practical software for Computational Aerodynamics Simulations used by NASA and the Aerospace industry, developing Game Theory algorithms for Load Balancing in Distributed Systems and developing master-worker loops self-scheduling algorithms for parallel, distributed and cloud computing.

Programming Architecture Lab (PALAB) At the PALAB, Dr. Abdullah Muzahid and his team are conducting research at the intersection of computer architecture, compiler design and programming models. The Lab is designing novel software and hardware features so that programmers can write high performance code. Their target is both sequential and parallel code. They are also conducting research using novel and exciting programming platforms like neuromorphic architecture and approximate programming. They collaborate frequently with compiler and circuit experts.

Real-Time & Embedded Systems Lab (RTES) At the RTES Lab, Dr. Dakai Zhu and his team are studying more efficient usage of computing system resources to better serve the various needs of timing constrained applications through system modeling, design of scheduling algorithms, and performance analysis and evaluations. The ultimate objective of their research is to make the right use of computing resources for the right application at the right time!

San Antonio Geometry Algorithms Lab (SAGA) At the SAGA Lab, Dr. Matt Gibson and his group develop cutting edge techniques, algorithms and methods for long-standing as well as potential future problems in computational geometry. The lab provides geometric solutions to problems that are motivated by important applications such as medical image segmentation, building surveillance, and cloud computing.

San Antonio Virtual Environments Lab (SAVE) The SAVE Lab, developed and maintained by Dr. John Quarles, conducts research in augmented, mixed, and virtual reality (VR) and applies this technology to real world applications such as, medical training, education, rehabilitation and exercise. The goal is to create new human-computer interfaces, immersive games, and simulations that will have a positive impact on the world.

Software Engineering & Formal Methods Laboratory Dr. Jianwei Niu and her team focus on developing mathematically rigorous specification and verification techniques to improve software dependability. This includes the design and verification of security policies and their enforcement mechanisms, as well as checking the collection and sharing of sensitive personal information performed by web and mobile apps complies with privacy policies and regulations .

Software Evolution, Reliability & Security Laboratory The major purpose of Dr. Xiaoyin Wang's research is to enhance the quality and productivity of software evolution. To achieve this goal, he works on various research projects involving automated software migration, software compatibility checking, software regression testing, and debugging. His work is largely based on improving and adapting the underlying techniques such as program analysis and data mining.

Software Research Group (SRG) At the SRG, Dr. Tongping Liu and his group focus on improving the performance, reliability and security of different types of software systems.

Systems and Networks Laboratory (SNL) Under the direction of Dr. Raj Boppana, the SNL lab conducts research on the performance analysis, security, and design of high speed computer systems and networks. SNL focuses on analytical models of performance validated by experiments and simulations and enhancing security of computer systems and networks by redesigning hardware support and communication protocols.

UTSA Visualization & Modeling Laboratory (VML) The goal of Dr. Kay Robbins and her team at VML is to understand the world through data. They combine visualization, machine learning, various modeling techniques, and advanced data infrastructure to look at problems in new ways by building tools that integrate a variety of techniques with usable interfaces to make new analysis accessible.

DR. STEVE ROBBINS RETIRES AFTER 41 YEARS OF UTSA SERVICE

BY KIMBERLY WARD

From left: COS Dean Dr. George Perry, Dr. Steve Robbins, and CS Department Chair Dr. Rajendra Boppana

The Department of Computer Science held a retirement celebration on August 26th for faculty member Dr. Steve Robbins, honoring his 41 years of service and the tremendous impact he has made for the university.

Lauded for being one of the main catalysts behind the formation of UTSA's Computer Science program, Robbins also designed and led the design of the Systems Design curriculum, later to be known as UTSA's Electrical Engineering department. He also received the NSF grant for equipment that led to UTSA's first Computing Facility. Robbins handled the setup and administration of the facility's account and software management, which made a huge impact on student and faculty research capabilities.

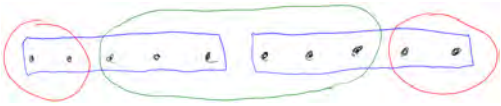
Robbins has taught 38 different undergraduate courses and10 different graduate courses in the disciplines of Computer Science, Mathematics, Statistics, and Software Development. These courses have ranged from large service courses to advanced graduate courses. He also has produced extensive teaching materials for nearly everything that he taught and consistently received high teaching evaluations from his students.

APROPOS: ALGORITHM DESIGN: GUILTY

BY DR. MATTHEW GIBSON

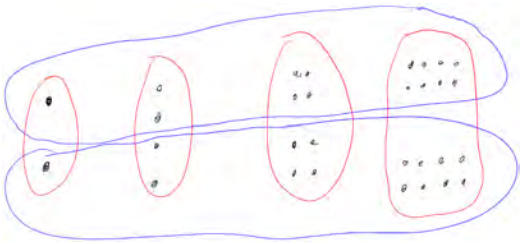
As technologies used in industry are ever-evolving, companies are faced with new computational problems that have never been solved before. Companies often turn to computer science graduates to design efficient algorithms for these problems. When posed with a new problem, often one must analyze the problem to determine an algorithmic strategy. A mistake that novice algorithms students make frequently is to trust their intuition too much. *This algorithm makes a lot of sense, and it works on many examples. Problem solved!* Unfortunately this line of thinking leads to algorithms which may return incorrect answers for many computational problems.

For example, suppose that UTSA wants to provide wireless coverage to a set of points on campus. The possible locations where we can place routers are fixed, and the coverage area of each router is cannot be changed. The goal is to choose the smallest number of routers to provide coverage to all points so that we can provide this coverage as cheaply as possible. How would you design an algorithm for this problem? Intuitively, we want to be choosing routers which can cover a lot of points. A router that can cover 6 points should be better choice than a router that only covers 5 points, right? Well, maybe not. Consider the following example.



The green router covers 6 points. If we include this router in our solution, then we may take the two red routers to complete the coverage of the points. This is actually worse than the optimal solution which takes the two blue routers which each cover 5 of the points.

Okay so our idea of choosing routers which cover the most points didn't produce a solution that was optimal, but it was only one router away from optimal in this case. This approach should at least produce a solution that is very good even if it isn't optimal, right? Again, maybe not.



The best solution here is to choose the two blue routers. Note that each blue router contains 15 points; however, the last red router contains 16 points. So our algorithm would include that router. Since those last 16 points are covered, we can now discard them as there is no need to cover those points again. Then the blue routers will now cover 7 remaining points each, but the third red router covers 8 points, so we would again choose this router. This process repeats until we choose all red routers, twice as bad as optimal. Note that this example could easily be extended so that the algorithm could return an arbitrarily large number of routers when the optimal solution is still only 2.

Simple, intuitive greedy algorithms like the one described above are very nice when they are correct. They are very easily implemented and tend to have fast running times. If a greedy solution exists, it is often is going to be superior to alternative approaches. But there is a reason why we cover complicated algorithmic techniques like dynamic programming and divide-and-conquer: simple greedy algorithms usually do not work for challenging computational problems. Often greedy strategies are a good place to start, but one should be very skeptical that the algorithm works. It is easy to convince yourself that the algorithm is correct, but until you can *prove* that your algorithm is correct, it is better to assume that it is wrong and try to find situations where your algorithm will fail. When these tricky situations are identified, then refine the algorithm to be able to handle these situations.

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Go here >>>
for all archived newsletters >>>

CS Career Development Opportunities

Session #	Event Title	Location	Date	Time	Details/Notes
0	Resume Writing	Online	TUE 09/02/2016	Any time	Visit www.cs.utsa.edu/~clark on or after Sept. 2 for resume writing tips
1	STEM Career Fair	HEB University Center Ballrooms 1 & 2	TUE 09/20/2016	1:30PM — 4:30PM	Usually 50+ employers looking for CS students Wear business attire Bring your resume Check out the UTSA Career Fair website
2	All Majors Career Fair	HEB University Center Ballrooms 1 & 2	WED 09/21/2016	8:30AM — 11:30AM	Register on the "Fairs" page at utsa.joinhandshake.com Professional dress required Bring your resume
3	Employers and You	NPB 1.412 (across breezeway)	FRI 10/07/2016	3:00PM — 4:30PM	When should I begin interviewing? How do I pick an employer? What is right for me? What do employers look for? Advice from employers
4	Mock Interviews	UC 2.01.24 (Mesquite Room)	FRI 11/04/2016	3:00PM — 4:30PM	You must register through Rowdy Jobs (HireRoadRunners.com) for priority As groups of 4-6 students, you will answer sample interview questions and receive feedback Network with possible employers

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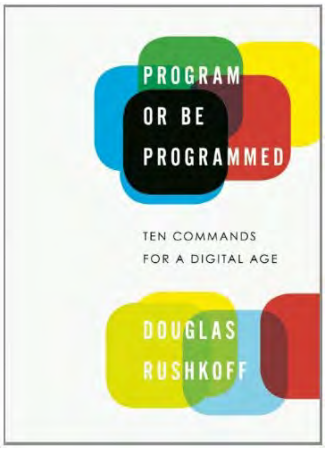
http://careercenter.utsa.edu/

FOR MORE GREAT OPPORTUNITIES LIKE THESE!!!

BOOK REVIEW: "PROGRAM OR BE PROGRAMMED" BY DOUGLAS RUSHKOFF

REVIEWED BY DR. RICHARD MURPHY

There are very few books I recommend unequivocally, especially to computer science majors, but this is one of them. Some readers have characterized Rushkoff's book *Program or Be Programmed: Ten Commands for a Digital Age* as simply a long essay by a digital skeptic, but I think those readers miss the point. Yes, this book does recommend "unplugging" for several days a week, but I happen to agree with his reasoning. This book is really a cautionary tale on the law of unintended consequences vis-a-vis modern digital technology. He is not a Luddite by any means. He provides one of the most concise and salient reasons for studying computer science and mastering both software and hardware technologies that I have seen in print.



Each chapter contains a command that leads back to his thesis that computer technology must be consciously directed in order to benefit society; left by itself it has equal potential for bad and good. I will leave you with the words that begin the book.

"When human beings acquired language, we learned not just how to listen but how to speak. When we gained literacy, we leaned not just how to read but how to write. And as we move into an increasingly digital reality, we must learn not just how to use programs but how to make them.

In the emerging, highly programmed landscape ahead, you will either create the software or you will be the software. It's really that simple: pro-gram, or be programmed. Choose the former and you gain access to the control panel of civilization. Choose the latter and it could be the last real choice you get to make."

Featured Job and Internship Opportunities

#	Employer	Job Title	Type	Apply Deadline	Interview Dates
1	Chevron	IT Intern-Cybersecurity - Summer 2017	Room Only	4:59AM UTC Monday September 19, 2016	September 28, 2016
2	Chevron	IT Entry Level Full Time - Cybersecurity Analyst	Room Only	4:59AM UTC Monday September 19, 2016	September 28, 2016
3	American Express	Information Security Junior Analyst	Room Only	4:59AM UTC Tuesday September 20, 2016	September 21, 2016
4	American Express	Information Security Junior Analyst- Internship	Room Only	4:59AM UTC Tuesday September 20, 2016	September 21, 2016
5	Randolph-Brooks Federal Credit Union	Various Positions	Room Only	4:59AM UTC Tuesday September 20, 2016	September 21, 2016
6	Raytheon Company	ME/EE, CS, IA	Room Only	4:59AM UTC Tuesday September 20, 2016	September 22, 2016
7	Tata Consultancy Services	Software Engineer - Initial Learning Program	Room Only	4:59AM UTC Tuesday September 20, 2016	September 22, 2016
8	Tesoro	Summer 2017 Intern - Information Technology	Room Only	4:59AM UTC Wednesday September 21, 2016	October 11, 2016
9	EY	Cyber Threat Management Intern, EY Advisory Services	Preselect	4:59AM UTC Monday October 10, 2016	October 20, 2016
10	Accenture Federal Services	Federal - Java Developer Analyst	Room Only	4:59AM UTC Monday October 10, 2016	October 24, 2016
11	Central Intelligence Agency (CIA)	Various Positions	Room Only	5:00AM UTC Monday October 24, 2016	October 26, 2016

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http://careercenter.utsa.edu/

FOR MORE GREAT OPPORTUNITIES LIKE THESE!!!

Upcoming Events

Faculty Speakers

Dr. Wei Wang
Dept. of Computer Science

Dr. Raymond Choo
Dept. of Info Sys & Cyber Security

Dr. Wonjun Lee
Dept. of Elec & Comp Engineering

The **College of Sciences Research Conference** will feature a day of panel discussions with faculty and students from a variety of disciplines in the College of Sciences. Students in computing and cyber security will showcase poster presentations on selected projects and current research in progress.

There is **no registration fee** and a **free lunch** is provided.

Conference Registration Deadline: September 23, 2016

COS Conference Date: October 7, 2016

Location: HEB University Center (1604 Main Campus)

For more information or to register for the conference, visit
http://www.utsa.edu/sciences/research_conference/

Have Questions?
Story Ideas?
Photos?

Email the editor at
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Kimberly Ward