Association for Computer Educators in Texas

Computer Science Education for ALL

Association for Computer Educators in Texas

Promoting Computer Education and Research in Texas

55th Annual Conference
1-2 November 2019

LONE STAR
COLLEGE

ACET 2019 Conference Schedule

Friday, November 1, 2019

Start	Stop	
9:00am	9:45am	Registration and Continental Breakfast
9:45am		Welcome from ACET Cindy Fry, ACET President
9:50am		Welcome to Lone Star College
10:00am	10:30am	A Unique Experience Using Social Media and Free Software: Pitfalls and Triumphs of Teaching a Class to Dispersed Students All over the world Sam Hijazi, Ph.D. - Texas Lutheran University
10:35am	11:05am	Steganography: Simplifying Cybersecurity's Unsolved Mystery Isaac K. Gang, Ph.D. - Texas A&M University-Commerce
11:10am	11:45pm	Teaching CSS Positioning with Coordinate System Chao Gong, Ph.D., Heejun Choi, Ph.D. - University of Mary Hardin-Baylor
12:00pm	1:25pm	Lunch: Keynote "10 things that yield happier students and better learning outcomes in lower-division CS/CE courses" Dr. Frank Vahid
1:30pm	2:00pm	Gamification of Computer Science Education William A. Booth, Ph.D. - Baylor University
2:05pm	2:35pm	Reexamining Information Overload Sam Hijazi, Ph.D. - Texas Lutheran University
2:40pm	3:10pm	Industry-Based DNA Chip Analysis Techniques and Implementation Heejun Choi, Ph.D. - University of Mary Hardin-Baylor Isaac K. Gang, Ph.D. - Texas A&M University-Commerce
3:10pm	3:25pm	*Break*
3:30pm	4:00pm	Positive cycle of integrating teaching and research: Machine learning Self-driving Car project Keith Edwards, Tanner Luce, Travis Teague, Heejun Choi University of Mary Hardin-Baylor
4:05pm	4:35pm	Getting Students to View Those Videos Ruth Robbins, EdD - University of Houston Downtown
4:40pm	5:10pm	Secure Coding for CS1 and CS2 William A. Booth, Ph.D. - Baylor University
4:35pm		DINNER: On your own

Saturday, November 2, 2019

Start	Stop	
9:00am	9:30am	Registration and Continental Breakfast
9:30am	10:00am	Student Poster Session, Elections Notifications
10:00am	10:30am	Development Of A Reverse Software Engineering Project Cindy Fry, Zachary Steudel - Baylor University
10:35am	11:05am	A Computer-Literacy-Based Course with Business Applications and Math Field of Study Curriculum for Business Shohreh Hashemi - University of Houston-Downtown
11:10am	11:40am	Analysis of Botnets and their Communication Patterns Isha Vyas & Lawrence J. Osborne, Ph.D. - Lamar University
11:45am	12:15pm	Developing a Digital Health Learning Platform: iManage Stefan Andrei, Ph.D. - Lamar University
12:20pm	1:30pm	ACET Election , Lunch, Announce Poster Session Winners Lunch: Keynote Reverse Software Engineering: A Sophomore-Level Project In Computer Systems Cindy Fry, Kevin Kulda, Gennie Mansi - Baylor University

Presentations

Keynote Address

"10 things that yield happier students and better learning outcomes in lower-division CS/CE courses".

A summary review of over four years of student success research around dynamic interactive learning methods, showing improved learning outcomes and better grades, and freeing lecture time for more examples, student activities, and facilitation of flipped classrooms.

Dr. Frank Vahid
Professor of Computer Science & Engineering, University of California Riverside and co-founder of zyBooks, now a Wiley Brand

A Unique Experience Using Social Media and Free Software: Pitfalls and Triumphs of Teaching a Class to Dispersed Students All over the world

Sam Hijazi, Ph.D. - Texas Lutheran University

The question was, would it be easy to teach Syrian students scattered all over the world a class on success and persistence using social media, smartphones, and free software? Would the instructor be able to handle the pressure caused by different time zones, faulty Internet connections, various backgrounds, different level of experiences, and unlike educational backgrounds? The answer was a big YES.

The presenter will share the challenges, difficulties, pitfalls, and triumphs of the experience. Working with an expert on motivation and a young assistant made the endeavor possible. What made it also convenient was the flexibility and availability of certain information technologies. These include Facebook, Screencast-O-Matic (screen recorder), and Google Drive, to name a few. The presenter will share the best, and worst lessons learned from this unique experience. The class started with 123 students and ended up in 24 students. The success rate was around 20%! Was it an acceptable percentage to call for a celebration? The answer was yes. The experience would still worth it, and the instructor would repeat in the future. Without existing and free technological innovations, it would have been impossible to share the needed knowledge with eager students all over the world. The passion for learning and the relative ease of access to innovation technologies worked magically to the benefit of the learners.

Steganography: Simplifying Cybersecurity's Unsolved Mystery

Isaac K. Gang, Ph.D. - Texas A&M University-Commerce

Securing data at rest or in transit has been a major challenge for researchers and practitioners alike for quite some time. Methodologies, particularly those pertaining to encryption, to disguise information at rest and in transit, have been proposed with varying degrees of success. In this presentation, the author will discuss steganography, an old but effective "secret writing" technique popular in the cybersecurity domain. This algorithm is implemented using contemporary software Application Programming Interfaces (APIs) to secure simple or complex messages in transit. Specifically, the software is implemented, so that it is capable of protecting and/or revealing confidential information in transit, using digital images

Teaching CSS Positioning with Coordinate System

Chao Gong, Ph.D. - University of Mary Hardin-Baylor
Heejun Choi, Ph.D. - University of Mary Hardin-Baylor

It is recommended by ACM and IEEE to offer web development courses in both Computer Science and Information Technology undergraduate programs. The three cornerstone technologies of the web, namely, HTML, CSS, and JavaScript, constitute the main contents of an introductory web development course.

Cascading Style Sheets (CSS) is a computer language for describing

the presentation of a web page. One function of CSS is to set how a web element, such as an image or a paragraph, is positioned in the web page. The traditional approach to teaching CSS positioning is to specify the offsets between two rectangles. Consider a web element, which occupies a rectangle area on the web page. The position of that element can be specified by the distances between that rectangle and another rectangle occupied by an existing web element.

We propose a new approach to teaching CSS positioning. In our approach, the position of a web element is specified by the coordinates of a point on a coordinate plane. The point is a vertex of the rectangle occupied by the element in question, and the coordinate plane is derived from another rectangle occupied by an existing web element. Our approach makes it easier for students to understand CSS positioning and to apply that knowledge in the process of developing web pages. Our approach teaches students new knowledge (CSS positioning) through connecting to the knowledge they already know (coordinate system). We have been started experiments in our teaching to compare those two teaching approaches.

Gamification of Computer Science Education

William A. Booth, Ph.D. - Baylor University

Gamification has become one of the most notable technological developments for human engagement. Therefore, it is not surprising that gamification has especially been addressed and implemented in the realm of education where supporting and retaining engagement is a constant challenge. However, while the volume of research on the topic has increased, synthesizing the consequent knowledge has remained modest and narrow.

Reexamining Information Overload

Sam Hijazi, Ph.D. - Texas Lutheran University

It is about time to reexamine information overload. Information anxiety is still an issue resulting in negative feeling, frustration, and even health problems. Information Technology (IT) is a double-edged sword. The exponential growth of information did not help the situation as well. There is no question, IT has improved the decision-making process, but also it has caused some confusion and has added burliness to the process. Distraction is one major problem that has been created by information overload. Information overload is a prevalent topic and should be taken seriously, an issue that would impact the quality of our decision making.

The solution will depend on handling the two actions, our technological use and behavior associated with technology. Clearly, the ubiquity of IT undoubtedly has significantly contributed to the problem. But, IT should as well help to alleviate the situation to reduce most the adverse side effect. Understanding how to use

capable search engines efficiently is the first step in handling this never-changing problem. Emphasizing the difference between data, information, and knowledge is also an elementary requirement in dealing with this problem. Accepting the fact that the time-gap that will take to double the amount of information will always get shorter will create a needed awareness. The presenter will suggest multiple solutions to handle these negative side-effects. It is evident that this presentation is not a call to unplug but to create a balance in how to react, act, and, as we should, proact to the tsunami of information.

Industry-Based DNA Chip Analysis Techniques and Implementation

Heejun Choi, Ph.D. - University of Mary Hardin-Baylor
Isaac K. Gang, Ph.D. - Texas A&M University-Commerce

Health industry has evolved in the last few decades witnessing a great deal of software use and advancement in the process. In this paper, the authors will review the DNA chip technological advancement with respect to research efforts and usage. The authors will also introduce a process of developing data analysis software that is used for analyzing DNA chips. Then, we will discuss technological limitations and impact on the healthcare sector that DNA chip technology has had. Finally, we will suggest several ways to successfully commercialize the DNA chip, emphasizing its impact on future healthcare sector.

Positive cycle of integrating teaching and research: Machine learning Self-driving Car project

Keith Edwards, Tanner Luce, Travis Teague, Heejun Choi
University of Mary Hardin-Baylor

When the computer science courses are designed, how to make the students understand the core concepts and algorithms is usually considered significantly. However, applying them to the real fields, which is considered more important, is often skipped. This research project introduces how to implement the positive cycle of integrating teaching inside the class and research outside of class. In addition, it shows the process that the students build the machine learning based self-driving car.

This project is a practical but good one because it includes various theoretical knowledge that is learned in the class. The project is conducted in 3 stages. First, an RC car is assembled with mechanical and electronic components (Raspberry, sensors, etc.) and is tested by the signal measurement. Then, the self-driving software modules using machine learning are developed and tested. Finally, the RC car with self-driving software module is tested and will be able to move on the bended lane.

Getting Students to View Those Videos

Ruth Robbins, EdD - University of Houston Downtown

Do you sometimes wonder did your students actually view a particular video? You give an assignment and ask the students to view the video and provide a description of what they saw. The answers are sometimes acceptable, but you cannot really tell if they actually viewed the video in full. Did they get their description of what the video was about by reading someone else's description? Or, did they get a friend's explanation and just change it somewhat.
This presentation will describe a testing tool available to Blackboard users, which allows students to answer multiple choice or true-false questions interspersed throughout the video, only while viewing the video. This eliminates the question attached to "Was the video viewed?".

Secure Coding for CS1 and CS2

William A. Booth, Ph.D. - Baylor University

Defensive programming is a form of defensive design intended to ensure the continuing function of a piece of software under unforeseen circumstances. Defensive programming practices are often used where high availability, safety or security is needed.

Defensive programming is an approach to improve software and source code, in terms of:
General quality -reducing the number of software bugs and problems.
Making the source code comprehensible – the source code should be readable and understandable so it is approved in a code audit.

Development Of A Reverse Software Engineering Project

Cindy Fry - Baylor University

An introduction to software hardening in general, and the development of the Fall 2019 semester project in CSI 2334, "Intro to Computer Systems", in particular, will be presented. We will discusses the design of the project; the implementation of the design; code obfuscation and reverse software engineering; and which obfuscation techniques were used to produce the mystery executable used as the class's project.

A Computer-Literacy-Based Course with Business Applications and Math Field of Study Curriculum for Business

Shohreh Hashemi - University of Houston-Downtown

In 2014, Texas Higher Education Coordinating Board (THECB) approved the revision of the Core Curriculum at institutions of higher education in Texas. The new core includes eight Foundational Component Areas (FCA) and one Component Area Option (CAO) for 42 semester credit hours that includes 36 Semester Credit Hour (SCH) of prescribed FCA, and six SCH of CAO addressing six core curriculum objectives including empirical and quantitative skills
. Furthermore, courses with the empirical and quantitative skills course objectives are contained within the UHD General Education Core - Freshman Seminar (Math) category with six math-related learning outcomes (LOs) focusing on quantitative literacy and use of technology to enhance understanding of key mathematical concepts.

In 2019, THECB's Field of Study Advisory Board identified the Field of Study Curriculum that includes Business Computer Information Systems (BCIS), a freshman computer literacy course, as the

Field of Study course for business. This course has nine learning outcomes that address topics associated with information technology and use of various Office software.

Since the new computer literacy course will be offered in Fall 2020, the author started developing a new Freshman Seminar (Math) course that contains both the THECB and the UHD Freshman Seminar (Math) learning outcomes. The content of the new course focuses on the BCIS course learning outcomes and the Freshman Seminar (Math) learning outcomes. In addition, assignments center on assessing both technology and math learning outcomes.

This presentation reviews a freshman computer literacy course that meets THECB Field of Study learning objectives mandates while satisfying the UHD Core Curriculum - Freshman Seminar (Math) core objectives. Furthermore, it will review and discuss the course syllabus and assignments utilized for learning outcome assessment.

Analysis of Botnets and their Communication Patterns

lists Isha - Lamar University
Lawrence J. Osborne, Ph.D. - Lamar University

Botnets pose numerous dangerous cybersecurity threats for which general detection and solution mechanisms have not been found. A botnet is described as a network of bots or zombie computers which are used to carry out malicious activities over a wide area at the same time. There are basically three parts to a botnet: (a) Botmaster (the person who creates/codes a botnet), (b) bots (the zombie or compromised computers), and (c) C&C (Command and Control). In our research we discuss the communication patterns of botnets that enable a C&C server to execute the malicious intentions of the Botmaster. This paper explains how botnets are constructed, the issues and challenges that are responsible for hindering the efforts to find a general solution to the threats of botnets, and how to recognize and remove botnets from a computer.

Developing a Digital Health Learning Platform: iManage

Stefan Andrei, Ph.D. - Lamar University

Rashmina Upreti
Department of Computer
Science
Lamar University, Beaumont
rupreti@lamar.edu

Nelvia Gurung
Department of Computer
Science
Lamar University, Beaumont,
USA
ngurung1@lamar.edu

Vinaya Manchayah
Department of Speech and
Hearing Services
Lamar University, Beaumont
mlharn@lamar.edu

Monica Harn
Department of Speech and
Hearing Services
Lamar University, Beaumont
vmanchaiah@lamar.edu

Ashley Dockens
Department of Speech and
Hearing Services
Lamar University, Beaumont
ashley.dockens@lamar.edu

Jamie Azios
Department of Speech and
Hearing Services
Lamar University, Beaumont,
USA
jamie.hartwell@lamar.edu

Elizabeth Long
Department of Nursing
Lamar University, Beaumont
elizabeth.long@lamar.edu

Abigail Dueppen
Department of Speech and
Hearing Services
Lamar University, Beaumont
adueppen@lamar.edu

Stefan Andrei
Department of Computer
Science
Lamar University, Beaumont
stefan.andrei@lamar.edu

Many countries cooperate with the purpose of using technology to improve the quality of health in the world. For example, countries like India, Brazil and South Africa channeled their Facility Fund to Viet Nam through UNDP (United Nations Development Programme) and WHO (World Health Organization) in 2018. This represents an example of South-South cooperation in education and healthcare, utilizing the advanced ITC infrastructure and innovation.

Another effort to accommodate technology in health and welfare services was recently done in Finland. Paper (Ahonena; 2017) described the competences that students have before their studies and those they expect to gain from the study module "Developing Digital Health and Welfare Services" in multi-professional groups during their bachelor studies. Their experimental results demonstrate that students are keen to learn about developing digital health and welfare services.

Many other efforts targeting using technology to improve the health services is done by universities and research institutes. Stanford University offers a course called 'Building for Digital Health', as a new Bio-design course sponsored by the Stanford School of Medicine and Stanford's Computer Science department.

None of these platforms considered the same designated health purposes and all of the following categories of people as we did in our study, from a wide variety of patients: children, nursing aides, autistic students, hearing and aphasia participants. This work describes our efforts to develop a digital health learning platform, called iManage. Besides explaining health related concepts, iManage will evaluate the research study findings as well as the results of its platform.

A Sophomore-Level Project In Computer Systems

Cindy Fry - Baylor University
Kevin Kulda - Baylor University
Gennie Mansi - Baylor University

On the first day of class, you are presented with a challenge. A piece of executable code has been found on a server, and you must determine what the code is designed to do. How do you begin? How will you find out if the file is safe to open? What could happen if the program is executed without knowing it's intention? Is there a way to tell what the file does before opening it?

We will walk through the spring 2019 group project in CSI 2334, "Introduction to Computer Systems," and have two students present their findings to us.

Keywords: reverse engineering, reverse software engineering, code hardening, code obfuscation, ethical hacking

List of Presenters

Dr. Stefan Andrei

Dr. Stefan Andrei graduated PhD from Hamburg University, Germany, in 2000 as a World Bank Scholarship Japan Graduate student. He was a recipient of a postdoctoral fellowship from Singapore-MIT Alliance between 2002 and 2005. He is currently a Professor and the Chair of Department of Computer Science with Lamar University.

His research interests include real-time embedded systems and software engineering. He has more than 23 years teaching courses such as, real-time embedded systems, software engineering, foundations of computer science, computer law and ethics, and programming languages. Stefan has been on the Program Committee for more than 50 prestigious conferences. He was invited as a Speaker at several universities and private organizations. He has already been a co-author of more than 100 peer reviewed papers at international reputable journals and conferences. Among his main contributions, he proved the problem of incremental counting satisfiability and invented the LRTL (Linear Real-Time Logic) useful for verification of real-time embedded systems specifications.

His research got more than 3600 non-self scientific citations. He was and is involved as a PI, co-PI, or Senior Personnel in more than 14 funded research projects. He is a Senior Member of the ACM and an IEEE Member. More details about Stefan may be found at the address: cs.lamar.edu

William (Bill) A. Booth, Ph.D.

Dr. William (Bill) A. Booth is a Senior Lecturer in the Department of Computer Science at Baylor University. He earned a BS in secondary education from Texas A&M university in 1986. After teaching in the Texas public school system for six years he returned to school in 1992. In 1994 Dr. Booth earned a MS in Computer

Science from Baylor University. He worked for six years as a programmer analysis at Baylor before becoming a full time member of the faculty in 2000. In 2013 Dr. Booth earned a Ph.D. in Educational Psychology from Baylor. His current area of research includes the pedagogy of computer science and computational thinking.

Dr. Heejun Choi

Dr. Heejun Choi is an Assistant Professor of Computer Science, Engineering, and Physics at the University of Mary Hardin-Baylor. His research focus and interests are in the area of Big Data, Data Mining, Cybersecurity, Digital Forensics, Networking, Bioinformatics, and Image processing.

Keith Edwards

Keith Edwards is an undergraduate student of Computer Science department at the University of Mary Hardin-Baylor.

Cynthia C. Fry

Cynthia C. Fry joined the faculty of the School of Engineering and Computer Science at Baylor University in 1997, where she teaches a variety of engineering and computer science classes, in addition to being the Faculty Advisor for the Women in Computer Science (WiCS), Director of the Computer Science Fellows program, and the Co- Director for the Technology Entrepreneurship Initiative at Baylor. She is the lead PI on a series of grants from the Kern Family Foundation, and a KEEN Fellow. She has authored and co-authored over fifty peer-reviewed papers..

Dr. Isaac K. Gang

Dr. Isaac K. Gang is an Assistant Professor of Computer Science & Information Systems at Texas A&M University-Commerce. He is also the Outreach Coordinator for A&M-Commerce Department of Computer Science & Information System. His research focus and interests are in the area of Cybersecurity, Big Data/Data Analytics, Image processing, and Computer Science Education.

Dr. Gong

Dr. Gong is an Associate Professor of Computer Science at University of Mary Hardin-Baylor. He joined the faculty of UMHB in 2007. He obtained a Ph.D. degree in Computer Science from UT Dallas.

Shohreh Hashemi

Shohreh Hashemi is an Associate Professor and Martel Professor of Management Information Systems at the University of Houston Downtown (UHD), Houston, Texas, where she teaches both upper- and lower-level MIS courses in face-to-face, hybrid, and online modes. Her research interest is now focused on student retention and success. She is the A+CE faculty champion for the Davies College of Business (DCOB). Professor Hashemi is the recipient of the UHD Excellence in Teaching Award, and twice recipient of the UHD Excellence in Service Award.

Dr. Sam Hijazi

Dr. Sam Hijazi has been a member of ACET since the year 2009. He has taught in FL Keys for 15 years before moving to Texas Lutheran University in 2008.

Kevin Kulda

Kevin Kulda is a senior at Baylor University studying Computer Science and Information Systems. He is concurrently in the Baylor Honors program and the Baylor Business Fellows Program. His senior thesis will be an analysis of black-box timing side-channel cyber attacks. Kevin spends time outside of school leading the Baylor InfoSec student organization and working for the Baylor Law School IT department. This summer, Kevin worked at ExxonMobil where he ran a proof of concept project on an emerging crowdsourced cybersecurity technology. Kevin is from Fredericksburg, Texas and enjoys playing racquetball and going fishing in his free time.

Tanner Luce

Tanner Luce is an undergraduate student of Computer Science department at the University of Mary Hardin-Baylor.

Gennie Mansi

Gennie Mansi is a senior at Baylor University with a statistics major and computer science minor. She is also enrolled in the Baylor Honors Program, and has successfully defended her undergraduate thesis titled, A review and analysis of fault detection and attribution metrics in MSPC literature. Previously, she has had the pleasure of performing research at Baylor in statistics. She spent this past summer at George Mason University (Fairfax, Virginia) working on a project to automatically generate documentation for large code projects. When she's not coding, looking at data, or studying, she enjoys climbing and spending time outside, reading, and drawing. She hopes to pursue a graduate degree in computer science after graduating in Spring 2020.

Dr. Ruth Robbins

Dr. Ruth Robbins is a Professor in the Finance, Accounting & Computer Information Systems Department at the University of Houston-Downtown. With over 30 years of post-secondary teaching experience. She has served as Coordinator of the Computer Information Systems discipline and Assistant to the Chairperson. She has taught online, hybrid, and face-to-face classes. She was awarded the Martel Endowed Professorship in 2011-12 AND 2016-17. She has served as a board member of the Association for Computer Educators in Texas and as a reviewer for the NSF (TUES Type 1 proposals) and NASA (EONS MUREP Small Projects proposals for Transformational Performance in STEM Using Innovative Solutions) grants.

Lawrence Osborne

Lawrence Osborne received a M.S. in Mathematics from the University of Missouri-Columbia in 1985 and a Ph.D in Computer Science from the University of Missouri-Rolla in 1989. His dissertation concerned techniques for solving the Steiner problem in directed graphs. He has been a faculty member at Lamar University in Beaumont, Texas, where he has been a professor since 1999. He has published numerous papers on network related subjects. Currently, his areas of research interest are distributed systems, IoT, and network algorithms.

Zachary Steudel

Zachary Steudel is a Junior Computer Science student at Baylor University. During Summer 2019, he worked as a Software Development Engineer Intern with Amazon, and currently works as a Teaching Assistant for Introduction to Computer Systems, an Assembly language Computer Science course. Zac also runs short weekly group tutoring sessions for freshmen Computer Science at Baylor and enjoys helping students acclimate to the exciting world of Computer Science.

Travis Teague

Travis Teague is an undergraduate student of Computer Science department at the University of Mary Hardin-Baylor.

Isha Vyas

Isha Vyas is currently pursuing a master's in Computer Science at Lamar University with a thesis on 'Analysis of botnets". In 2015 she earned a B. Tech degree in Computer Science from ITM University in India. She has worked as an intern at Tata Consultancy Services, India, as a software developed in Java and at mJobTime, in Texas, where she developed applications in C# since 2016 with an ongoing thesis on 'Analysis of botnets and their communication pattern'.
I have completed B. Tech degree in Computer Science from ITM University, Gwalior, India in 2015. I have worked as Software developer intern at Tata Consultancy Services, India where I gained experience in Eclipse Java and as Web Developer Intern at mJobTime Corporation, Texas where I used C# dotnet.

Program Committee

Program Chair

Dr. William A. Booth, Baylor University

Program Committee Members

Mrs. Cindy Fry, Baylor University
Dr. Stefan Andrei, Lamar University
Dr. Rajiv R Malkan, Lonestar College
Dr. Shohreh Hashemi, University of Houston-Downtown
Dr. Greg Speegle, Baylor University
Dr. Matthew Fendt, Baylor University
Dr. Sam Hijazi, Texas Lutheran University