

## 02 EDITORIAL Corner



IEEE CTS Chairman

Fawzi Behmann  
 f.behmann@ieee.org

The Central Texas Section focus in November/December period has been characterized by being thankful to the loyalty of our members and community. As the year draws to a close, it is time to appreciate and reward those that have gone beyond the call of duty. We also appreciate the great and positive feedback we received on both the Smart City Summit and the NEC Workshop. The Student Satellite conference was also a great success.

December signals the end of fall semester and as students prepare for their exams, CTS sponsors have provided them with guidance for completing their IEEE special projects for the semester. The IEEE CTS Appreciation Dinner was held December 1st – check the event listing for other networking and appreciation events taking place in December.

## 10 IEEE Member Development

### HAVE YOU RENEWED YOUR IEEE MEMBERSHIP FOR 2020?

It is easy to forget and easy to put off. If you haven't renewed your IEEE membership, or don't know if you have, go to your MYIEEE account NOW and check at [www.ieee.org/myieee](http://www.ieee.org/myieee) or call 800 678-4333.

OR just renew now to avoid loss of any of your IEEE benefits at [www.ieee.org/renew](http://www.ieee.org/renew).

If you have already renewed, thank you for being part of the Central Texas Section and the IEEE, the world's largest technical professional association. We have a lot planned for you in the CTS for 2020.

Visit [www.ieee.org/membership](http://www.ieee.org/membership) to view all YOUR benefits of IEEE membership.

## 11 IEEE CTS EVENTS

Come and see our section events.

<https://r5.ieee.org/ctx/>



# EDITORIAL Corner

Chairman, IEEE Central Texas Section

Fawzi Behmann

[f.behmann@ieee.org](mailto:f.behmann@ieee.org)

## **A. Student Satellite Conference:**

The IEEE Student Satellite conference on November 16, 2019 at the Ingram School of Engineering, Texas State University was the very first student-held conference in the history of the Central Texas Section. The morning began with coffee and kolaches as guests prepared for the interactive Python demonstration. Volunteers scanned the room assisting members in downloading the specified IDE and installing the necessary libraries. Once everyone was fully prepared, the guest speaker kicked off the event with introductions.

The first honored guest was Vittal Siddaiah, an experienced engineer with twenty years of experience in industry (Sixteen of which spent at Intel). In his career, Vittal has developed many different automation tools using Python for Intel. He began the presentation with the classic demonstration of 'Hello World' using python. The students, graduate and undergraduate alike, worked along with Vittal as he covered topics such as functions, classes, and loops. Throughout the presentation, students worked diligently to complete in-house programming tasks to exercise their new skills. After Vittal finished covering the basics of programming using Python the members broke out for lunch. Attendees enjoyed a variety of pizza and refreshments before returning to view the next session.



The final guest speaker was Dr. Abhay Samant. Dr. Samant is a professor at U.T. Austin and the Chief Software Engineer at National Instruments. The topic was an introduction to 'Big Data' programming using Python. The discussion began with an explanation of the term 'Big Data.' The phrase is slightly misleading, as Dr. Samant explained, the term simply refers to a packet of unknown size. For example, many members brought up user data mining, autocorrection, amazon orders, and many other instances where the amount of incoming data is completely unknown. This sort of data processing requires scalable automation techniques. First, Dr. Samant covered a common framework used for processing 'Big Data' called Hadoop. This framework includes a feature called MapReduce. There are two parts to this framework: the mapper and the reducer. The mapper takes the data and sorts it into a key/value pair. The reducer takes

final key/value pairs and gets rid of all of the extraneous data. This framework is special because it is totally scalable. Next, Dr. Samant went on to demonstrate MapReduce capabilities using Python. The example consisted of Dr. Samant running a Python script on multiple .txt files simultaneously to output the unique word count.

The 2019 Student Satellite Conference was a huge success, and there are likely to be more in the future. Students were able to learn the fundamentals of Python programming and indulge in an interesting discussion about 'Big Data.' Neither of these topics is explicitly covered in the curriculum at Texas State. It is outstanding that IEEE was able to enable this sort of extracurricular learning opportunity for its members.

*Written by Zachary Fox, Texas State Student Branch*

## **B. Section Appreciation Dinner:**

Central Texas held its annual appreciation dinner in Austin on December 1st. Over 50 members and guests were in attendance at County Line on the Lake. The setting was beautiful and everyone was in great spirits. Fawzi Behmann, the current chair for Central Texas Section, opened the festivities with a brief introduction welcoming all the members and guests and introducing the program for the evening.

A special menu was prepared for IEEE that was a buffet style starring a variety of smoked and barbecued meats, with all the usual sides. Vegetarian was also available upon request. The big attraction, however, was the dessert – homemade Ice Cream and Fresh Peach Cobbler.



Mr. Ajit Gokhale, SVP and GM at National Instruments, was our guest speaker. He engaged the attendees in a fun word and math puzzle, which was a little challenging after the barbecue feast. He then presented an inspiring message about building a better society by helping engineers and scientists, helping employees, customers and wider communities achieve potential.

Recognition of IEEE members in the Central Texas Section was the next agenda item. In 2019, ten members provided significant contributions and/or services beyond normal performance, and Bob Shapiro, Region 5 Director and Fawzi Behmann presented nine Achievement awards and one Exceptional Service award.

**Achievement Awards:**

- Ernest Franke
- Garrett Polhamus
- Sue Hill
- Kristen Roberts
- Kai Wong
- Heena Rathore
- Larry Larson
- Semih Aslan
- Abhay Samant

**Exception Service Award:**

- Stan McClelland



In closing, Fawzi Behmann briefly provided an overview of the key accomplishment in 2019 linked to the overall mission of the section and strategic plan introduced in January 2018. And he thanked the attendees for their support of and contributions to advancing the section to a new level.

Shown below some of contributions made in 2019 by CTS in serving the members and community.

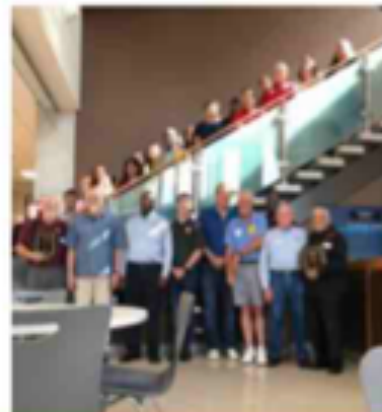


## CTS – Outstanding Large Section Award

### 2 Member Achievement Awards



Larry Larson   Scott Atkinson   Kenny Rice   Bill Martino   Fawzi Behmans   James Mercier   Tom Grim



**2019 Fall CTS Leadership Meeting, August 24 at San Marcos**  
Sample pictures of section, chapters, affinity groups chairs and Student Branches



### IEEE (PI)<sup>2</sup> Austin Workshops Attract Attendees by Targeting Their Needs



### 2019 IEEE Women in Engineering International Leadership Conference (WIE)



### 5G: The Wireless Communications Technology That Will Transform Society

May 24, 2019  
Austin Central Library



### Panel: 5G – Smart Networks and Social Innovations

10:30 AM - 11:30 AM  
MCH 9 & 9



with Moderator: Sandra Bean, President, Personal Office with panelists: Austin Zalkin, Berkeley; Neal Behrman, The Management Consulting, Inc. and Vice-Chair, IEEE 802.11 Communications Society; Irene Ho, Hardware Engineer, Bell



### NI WEEK 2019



**"IEEE Outstanding Unit Award 2019"**  
Presented to  
**IEEE Life Member Affinity Group of San Antonio**  
Group Leaders: Jim Brakefield (Chair), Garrett Polhamus, Scott Atkinson, Tom O'Brian, Ernest Franke, Bob Harris, Richard Wiggins & John Lyons  
Picture (Left to Right): Garrett Polhamus, Jim Brakefield and Scott Atkinson



## Outreach – Community Project

**Smart Cities  
Patient Fall Detection**



**Smart City  
Garage System**



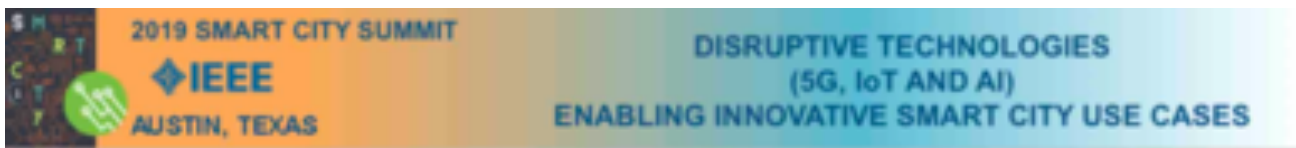
Team: Christopher Gossel, Marco Castro, Samuel McKinney, Jack R Gargano  
Faculty Advisor: Dr. Sarah Azlan  
IEEE Sponsor: Kasei Behrmann

Team: Wylie Hoag, Case Winters, Muhammad Ahmad, Wesley  
Faculty Advisor: Dr. Sarwan Malik  
IEEE Sponsor: Kasei Behrmann



## Demo at Austin CityUp – Texas Smart Summit





## Summary

Over 120 participants from different US regions and outside US: Rome, Italy and Namibia, Africa, and remote connections were set up with Guadalajara, Mexico and Athens, Greece.

The participants' profiles represent cities/municipalities, the medical community, industry and startups, as well as professors from multiple universities, researchers and students.

## Theme

The theme of summit will examine the effect of disruptive technologies on potential innovative use cases for Smart Cities, Mobility and Healthcare. Disruptive technologies being considered include IoT, 5G, and analytics AI/ML/DL.





## **C. End of Term and New Officers:**

My term as section chair is coming to an end on December 31 and hence, I'd like to express great gratitude for the tremendous and un-wavering support from current and previous officers, Standing Committee leaders, appointed coordinators and all the chapter & affinity groups chairs and their officers. It has been a pleasure and honor to work with you as the CTS Chair.

The new officers for 2020 are:

- CTS Section Chair – Larry Larson
- Vice Chair – Andrew Bluiett
- Secretary – Martha Dodge
- Treasurer – Bill Martino.

I wish them all the best.

## **D. Volunteering, Ideas and Suggestions**

***The IEEE Central Texas Section offers great opportunities to participate in the growth of the section and its Chapters.***

Opportunity to

- Join and grow chapters/Affinity group
- Speak on a subject you are passionate about
- Lead an activity that impact the community
- Help out
- Volunteer for an event
- Start a discussion group
- Invite others to be on the CTS Newsletter mailing list

Questions? Please send an email to Fawzi Behmann, Chair at [f.behmann@ieee.org](mailto:f.behmann@ieee.org)

Thank you for being part of the CTS mission to bring relevant topics, to be part of the dialog, discussion and networking events, and to serve our members and communities.

***Please consult later in the newsletter with locations of meetings and events for the month of December***

Chairman, IEEE Central Texas Section

Fawzi Behmann

[f.behmann@ieee.org](mailto:f.behmann@ieee.org)

Message from CTS Chairman



## Member Development

### **Have you renewed your IEEE membership for 2020?**

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Visit [www.ieee.org/membership](http://www.ieee.org/membership) to view all YOUR benefits of IEEE membership.

### **Did you know about IEEE - Life Membership**

Close to retirement?

Don't retire your IEEE membership too soon!

IEEE Members who are over 65 and have been dues paying members for over 35 years qualify for IEEE Life Membership with waiver of future dues and begin the next chapter of your life as a IEEE Life Member. Find our more at [www.ieee.org](http://www.ieee.org) and search on "Life Member".

The CTS has an active Life Member Program with meetings and activities tailored specifically for those honored members.

### **Did you know about IEEE - IEEE.tv**

IEEE.tv offers a wide variety of programming included **highlights** from IEEE conferences, interviews with leading IEEE authors, technology reports from IEEE Spectrum, and coverage of special IEEE events and people and lots of other fun stuff to look at. And you don't have to be an IEEE member to

As an IEEE member, IEEE.tv offers extensive members-only programming including many education and training videos designed to keep you current OR to help you learn a new and emerging technology. <https://ieeetv.ieee.org>

Check out the new monthly programming at <https://ieeetv.ieee.org> !!!!!!!

Joe Redfield  
CTS Membership Development Chair  
[J.Redfield@ieee.org](mailto:J.Redfield@ieee.org)  
210-744-2968

# IEEE CTS DECEMBER 2019 EVENTS

## 1 IEEE CTS 2019 Appreciation Dinner

**Time:** 6.30 pm - 9:00 pm -- **MORE INFO AND REGISTRATION:**<https://events.vtools.ieee.org/m/205057>

It is time to celebrate the 2019 accomplishments and successes of Central Texas Section (CTS) Chapters & Affinity Groups, Student Branches and Leadership.

**Agenda:**

- Welcome
- Dinner
- Guest Speaker
- Awards

**Special Guest Speaker and representing National Instruments is**

**AJIT GOKHALE**

SENIOR VICE PRESIDENT AND GENERAL MANAGER OF ELECTRONICS, ELECTRICAL MACHINERY, ENERGY, ACADEMIC, AND LIFE SCIENCES BUSINESS

**Location:**

THE COUNTY LINE ON THE LAKE  
5204 FM 2222, AUSTIN, TX  
(512) 346-3664

## 3 IEEE TEMS GRAD STUDENT CHAPTER - FALL 2019 SOCIAL

**Time:** 6:00 pm - 7:00 pm -- **MORE INFO AND REGISTRATION:**<https://events.vtools.ieee.org/m/212913>

Fall end of year social at UT Austin for graduate students.

**Location:**

2501 Speedway,  
Austin, Texas  
United States 78756  
Building: EER  
Room Number: 3.640

## 4 IEEE AUSITN LIFE MEMBER APPRECIATION LUNCH - 4 DEC 2019

**Time:** 11:15 am - 1:15 pm -- **MORE INFO AND REGISTRATION:**<https://events.vtools.ieee.org/m/210399>

As we are approaching the holiday season of the year, we would like to invite you to join us for lunch on December 4, 2019 to celebrate our friendship, sharing and learning subject of interest in the Life Member monthly meetings. Life Members are free and spouses are welcome with a charge of \$10 to pay with cash at door.

**Speaker :** Kai Wong

**Location:**

Ho Ho Chinese BBQ and Seafood Restaurant  
13000 N Interstate 35  
Austin, Texas  
United States 78753  
Building: 6

## 5 IEEE COMSOC/SP JOINT CHAPTERS, AUSTIN LIFE MEMBER, COMPUTER AND EMBS JOINT CHAPTER AND CTCN: HOLIDAY SOCIAL AND NETWORKING EVENT, THURSDAY, DECEMBER 5, 2019

**Time:** 5:00 pm - 7:00 pm -- **MORE INFO AND REGISTRATION:** <https://events.vtools.ieee.org/m/210792>

You are invited to share an evening with your colleagues and enjoy some holiday cheer. COMSOC/SP Joint Chapter, Austin Life Members, Computer and EMBS Joint Chapter and CTCN will provide the snacks and a drink. Anything more is up to you.

**Reservations:** Please register so that we know approximately how many are coming. Space is limited. Reservations are required. (First Come - First In). Last minute walk-ins and guests welcome.

Time: 5pm to 7pm. Come and go as your time permits.  
The COMSOC/SP website is: <http://sites.ieee.org/ct-comsp>  
The CTCN website is: [http://ewh.ieee.org/r5/central\\_texas/cn](http://ewh.ieee.org/r5/central_texas/cn)

**Location:**

The Park at the Domain  
1601 Domain Drive  
Austin, Texas  
United States 78758  
Room Number: Suite 200

## 13 JOINT SMC/AESS CHAPTER MEETING

**Time:** 2:00 pm - 4:00 pm -- **MORE INFO AND REGISTRATION:** <https://events.vtools.ieee.org/m/212915>

**Topic:** *"1553 Avionics Cyber Vulnerability Assessment and Cyberattack Detection"*

Our research investigated methods for performing malicious message insertion attacks within the MIL-STD-1553B avionics bus, identifying their associated hardware and software design constraints and overcoming associated resource limitations associated with the attacks. We leveraged this research towards the development of software-based detection methods and the identification of design considerations that could mitigate such attacks. As a means of providing proactive cyberattack mitigation, we also developed cyberattack insertion ("penetration testing") methods as a means of performing cyberphysical vulnerability assessments for avionics subsystems.

**Speaker:** Edwin Aulick of Southwest Research Institute

**Bio:** Mr. Aulick has B.S. and M.S. degrees in Electrical Engineering from the University of Texas at San Antonio (UTSA). His studies included control systems, digital signal/image processing, and wireless communications. Mr. Aulick is primarily responsible for technical management, business development and marketing activities. Mr. Aulick's strengths includes managing Government hardware and software development efforts, performing trade studies, implementing process improvement particularly with respect to production and testing, and being a system lead on complex design efforts. Mr. Aulick was recently the principal investigator for an internal avionics vulnerability assessment internal research effort. He and his team explored the vulnerabilities associated with the MIL-STD-1553B avionics bus and developed cyberattack detection and mitigation techniques as part of securing DoD military weapon systems. Mr. Aulick is presently the AS9100 management representative for the Division.

Mr. Aulick's software experience includes Assembly, C/C++, MATLAB, Simulink, Basic, Python and LabVIEW languages using LabWindows/CVI, Code Composer Studio, GNU Radio, and Visual Studio development platforms. Mr. Aulick's hardware experience includes VHDL, HyperLynx Analog, DxDesigner, and CAD. Mr. Aulick is familiar with Windows and Linux Ubuntu operating systems.

**Location:**

6220 Culebra Rd  
San Antonio, Texas  
United States 78238  
Building: SwRI Dining Services (Cafeteria)  
Room Number: Private Dining Room #1

## 15 IEEE PI2 CHAPCOM AND VOLUNTEER APPRECIATION DINNER

**Time:** 6.30 pm - 8:30 pm -- **MORE INFO AND REGISTRATION:** <https://events.vtools.ieee.org/m/199863>

Join the PI2 Chapcom and Volunteer Appreciation Dinner at Cover3. Spouses/significant others welcome.

**Location:**

2700 W Anderson Ln #202  
Austin, Texas  
United States 78757  
Building: Cover3

## 16 CTS WIE, TEMS, YOUNG PROFESSIONALS AND EDUCATION SOCIETY: PLANS FOR THE FUTURE

**Time:** 6.30 pm - 8:00 pm -- **MORE INFO AND REGISTRATION:** <https://events.vtools.ieee.org/m/211415>

IEEE Event, brought to you by IEEE Young Professionals, Women in Engineering, Technology and Engineering Management Society and Education Society. Join us for a great discussion, networking and great food and drinks!

**Location:**

Cirrus Logic  
702 West Avenue  
Austin, Texas  
United States 78701  
Building: Just North of the Parking Garage. Park near West & 7th

## 17 JOINT SMC/AESS CHAPTER MEETING

**Time:** 11:30 am - 1:00 pm -- **MORE INFO AND REGISTRATION:** <https://events.vtools.ieee.org/m/212925>

**Topic:** "RF Geolocation Using a Single LEO Satellite "

A passive radio frequency (RF) geolocation solution is provided that uses a single low earth orbit (LEO) satellite to find an uncooperative earth-bound emitter. For the first time, an unambiguous solution is available for real-time, single-pass, and time-constrained acquisition scenarios where single transmissions are expected. The geolocation algorithm rapidly maps Doppler and Doppler rate measurements to an RF emitter location. Corresponding theoretic performance bounds are provided for mission analysis and optimality comparison. Numerical analysis over measurement noise, center frequency, slant angle, initialization error, ephemeris errors, and oscillator errors exhibit the algorithm's robustness over various mission types. The performance of the cUKF is demonstrated on raw IQ data acquired from the TDS-1 satellite operated by Surrey Satellites.

**Speaker:** Patrick Ellis of Southwest Research Institute

**Bio :** At SwRI, Mr. Ellis is tasked with the research, production, deployment, and support of signals intelligence solutions. General tasks include developing communications signal intercepts, direction finding, surveillance, and geolocation systems. Mr. Ellis has expertise in designing statistical signal processing algorithms and array processing in MATLAB, Python, and C/C++. He has also worked extensively with Simulink, NEC-based antenna modeling programs, R, and Latex. Working experience has been done on Linux, Windows, and Macintosh systems.

**Location:**

6220 Culebra Rd  
San Antonio, Texas  
United States 78238  
Building: SwRI Dining Services (Cafeteria)  
Room Number: Private Dining Room #1

## 19 IEEE AUSTIN SPECIAL SESSION ON “DATA ANALYTICS FOR IMPROVED SECURITY IN INTELLIGENT AUTONOMOUS VEHICLES”

**Time:** 6:00 pm - 8:00 pm -- **MORE INFO AND REGISTRATION:** <https://events.vtools.ieee.org/m/212312>

IEEE Austin ComSoc & SP and Computer & EMBS Joint Chapters

**Topic:** “Data Analytics for Improved Security in Intelligent Autonomous Vehicles”

### **Abstract:**

The rapidly expanding market size of the Internet of Things (IoT) has raised fundamental challenges in processing/transmitting unprecedented volume of data and powering all these devices. To address the limitations of cloud computing, the new technologies of edge computing leveraging the power of local computing close to where data are collected has become a promising solution in reducing the transmission overhead and supporting delay-sensitive and context-aware services. However, it further poses significant challenges in designing the computing and transmission system, memory system, and energy storage in embedded devices. Besides the challenge in designing a single device, new methodologies for data fusion, task distribution, and cooperative heterogeneous system on both edge and cloud are also in urgent need to enable efficient edge computing for IoT applications. This talk will discuss those new challenges and possible solutions. In the end, the design trends for the next-generation IoT system and future research directions will also be discussed.

**Speaker:** Dr. Heena Rathore

**Bio:** Dr. Heena Rathore is a Visiting Professor at Texas A&M University, in the department of computer science. Earlier Dr. Rathore was Data Scientist and Program Manager at Hiller Measurements. Prior to that, she was a post doctorate researcher for US-Qatar Joint Collaborative Project between Temple University, USA, University of Idaho, USA and Qatar University. Also, she was a visiting scholar for Wichita State University. She received her Ph.D. (with distinction) in Computer Science and Engineering Department while she was a Tata Consultancy Services Research Scholar at Indian Institute of Technology, India. She has also worked professionally as Design Executive with Phosphate India Private Limited and academically as Guest/Assistant Professor with University of Texas, Austin and SS College of Engineering, India respectively. She has been the winner of number of prestigious awards including Young Engineer Award, Global Engineering Impact Awards and Graphical System Design Achievement Awards by National Instruments. She has published more than 30 papers in peer reviewed journals and conferences in her field and is the sole author of Mapping Biological Systems to Network Systems (Springer). She is an IEEE senior member serving as the Vice Chair of IEEE Central Texas Section and Vice Chair of IEEE Engineering in Medicine and Biology Society, San Antonio Chapter and is an ACM distinguished speaker. She was also featured on TedX, Qatar held by TedXAlDafnaEd in Qatar and her work is covered in professional and major trade publications, major media, such as Microwave Journal, Everything RF, Financial Express, Science Reporter, Times of India, and India Today. She has been invited as a panelist, TPC member and has been a chair for multiple sessions. She is a reviewer of many peer-reviewed journals and conferences in IEEE, ACM, Elsevier, IET etc. Her research interests include cyber physical systems, deep learning, machine learning, security, cryptocurrency, distributed systems, wireless networks biologically inspired systems and software defined networks.

### **Agenda**

6:00 - 6:20 pm Networking  
6:20 - 6:30 pm Intro  
6:30 - 7:30 pm Lecture/presentation/Demo  
7:30 - 7:45 pm Q&A  
7:45 pm Adjourn

### **Location:**

AT&T Labs, 9505 Arboretum, Austin  
9505 Arboretum  
Austin, Texas  
United States 78729  
Building: AT&T Labs  
Room Number: 220