VOL. 2, NO. 6 OCTOBER 2020

IEEE FOOTHILL SECTION

Serving to Enhance the Community

(http://www.ieee-foothill.org/)

Monthly Newsletter

Section Announcement

IEEE Foothill Section Election

Attention: All Section Members

We are having an election in our section to be held from December 1st, 2020 until January 11th, 2021.
We are looking for candidates to run for all the various Officers within our section.
Please send your information before the end of November to:
David E. González (DavidGonzalez@ieee.org)
or Scott Wedge (wedge@ieee.org).

IEEE-FH STEM Initiative: Annual Inland Empire STEP Conference for K-12 Students

by David E. González

The Section Chair STEM Initiative participated once more in the Science and Technology Education Partnership 2020 Conference (STEPCon20) held on Oct. 8, 2020. This year was a special year for the STEP Conference as it marked the 20th anniversary of establishing this conference. If you want to find out more about this conference, please visit http://www.stepconference.org/.

Due to the CoVID-19 pandemic, the conference was all virtual. This annual event attracts K-12 Students from all the school districts in the Inland Empire. For this virtual event, there were approximately 5,000 students, teachers, and educators that attended.

IEEE-FH had our own virtual booth where we posted information and videos targeted to K-12 Students and the TryEngineering program. We also participated in a round table discussion to answer questions students and teachers had about engineering and computer science. We were the only group that had a live QA session for the event attendees. Our participation was a great success and we were asked to return next year. Keep up the great work members and volunteers!

As a side note, after the conference, we started talks with the technical coordinator for STEP and the Associate Superintendent of Secondary Education and Science Lead for the Rialto Unified School District - Dr. Edward D'Sousa. We will continue our discussions to have IEEE-FH volunteers assist Rialto USD to create a summer science boot camp for the district schools, which will include sessions to "Teach the Teachers" about science.

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PREPARED BY: Max Cherubin (mail@maxcherubin.com)

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I would like to thank the small group of IEEE-FH members that volunteered and actively participated in this event. Without them, this would not be possible. A big thank you to Dr. Osman Ceylan, Chair of Educational Activities (EA), Miss Arusyak Hovhannesyan from our Young Professionals (YP), and auxiliary support from Miss Jackie Kelley from Women in Engineering (WiE) and our section Vice Chair Dr. Scott Wedge. The virtual conference was hosted by 6CONNEX and funded by various sponsors including the Gordon Bourne from the Bourns Company (https://www.bourns.com/).

We are always looking for volunteers to share their passion for STEM activities and make a difference to our community. Please contact me - DavidGonzalez@ieee.org or our Dr. Wedge @ wedge@ieee.org.

Foothill Consultant Network Meeting Minutes

by Cash Sutton III, P.E

Held on Oct. 3, 2020, each attendee introduced self and provided a brief technical background.

- Former member from DeVry has returned to his home in Indonesia where he works as an IT consultant for the local school district.

Small Business Innovative Research (SBIR)

Dr. Beatty identified a couple of SBIR projects

- one associated with a fission reactor for space flight
- 2nd associated with solar energy and storage.

Student Liaison

We discussed the lack of students and agreed that many of us are near the end of our careers. We encourage students to join our meetings to examine opportunities that may be available for them, either as a consultant or an employee of a current consultant.

Old Business

We have agreed to plan a conference in May 2021. We need committee members to assist us with the planning. Please join us!

Next Meeting: November 4, 2020

Foothill Section October OpCom Meeting

by Scott Wedge

The October Foothill Section Operations Committee (OpCom) meeting was held on October 13th via Zoom. Fourteen IEEE members attended. The meeting began with congratulations to our new IEEE President-elect, Prof. K.J. Ray Lui, and new Region 6 Director-elect, Kathy Hayashi.

IEEE Day was celebrated on October 6th, and the STEP Conference (supported by UC Riverside) was held on October 8th. Cal Poly participated in IEEE Day with a featured speaker from the Electronic Design Automation industry, while members of our IEEE Young Professionals and Educational Activities teams had built a virtual booth for STEPCON. Section Chair David Gonzalez presented a slideshow showing the booth and its activities involving contributions from IEEE volunteers Arusyak Hovhannesyan and Osman Ceylan.

Membership Development Chair Kimberly Mosley reported on 33 additional IEEE members in the Foothill Section and one elevation to Senior Member: congratulations Orlando Nova! Student members at Cal State San Bernardino discussed their preparations for the IEEEXtreme event to be held on October 22-23. This is a global 24-hour hackathon and competitive programming competition held every year where students compete to solve a set of programming problems. Student leaders were seeking volunteers to help proctor the 24-hour event in support of the competition and to oversee their participation. Several volunteers came forward to help despite some very late-night proctor time slots that needed to be filled.

Computer Society Chapter Chair Ray Moreno announced that the NIST Cybersecurity Compliance presentation will be held on October 20th, featuring our own David E. González. Ray is also planning a Flight Software Workshop to be held in early 2021. Young Professional Vice-Chair Arusyak Hovhannesyan has also been busy organizing a "Beers with Engineers" event to be held (via Discord) on October 24th. Foothill Consultants Network Chair Cash Sutton, III reported on several activities and member participation at the FHCN meeting held on October 3rd. Students are welcome and encouraged to attend future FHCN events.

The OpCom meeting concluded with Chair David E. González encouraging all members to run for an office or a position of their choice for the Foothill Section Election to be held in December. Essentially, all Foothill Section positions are open to candidates so long as they are qualified: they must be IEEE members and members of the Section, Society Chapter, Council, or Affinity Group that they would represent.

VIRTUAL IEEE COMSOC Presentation: Cognitive Approach to Building a Safe and Smart Cities/Societies

by Dr. Frank Freyne

Presented by Fawzi Behmann, IEEE NAS Officer
Primary sponsor: IEEE Saint Maurice Section,
located in Trois Rivieres, Province of Quebec, CANADA; Professor Pierce Mooney
Joint event sponsors were IEEE Sections in Orlando and Puerto Rico / Caribbean sections
Held October 19, 2020

A current and perennial topic within the city planning arena is how to make cities safer, more efficient and sustainable for those who choose to reside there. Developed cities around the world are actively launching "smart" solutions, that is, solutions that will use the currently available technology in their redesign and construction. In the developing world, new and emerging cities are integrating "intelligent" connected systems from the start. The opportunities are immense—across infrastructure, people mobility, energy availability coupled with energy usage, integrated health care solutions, and the food production and distribution cycle. Developing innovative technology applications from all the technical engineering and scientific fields and integrating these together in city/ urban planning is the challenge in the coming decades. It is a certainty that electronic communication systems will have a critical part of this effort.

Our presenter today, Fawzi Behmann from the IEEE COMSOC Houston and Galveston Section, shared his insights in many of the areas that will be part of the "Smart City" of the Future. As he showed, it includes many other areas than electronic communications (4G, 5G and Beyond). However, 5G still appears that it will be a significant part in integrating the many other urban development areas.

FIGURE 1: Our speaker started here. Even if the Smart Cities will be transformative, note that the design of work places, design of water and waste systems, and functioning transportation systems (with a goal of eventual autonomous transportation systems); all current planning considerations will still be on the agenda. In fact, our IEEE COMSOC members need to view their contribution as part of integrated systems engineering effort.

FIGURE 2: Better, highly reliable telecommunication. Including wireless as it is needed, will be an integral part of the future economy. We know that it has in roads in all these areas now.

Many other "concepts" such as machine learning, neural networks, "artificial intelligence", etc., were noted (in passing) as areas that will be included in the "new industries", depending on their respective progress.

FIGURE 3: Part of the list of the initiatives that are part of the global planning for Smart cities is cited in this chart. Note that many of these are community and support goals for a prosperous and functioning society. Fauzi Behmann pointed out these important facts to our IEEE COMSOC engineers. It takes all the people in a city to make it a working and livable city. A COMSOC engineer has to broaden his / her horizons.

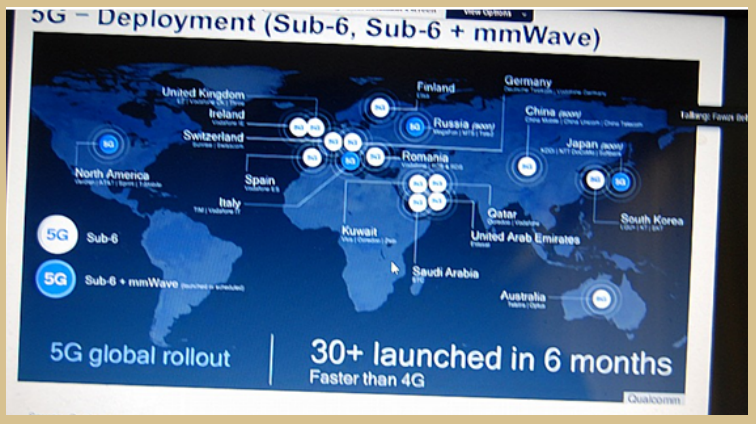

FIGURE 4: Deployment status of 5G around the world. As we know from other sources, it is strictly limited to a handful of urban areas in the USA at this time. (The joke is that you have to have a 5G mobile phone and be located in the near shadow of a 5G base-station. Fawzi Behmann did not get to this level of current technical field engineering detail.)

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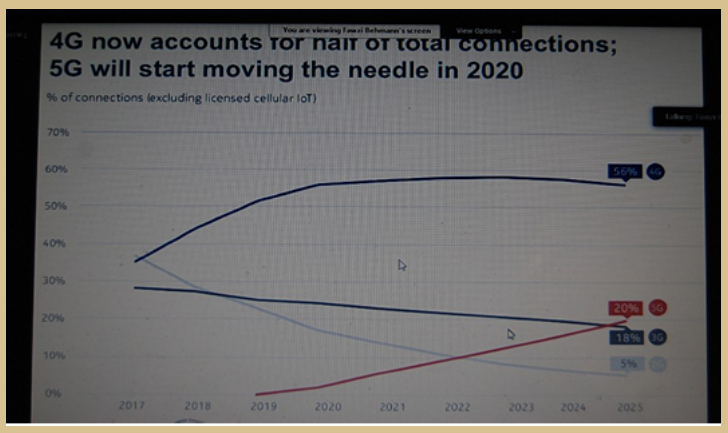


FIGURE 5: Beware of the 5G hyperbole and euphoria of the immense and well paid marketing and PR community. We are living (and surviving quite well) in the 4G and 4g-LTE wireless deployed community. Notice the red line on this chart showing the projected 5G deployed units. Right now we are in low single digits. Lots of work needs to be done to achieve the 5G BW specifications at the higher frequencies (greater than 6 GHz). Why? So that the urban planners and the broader economy players see the utility in 5G investments.

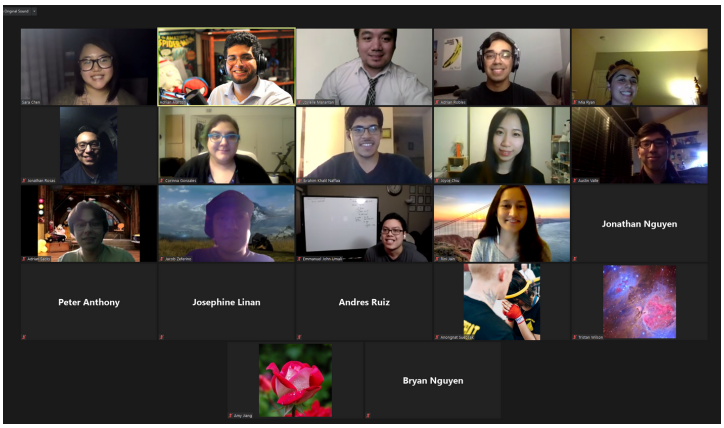
As supplied by our presenter today, some key examples where this 5G technology needs to be technically and cost ROI demonstrated include these areas : smart homes, public safety, autonomous driving, healthcare, and smart energy.

It must be carefully noted that this REPORT represents the attendee's (Frank G. Freyne) notes and interpretation of the most important points of this excellent presentation. As noted earlier, the important message is that the IEEE COMSOC engineer should broaden his/ her horizons to see where telecommunications (4G , 4G LTE, 5G and whatever is beyond) fits into public planning for a growing advanced society.

Our thanks to Fawzi Behmann for an excellent presentation.

IEEE | CPP - Member Induction Night

by Adrian Alarcon



On Saturday, October 10th, the IEEE Student Chapter at Cal Poly Pomona held its first-ever Member Induction Night. We felt it would be a welcoming experience for those who are new and returning members of the club, we wanted them to be acknowledged and gather around people that they will get to know throughout the year. We started the event off with an introduction of the Branches Cabinet, followed by the Chair of the IEEE Foothill Section, and a welcome from the advisors to the club. We recognized all of the members who registered since the beginning of the academic Fall Semester. After the recognition ceremony, we played some IEEE and Cal Poly Pomona trivia on Kahoot! and wrapped the event up with a conclusion and debrief on what was to come.

Cyber Security as it Relates to NIST Compliance

Date & Time: Tuesday, October 20, 2020; 18:00 – 19:15

This Cyber Security presentation was given by our own Section Chair, Mr. David E. González. He is a member of the Department of Defense (DoD) Cyber Security Work Force (CSWF) and he shared the practices of Cyber Security compliance within the Federal Government and aerospace industry. National Institute of Standards and Technology (NIST) publishes various guidance and standards requirements documents to help businesses and government entities at every level improve the protection of their digital assets. The technical talk ("TechTalk") will cover the top NIST approved documents – NIST 800.53 and NIST 800-171. Also, discussion on defining Control Unclassified Information (CUI). The main topic of the presentation was focused on self-auditing their company's Cyber Security stance in compliance with NIST 800.171.

Young Professionals (YP) Beers with Engineers (BWE) Virtual Event

by Arusyak Hovhannesyan

The Young Professionals Affinity Group of the Foothill Section celebrated October once again with beer during their event, Beers With Engineers (BWE). On Saturday, October 24th, young engineers met on Discord to socialize and meet new like-minded folks. Due to the CoVID-19 pandemic, meeting new people has become a real challenge and left many of us socially deprived. This networking event gave the outlet folks needed to gather and discuss topics on business, project ideas, as well as more casual conversations such as building drones, 3D printing, and of course video games.

Although there was a significant gap between the last YP event and BWE, turnout was better than expected, with 13 attendees in total. Over 20 members joined YP's discord which we are hoping to continue expanding for YP members to have an ease of access to YP cabinet members for better outreach. If anyone is interested in joining to participate in our future events, please follow this link: https://discord.gg/cUgVUxrfpc.

All in all, we had a positive response and feedback from our attendees who let us know they would be most interested in attending YP's future events. I would like to give a big thank you to Scott Wedge for leading the business talks, as it seemed to be the most popular topic among our participants due to his well informed advice to the early career starters. Our YP cabinet members, Eric Diaz and Sherry Buiter also had a big hand in organizing the event and I could not have done it without their support.

If you have any questions about YP or BWE, please feel free to email me at arusyakhovhannesyan@ieee.org.

Ray Alcantara from EPICS in IEEE and IEEE TryEngineering LIVE interview with Professor Hal Walker

by David E. González

It was a free event on Oct. 22nd, 2020 targeted to middle school and high school students. Dr. Bettye and Professor Hal Walker were interviewed live from their home in Capetown, South Africa. There were students, educators, and teachers from across the country and the world that attended this event. Our IEEE-FH section chair's STEM Initiative was involved in coordinating this event with TryEngineering and IEEE Southern California Council (ISCC).

Professor Hildreth (Hal) Walker, Jr., truly a NASA hidden figure, Walker led the manufacturing, testing and operation of the KORAD K-1500 ruby laser system in 1969 during the Apollo 11 Moon Landing. The Lunar Laser Ranging Experiment was the only interactive planetary experiment that took place for the first Moon Landing.

IEEEXtreme Global Hackathon Competition (IEEE Xtreme 14.0)

by David E. González

Despite the hindrances and difficulties of the pandemic, we were able to have some of our IEEE Student Branch members participate in this year's IEEEXtreme Global Hackathon Competition (IEEE Xtreme 14.0). We had brave souls from California State University, San Bernardino represent our IEEE Student Branches. One of the other problems that our students had in setting up and participating in this competition was to find proctors for this event. Our section members stepped up and came through! A special thanks to Dr. Osman Ceylan and Mr. Cash Sutton, III for stepping up and pulling two shifts of the 24-hour long hackathon. Our students placed well in the overall global rankings. Thank you CSUSB Student Branch Computer Science & Engineering Club!

PREPARED BY: Max Cherubin (mail@maxcherubin.com)

IEEE COMSOC Distinguished Lecturer VIRTUAL Presentation

by Dr. Frank Freyne

"Computation Offloading and Activation of Mobile Edge Computing Servers: Minority Game Model"
By Dr. Ekram Hossain, University of Manitoba, Canada
Held October 20, 2020

This interesting presentation explored the utilization of Mobile Edge Computing. Professor Ekram Hossain started his explanation referring to several independent college students, all over the age of 21 years presumably, wanting to go out to the college town favorite bar. However, each only wanted to go out if that bar was less than 60% occupied.

To explain the concept in a different way, in terms that should be descriptive for an IEEE COMSOC engineer, consider a situation where a number of mobile 5G wireless users that are part of a series of small cell networks. Each has gathered some data from their mobile device sensors, and wants to do some computations with the parameters obtained. We presume that the each mobile device is unable to do these computations (which could be of a machine learning or artificial intelligence type). This may be due to the time allotment and CPU allocation simple needs of doing other tasks with the mobile device or a desire to save mobile battery power, etc, The information could be sent to a distant cloud (if latency were not an issue). It could be sent to a base-station that can gather the different parameter information from a set of mobile users. It is assumed that all the mobile users want some processing help; most possibly for different processing algorithms. For this problem, the base station is considered a local edge of the cloud. Each user wants his / her job done quickly and efficiency. Hence the terminology assigned here of Mobile Edge (of the main clouds) Computing.

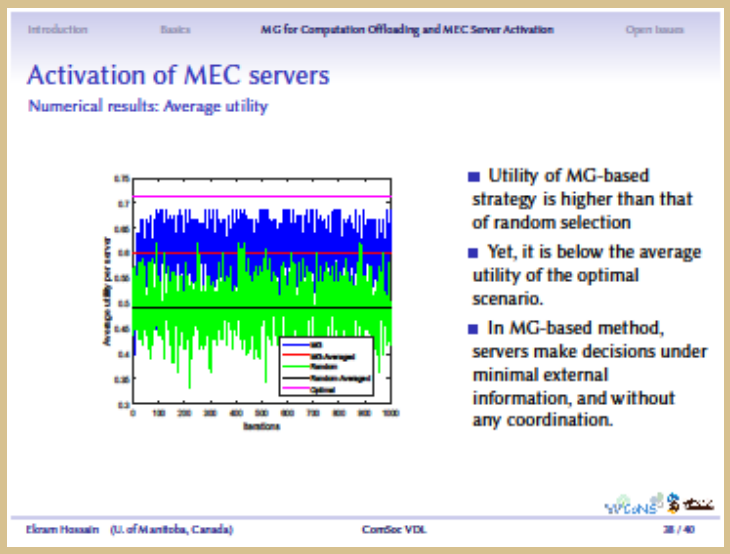
The emphasis of this presentation was to explore the mathematical concepts of minority games; in particular, non-cooperative game theory. The problem is that of dynamic resource allocation. Each mobile device wants to have its processing done by the MEC station within some time for completion, The system constraint is that this off-loaded work interacts with a fixed number in total of MEW processors (CPUs). There are some other general constraints (which were not clearly specified). Note that each mobile unit is assumed to have no communication capability with any other mobile unit. There is no cooperative planning. In addition, there is no ordering of requests or scheduling by a base-station cloud. (This was stated as not preferable due to required central site
signaling overhead to and from each mobile user.)

Begin the game for each mobile user. Consider a strategy. That is, make a binary choice for what action your mobile device will take when each specified input–to-the-MEC epoch occurs. Transcribe it to your line-up / scorecard.

The other mobile devices are considered as distinct players in this game. Each will have a different strategy. (Assume randomness; no mobile user has the identical strategy.) Assume that the number of MEC processors is fixed during these trails. Then at each possible transmission interval to the MEW, there may success) or may not (failure) be a CPU processer available.

Run a thousand iterations, and tally a score for success for your processing completion. (We are skipping all the charts of mathematics in this report.)

The results of these non-cooperative games are shown in the following Figure. The wording on this summary chart describes the results.



As for the future study plans of Professor Ekram Hossain, they include extending these Minority Games (MG)-Mobile Edge Computing (MEC) to consider classes of heterogeneous users (look past smart mobile phones to include tablets and laptops, for example). This could include developing stochastic models for the signal / data processing between the user's device and the base-station-entry to the edge computing processor.

In this regard, we would propose starting from the capability of the currently being developed 5G chip sets (for example, Qualcomm Snapdragon 5G sets with their core memory). We note that this would be a challenging problem. Since these stochastic model results could directly affect the performance of the 5G system, we in the IEEE Foothill COMSOC Chapter would be directly interested in hearing Professor Ekram Hossain's such advanced results.

Our thanks to Professor Ekram Hossain for an interesting briefing on game models in MG-MEW.