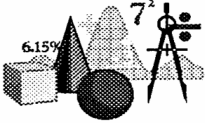# IEEE

SPARKS
Daytona Section Newsletter
November 2019

SECTION MEETING
Thursday November 21st at the Halifax River Yacht Club
331 South Beach Street, Daytona Beach, Florida 32114

PRESENTATION
USE OF TECHNOLOGY AND
AI IN THE POWER GRID
*****

2019 Outstanding Section Membership Recruitment Performance

Daytona Section

CHAIR'S REPORT

It is with great satisfaction that I get to tell you about one of our IEEE student chapters. The Embry-Riddle Aeronautical University (ERAU) Daytona Beach students took part in the 2019 IEEExtreme programming competition over the fall break. The competition was a global, 24-hour, non-stop programming contest.

There may be an update on the rankings, but the latest numbers I saw for ERAU were outstanding. The results place the ERAU students 289 out of 4103 worldwide, 27th out of 202 in the United States, and 8th out of 65 in the Southeast United States. My calculation shows that the ERAU students placed at the ninety-third percentile in the world.

More specifically, Stephanie Zerby was the IEEE student point of contact for this year's event, and Donna Ferrell organized all the rooms, food, and pre-coordination with security. Dr. Keith Garfield proctored the event with help from Dr. Akbas, Dr. Liu, and Dr. Stansbury.

I think it is important to mention all the students who kept programming for 24 continuous hours. The students who participated are Mohammad Alali, Vivian Dang, Laurel Dodson, Chris Etinas, Daniel Khalil, Kira McFadden, Dalton Mitchum, Victoria Rutenbeck, and Stephanie Zerby. These are some of our future leaders.

Rich

OCTOBER'S PRESENTATION

October's presentation on the Role of Drones in Law Enforcement was a fascinating look into how this technology is being used to help law enforcement in all aspects of public safety.

Dr./Professor/Officer Anthony Galante and Detective Matthew Smith from the Daytona Beach Police Department (DBPD) explained how and when the drones are used and showed video from the drones which helped them in situations which would not have been possible without the technology.

Dr./Professor/Officer Galante and Detective Smith receiving our Daytona Section Mugs from Section Vice Chair Dr. Helen Hernandez

NOVEMBER'S PRESENTATION

USE OF TECHNOLOGY AND AI IN THE POWER GRID
Michael Putt, PE, from Florida Power and Light, will present a general overview of the smart grid, the power grid and the deployment of drones.

Mr. Putt has 30 years of experience in innovating solutions for the Power Grid. Started with Commercial Industrial, move to utility Substation Automation, then Smart Grid and today it's application of Artificial Intelligence, Machine Learning and Drones.

Mr. Putt graduated from Penn State with a BS in Electrical and Electronic Engineering and is a member of the IEEE.

ANOTHER TALE FROM THE OLD PROFESSOR

EXASCALE Computing

The computer industry has used a number of different metrics to describe the speed of a computer. One metric that is often stated, particularly for PC's, is the system clock frequency. Modern desk-top PC's have clock frequencies in excess of 1 GHz. One would think that the clock dictated the speed of the computer but this is misleading. It takes more than a fast clock to make a fast computer. There are many other parameters that come in to play.

The basic machine cycle for the ENIAC, one of the first large scale digital computers built during WWII, was 200 kHz. It took the ENIAC about 28.6 ms to take a ten-digit square root. This might sound painfully slow by today's standards but before the ENIAC, some expensive mechanical "adding machines" could take 10-digit square roots and the process would last for almost a minute.
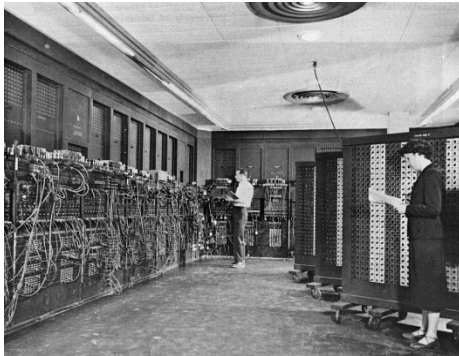
ENIAC started with 5000 vacuum tubes and had as many as 20,000 when enlarged over the years. The mean time between failure, MTBF, was 48 hours and the mean time to repair, MTTR, was 15 minutes.

One method of assessing a computer's speed is how long it takes to do some sort of benchmark calculation such as taking square roots. An early, (1972), benchmark was the "Whetstone". A later benchmark, the Dhrystone, was introduced in 1984. (What would follow the Whetstone? The Dhrystone, of course.)

One disadvantage of the Dhrystone was it did not use floating point calculations and would not accurately characterize a computer that would perform a lot of floating-point operations such as computers used for scientific calculations. For the scientific computers, a measure of the computer's speed would be the number of floating-point operations per second, or FLOPS, a computer could perform.

If a computer could perform a million floating-point operations in a second it would be a megaFLOPS computer. This would be a very slow computer compared to what modern, large scientific computers can do. Laboratory super-computers perform gigaFLOPS, (10^9 FLOPS), teraFLOPS, (10^{12} FLOPS) and even petaFLOPS, (10^{15} FLOPS).

The US Department of Energy's laboratories with its partners in academia, computer manufactures and other government laboratories have introduced their "Exascale Computing Project" to create a computer that can perform 1×10^{18} FLOPS or exaFLOPS.

Let's get a handle on how fast that is. Let's say we want to translate English text to another language; say, German. Let's also say it takes 1000 floating-point operations or a kiloFLOP per textual word to do this. It would take only 1.57 nanoseconds to translate "Atlas Shrugged" plus "Gone with the Wind" plus "War and Peace", a total of 1.567 million words, from English to German. Let's translate those novels to 100 different languages. That will take a while longer; 157 ns. Obviously, the National Laboratories are not translating novels with their super-computers. It would probably take less than a second to translate every novel ever written.

The first Exascale computer, named Aurora, will go to the Argonne National Laboratory, Chicago, in 2021. The computer will be built by Intel and will use Intel's XEON technology at a cost of about $500 million which seems a bargain at one-tenth of a nanodollar per FLOPS.

Dr. Al Helfrick, a.k.a The Old Professor

PE CORNER

THE STEPS TO PROFESSIONAL LICENSURE, PART 2
In a recent column I discussed the beginning of the route to get your Professional Engineer license; taking the FE exam. This month I will focus on the next step, experience required and being an Engineering Intern (EI).

If an EI graduated with 4-year engineering degree, they must obtain 48 months of experience to qualify to apply to be a PE. The Florida Legislature recently changed the law such that an EI graduating with an approved Engineering Technology degree will need to complete 72 months of experience before being qualified to apply to be a PE.

What qualifies as experience? The type of employment considered acceptable must principally involve activities in the field of engineering as defined in *Section 471.005(7), F.S*. What qualifies as "experience" is found in *61G15-20.002, F.A.C.- Experience*. Some criteria considered for meeting the 48-month requirement includes:

- Experience that logically follows and incorporates an application of the engineering education previously obtained.
- Full-time experience obtained within 2 years of completing the engineering degree, that involves tasks and responsibilities consistent with the disciplines of engineering. Experience credit may be awarded at 50% of actual time, with total allowable credit for pre-graduation experience to not exceed 12 months.
- Experience on engineering projects that is progressive in nature, indicating an increase in quality and involving greater responsibility.
- Experience gained under the supervision of a licensed professional engineer.
- Experience gained in engineering research and design projects by members of an engineering faculty where the program is approved by the Board.
- Experience that includes demonstration of a knowledge of engineering, mathematics, physical and applied science, properties of materials, and the fundamental principles of engineering design.
- Experience that includes demonstration of the application of engineering principles in the practical solution of engineering problems.

Additionally, an applicant must list three (3) personal references who are professional engineers. These references cannot be the same individuals used to verify employment and experience.

To learn more about the examination and application process for the FE and PE exams go to the *Application Process* page under the *Licensure* section of FBPE's website at *www.fbpe.org*. If you have questions related to qualifying experience contact the Board office at (850) 521-0500 and ask to speak to someone in the *Licensure* department.

Next month I'll discuss the final step to licensure, the PE exam.

Whether you are a PE looking to attain required CEHs, or an engineer looking to learn something new or keep current with the latest trend in the profession, IEEE has seminars that will meet your needs.

Art Nordlinger, PE, Senior Member

DAYTONA SECTION SHIRTS

We are pleased to offer Daytona Section polo shirts for our Section members. The shirts are embroidered with the IEEE Logo and DAYTONA SECTION on the left and your name and grade, if desired, on the right. The shirt is a high quality 5 oz, 65/35 poly/cotton pique in Royal Blue with white embroidery. Available in S - 2XL in men's as well as ladies' sizes. Price is $30, including tax, for S-XL size's, 2XL size is $3 additional.
For more information or to order shirts contact: Allan Jusko 386-671-3706 or a.jusko@ieee.org.

FUTURE MEETING DATES:
Dates for the 2020 sessions are being confirmed.

EDITORS NOTES
Visit our Daytona Section website: https://ewh.ieee.org/r3/daytona/

ENGINEERING HUMOR

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NOVEMBER 2019 MEETING

Thursday November 21st at the Halifax River Yacht Club
331 South Beach Street, Daytona Beach, Florida 32114
Just south of the Fire Station at the corner of Beach and Orange Streets

TOPIC– Use of Technology
and AI in the Power Grid

SPEAKER – Michael Putt, PE,
Florida Power and Light

AGENDA
5:30 PM Greetings & Cocktails
6:00 PM Dinner
7:00 PM Presentation

Dinner Selections

Roasted Pork Tenderloin – Topped with Madeira Sauce served with Sweet Potato Mashed and Roasted Brussel Sprouts

Chicken Cordon Bleu – Chicken Breast stuffed with Swiss cheese and lean Ham served with Sweet Potato Mashed and Roasted Brussel Sprouts

Blackened Salmon – Served with Sweet Potato Mashed and Roasted Brussel Sprouts

All Dinners come with HRYC House Salad and Bread Service, Coffee or Tea

Members and guests $20.00 each
Students $5.00

IMPORTANT DINNER NOTE!
The Yacht Club is requiring us to give them a dinner count by the Tuesday afternoon

before our meeting. As always, all members and guests are welcome to attend the meeting and presentations, however any dinner requests received after Tuesday afternoon may not be accepted

Please contact Allan Jusko by <u>Tuesday November 19th at noon</u>
to give us a count for dinner or for further information

If you make reservations and are unable to attend, call prior to the event to cancel.

The Section is charged for all dinners ordered, please let us know if your plans change

Allan Jusko   Editor   386-671-3706