Wavelengths

IEEE Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

Volume 63 – Issue 05

Contents

Upcoming Events

We have several events coming up this month, all are listed below, FYI.
Note: All times are EST/EDT. If any events are missed do kindly bring them to the attention of wavelengths@ieee-sem.org. Enjoy!
You can also use this bookmark to view All of the links at a single glance
http://bit.ly/sem-upcoming

Event	Date	Time
The Future of Fast Data Center Networks	05 May 2023	01:00 PM
Documentary Night: The Codebreaker	05 May 2023	04:31 PM
Ch8: AdCom Teleconference	11 May 2023	11:00 AM
SEM Section ExCom Monthly Meeting (virtual) For MAY 2023	11 May 2023	06:30 PM
Documentary Night: Einstein's Quantum Riddle	12 May 2023	04:30 PM
Technical Judging - Robofest World Championship	13 May 2023	08:00 AM
"How to Change"	17 May 2023	06:30 PM
Digital Substations - Concepts, Designs and Benefits (Virtual Event)	19 May 2023	noon
Documentary Night: Great Electric Airplane Race	19 May 2023	04:32 PM
EMC Fest 2023	25 May 2023	08:00 AM

Chair's Column

The year so far:
It sure seems like time has started flying faster these, now that thankfully the pandemic has been declared officially over. I have not heard from IEEE-HQ on this topic – but as you know we have started to slowly increase the number of in person meetings, although we continue to do plenty of technical/admin/planning meetings online. By the way we remain on track to meet/exceed the total # of meetings we did in 2022, so good job to all of our volunteer chapter, affinity group, committee and student branch leaders!

The IEEE Section has, as in the past always supported the development of our budding young kids in Science and STEM. Read Don Bramlett's report (page 13) on the Science Fair judging – you will be happy to see the kind of work our future engineers and scientists are doing. Gives one immense hope for our technological future!

Coming up soon:
Chapter 5 has scheduled a Summer Potluck Picnic on July 2nd at the Rochester Municipal Park. Expect to see an E-notice but you can see the flyer on page 14.

We have 3 more very interesting documentaries scheduled for our Friday nights to help kick off our weekends. The topics are: the race to build Electric Airplanes (page 19), the pioneer codebreaker/cryptanalyst Elizebeth (yes that is the correct spelling) Friedman (page 10), and some fascinating background on the physics of quantum entanglement (page 9).

This May will be Robofest at LTU (check out CJ's brief on page 15). The IEEE Section will of course be there and supporting them in more ways than one! And one of the grand events – EMC Fest takes place on May 25th – but I bet most of you were already aware. (see page 11)

Last year Chapter 5 celebrated the 20th anniversary of their ESW (Embedded Systems Workshop). They have already begun planning to up the ante and are preparing for a massive 3-day event spread over October 14, 21 and 28th. Keep a weather eye out for announcements!

The TEMS chapter has a new format for their tech event – a book discussion. See their event on the SEM website calendar (May 17).

Also in this edition, we are featuring Robert Hipple, a dual chapter chair (see page 20). In the next few editions, we will highlight more of our volunteers.

Finally, I ask you to help share news about our IEEE Section to fellow engineers. This will help us fulfill the mission and goals, which is to use technology to help society. Do help us gain more visibility – word of mouth, invitations to our tech events, skills, join as members, post our events to your social media feeds, etc.

Sharan Kalwani
Via email: chair@ieee-sem.org
Section members are encouraged to engage using <u>any</u> of these online platforms:

Technical Activities Report

2023 IEEE SE Michigan Section Geo-unit Status (Till April 27th)

Ch's & AG's	Ave Tech Mtg. Attend	Ave Tech Mtg Guest	#L31 -Technical	#L31 -Admin	#L31 Professional	#L31 -Other	Geo-Unit Name	# Unreported	Total Mtgs
Cnslt	0	0	0	0	4	0	Consultants Network	1	4
LIFE	0	0	0	0	0	0	Life Members	4	0
WIE	25	15	1	3	1	0	Women In Engineering	0	5
YP	0	0	0	0	0	0	Young Professionals	0	0
1	0	0	0	0	0	0	Circuits & Systems, Signal Proc., Info Th.	0	0
2	21	8	3	0	0	0	Vehicular Technology	0	3
3	0	0	0	0	0	0	Aerospace & Elec. Sys., Communications	0	0
4	40	27	3	0	0	0	Trident (Ant, Elect Dev., uWave, Photo)	0	3
5	32	9	12	2	0	0	Computers	0	14
6	161	56	1	0	0	0	Geoscience & Remote Sensing	0	1
7	183	74	3	2	0	0	Power Engineering, Industrial App.	0	5
8	37	18	4	4	4	0	Electromagnetic Compatibility (EMC)	1	12
9	0	0	0	0	0	0	Power Electronics, Industrial Electronics	0	0
10	0	0	0	1	0	0	Engineering Management	0	1
11	0	0	0	0	0	0	Eng. in Medicine & Biology	0	0
12	24	0	1	1	0	0	Control Systems	1	2
13	20	0	14	4	0	0	Education	0	18
14	0	0	0	0	1	0	Robotics & Automation	0	1
15	40	27	3	0	0	0	Nuclear Plasma Science Society	0	3
16	0	0	0	1	0	0	Computational Intelligence / Sys.Man.Cyber.	0	1
17	27	0	1	0	0	0	Nano Technology Council	0	1
SEM	28	0	3	21	1	0	SEM (Section)	3	25
	640	235	49	39	11	0	NOTE: Highlight Green = Active	10	99
		37%					NOTE: Highlight clear = Concern		

Chapter and Affinity group leaders please reach out to the TAcom for any assistance. Chapter and Affinity group members if you have suggestions or requests for technical meetings please contact me via the email below.

Your TAcom plans to continue contacting chapters and groups needing assistance in meeting IEEE and SEM Section goals for encouraging member participation and discussions related to the vast amounts of technical and engineering challenges facing our world.

V/r
Jeffery V. Mosley
TAcom Chairman
jvmosley@ieee.org

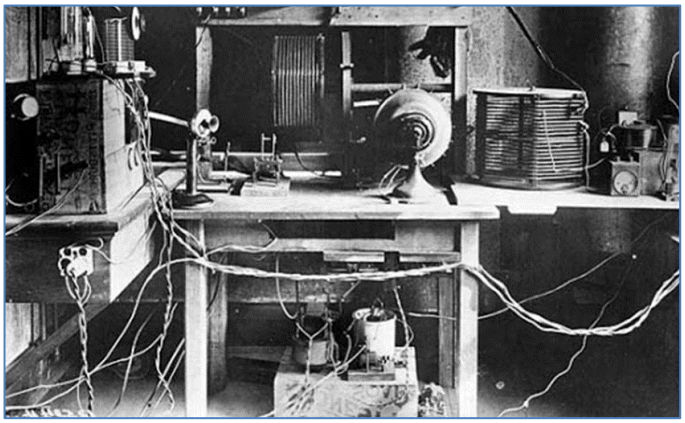
Radio Evolution

The "Code of Federal Regulations" (Part 97) which defines Amateur Radio as a service states in part :
(c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.

This begs the question of how and why do any 'advancements' come about? Aside from organizations such as the ARRL (American Radio Relay League) and the RSGB (Radio Society of Great Brittan) and local 'clubs', everyone seems to be off doing "their own thing". And what reason would any Amateur Radio Operators have for spending time and investing money in either the skills or technical phases of radio communications? As has been pointed out elsewhere, in Part 97 they are forbidden from accepting any financial compensation for what they do with or for radio.

The answer is the large number of 'Hams' who maintain a focused interest in all aspects of radio communications and related technology. Among the approximately 3 Million hams worldwide, many are either active electronics practitioners, or just love to 'tinker' with equipment to find out just what it can do in the extreme, or how it can be made to provide better communications, or the many who participate in 'contests' to see who can make the most 'contacts' if a specific type or 'mode' (Voice / Morse Code / Digital / to a particular state or country / using a particular 'key' / etc)
The variations are almost endless.

All those interested parties make incremental advances, and tell each other about what works and what fails. Successful innovations are almost impossible to avoid. During the early days of radio experiments with loading coils and capacitors and spark gap transmitters, Hams began the first movement toward frequency selection:



This YouTube video is an interesting demonstration of a rotary gap spark gap transmitter..
https://www.youtube.com/watch?v=p9PJTZQgZwo&list=PLt-EzlLx2AKE0nntk6MUb203Qg2CqczLo
Those early days saw a rapidly growing interest in radio among young people who constructed their radio stations from scratch since there were no manufactured parts to purchase. Well before the US government got interested and began licensing stations there were hundreds of young 'Hams' experimenting with stations like the one shown here.

After the sinking of the 'Titanic' when the US government began licensing stations and assigning frequencies the question came up "What do we do with all those 'Hams'?" Since the prevailing theories about radio involved low frequencies and 'groundwave' propagation, the solution was simple. "Give them everything 200 Meters and down. (*i.e. to shorter wavelengths*.) They will never get out of their back yards and eventuallly go away.". In other words, the government relegated Amateur Radio to the 'Useless' short waves.

Undaunted, the experimenters of the day began two movements. Ffirst, relaying signals from one station to another to get messages further than the low frequencies would allow, and second, building equipment to see just what could be done with those 'useless short waves'. The relay experiments evolved into the American Radio Relay League and it National Traffic System. At the same time, the high frequency experiments discovered the phenomenon of 'skip' where radio waves refract in the upper atmosphere and reflect off the earth. Suddenly Ham radio operators were demonstrating long-distance communications which opened up what then became "Short Wave Radio".

Developments coming out of Amateur Radio continue today with a long history of advancements in equipment, technology, and communications (operational) methods. Almost every step forward in radio has been preceded by Radio Amateur And the process shows no sign of slowing.
kw 30

This Month in May

Or: Notable Events in Engineering & Science History, which I Did Not Know! ☺

Frank Conrad (Station 8XK 1920)
Born 4 May 1874, died at age 67;
An American electrical engineer whose interest in radio telephony led to the establishment of the first commercial radio station. Conrad worked for Westinghouse as assistant chief engineer at its East Pittsburgh Works and acquired over 200 patents in his lifetime. As an amateur, having built a transmitting station on the second floor of the garage behind his home in Wilkinsburg, PA, when he substituted a phonograph for his microphone, he discovered a large audience of listeners who had built their own crystal radio sets and who, upon hearing the music, wrote or phoned requests for more music and news. When he became swamped with these requests, he decided to broadcast regular, scheduled programs to satisfy his listeners. He coined the term "broadcast."

Walter Bruch
Died 5 May 1990 at age 82;
Walter was a German electrical engineer who invented the Phase Alternating Line (PAL) color television system adopted in Europe. On a trip to America in 1953, he found inadequacies in the system as first developed there (NTSC, National Television Standards Committee). He returned to his German employer – Telefunken - and researched a way to improve color stability without need for tint and hue controls. By 1961, a preliminary patent was filed, but was superseded on 30 Dec 1962 with a definitive version of the PAL system. There followed a struggle for it to be recognized as the best coding method. Britain selected PAL as superior to NTSC and introduced it on 1 Jul 1967. Germany followed on 25 Aug 1967. Eventually most of the world, too.

Oskar von Miller
Born 7 May 1855, died at age 78;
A German electrical engineer who fostered the electric-power industry in Germany and founded the Deutsches Museum of Science and Technology in Munich. He made fundamental initial experiments on long-distance energy transmission such as (in 1882) over 57 km from Miesbach to Munich with 1400 volts direct current. In 1891, he organized a 20,000-volt power transmission line over 175 km from Lauffen to Frankfurt, an important advance in the transmission of alternating current. From 1918-24, he was project manager building the power station on Lake Walchen, at that time the largest hydroelectric power station in the world. With an average of 300 million kWh a year, the Lake Walchen power plant is still one of Germany's largest peak load power stations.

William Lear
Died 14 May 1978 at age 75;
An American aeronautical engineer, electrical engineer and inventor who taught himself electrical engineering and is best known for the Lear Jet Corporation he founded, the world's first mass-producer of business jet aircraft. Beginning in 1930, over a 20 year period, he secured more than 100 patents for aircraft radios, communications and navigation equipment. Lear's other inventions include the miniature automatic pilot for aircraft, the first commercial automobile radio, and the eight-track stereo tape player.

Oliver Heaviside
Born 18 May 1850, died at age 74;
Oliver was an English physicist and electrical engineer who predicted the existence of the ionosphere. In 1870, he became a telegrapher, but increasing deafness forced him to retire in 1874. He then devoted himself to investigations of electricity. In 1902, Heaviside and Arthur Kennelly predicted that there should be an ionized layer in the upper atmosphere that would reflect radio waves. They pointed out that it would be useful for long distance communication, allowing radio signals to travel to distant parts of the earth by bouncing off the underside of this layer. The existence of the layer, now known as the Heaviside layer or the ionosphere, was demonstrated in the 1920s, when radio pulses were transmitted vertically upward and the returning pulses from the reflecting layer were received.

Hideo Shima
Born 20 May 1901, died at age 96;
Hideo was a Japanese engineer, who designed and supervised the construction of the world's first high-speed "bullet" train, linking Tokyo and Osaka. It began service at 138 mph in Oct 1964. The rail line opened a new era in land transport. (The current generation reaches 169 mph). Shima also led Japan's space development program until 1977 at Japan's National Space Development Agency. In his early career, Shima worked hard to further develop powerful steam locomotives, culminating in the wartime 2-8-2 D51 and D52 for freight and the post-war 4-6-4 C62 for passenger trains.

He next developed electrical motive power distributed along the whole train length yielding higher power output on a multiple-unit train without damaging tracks and structures.

Lillian Evelyn Gilbreth,
Born 24 May 1878, died at age 93;
Lillian (née Moller) was an American efficiency expert, who was the wife of Frank Bunker Gilbreth, contracting engineer, together developed the method of time and motion study. Upon her marriage, 19 Oct 1904, she became a partner in her husband's fledgling motion study business. As a contractor, he was already applying ideas to improve the speed of building. After a few years, they applied motion study to industry. Each step of work activity was to be studied in detail (employing motion pictures for analysis) to determine the optimal way to execute a given task. By choosing a method of least exertion, the employees would be healthier, more productive, and economically improve the business. She continued after her husband's death in 1924.

Ernst Ruska
Died 27 May 1988 at age 81;
Ernst August Friedrich Ruska was a German electrical engineer who invented the electron microscope. For “his fundamental work in electron optics and for the design of the first electron microscope” he was awarded a share of the Nobel Prize for Physics in 1986 (with Heinrich Rohrer and Gerd Binnig). In 1928, he found that a magnetic coil could act as a lens to focus an electron beam. Adding a second lens he produced the first primitive (x17 power) electron microscope. By 1933, his refinements increased the magnification to x7000, exceeding what was possible with visible light. The first commercial model was marketed in 1939. Since then, electron microscopes rapidly found applications in biology, medicine and many other areas of science.

This continues the yearlong feature of interesting ***engineering*** events or milestones that occurred in a specific month. Readers are invited to share their views and opinions (or suggestions) at the accompanying link. Submissions can also be made using direct email to the editors at: wavelengths@ieee-sem.org.

Sharan Kalwani
Just one of the Editors, Wavelengths,
2022-2023 Chair, Southeastern Michigan Section
Passionate Engineering History Buff/Aficionado

Antenna Safety

I host a weekly 'forum' for the Long Island CW Club on antennas, and a recent topic was **safety**.
At this time of year when the weather is becoming more conducive to spending time out of doors most amateur radio operators want to take a 'closer look' at their antennas and feedline systems to see just what last winter's weather has done.

- Has there been any significant damage from those high winds?
- Are the coaxial cables or ladder line feeders showing any wear?
- Have any of the insulators cracked or developed a patina lately?
- Is there evidence that any of the neighborhood squirrels have found the tie lines 'tasty'?
- Have the counterweights for long lines drooped low indicating stretching of the antenna wire?
- Are any of the spring supports for tree movement in winds starting to rust?
- Do all the ground rod connections still look, and test, as good 'sinks' for lightning?
- Are any of the lightning arrestors showing signs of overload or burnout?
- Do any of the guy wires or cables look or feel as strong as they were when last checked?
- Are all the roof mount or tower mount bolts still tight and secure?
- Etc.

Obviously, every antenna installation is as unique as the rig and the Ham who assembled it and the answers will also be as varied. However, most usually involve some amount of climbing above 'tera firma' in order to get a closer look at the details of the antenna and the systems that support or feed it.

Therein lies a concern. Many of us 'mature' hams are getting to the age when we have no business getting up a ladder, or climbing a tree, or walking on a roof.
Case in point: The photo at the right of my vertical antenna on the peak of our roof with 6 radials, 4 guy lines, one coaxial feed line, a common current 'Choke' (That black coil on the PVC form) and a roof mount tripod with ground wires to two different ground systems. (Belt and suspenders approach to lightning protection.)

One of my ham friends, Tom VE6ARG, who lives in Alberta, Canada published an article on this subject a few years back, and I have reprinted it here, on the next page. Tom was a National Construction Safety Officer 'in a past life' and listed a number of 'best practices' for anyone of 'advanced years' to consider before getting more than a few feet above ground.

Tom's list contains a 14-point list of things to consider before you set foot on that ladder, or roof top, or tree. It is a good list, and well worth the time to read and think about each point. I know I have changed my mind about how I do things around my antenna system (or anything above the ground) after reading the advice given there.

So this is a plea to all the amateur radio operators in our IEEE Section. (Southeastern Michigan is a 'hot bed' of amateur radio activity and has been since Marconi first sent a signal across the Atlantic). When you get the urge to check out your antenna system, and it involves anything 'above the ground' further than you can easily jump, read Tom's check list again, and think about each point. We want to see you at the next club meeting or ham-fest, instead of visiting you in the hospital.

One more recommendation. If (when) you leave the ground for the heights, have a friend or loved one standing by to watch you and call the ambulance if you return to the ground faster than you got up there.

73 kw N8FNC

Safety is Job One:

As some of you may remember, I was a National Construction Safety Officer (NCSO) for many years. During that time, I have seen and heard and experienced some pretty amazing incidents that have happened to construction workers. By the way, ham radio operators installing antennas and other devices are ***CONSTRUCTION WORKERS*** in the real sense of the word and should follow the same rules. Of course, you are not covered by WCB or any of the other authorities, but you still need to set some guidelines on safety whenever doing this kind of work.

So, what made me think of this? I received a phone call from a ham last week that astonished me because he knew better. By the way ***ALL INCIDENTS ARE PREVENTABLE***. He had a problem with one of his antennas after that snowstorm and decided to go up on his roof which was covered in snow and lost his footing and slid down it and over the edge. He kicked over the ladder on the way and grabbed on to the gutter which of course slowed his descent a bit but couldn't hold his considerable weight and pulled away from the house and he landed unceremoniously on the deck. Fortunately, he's ok and no serious damage was done although from what he told me the damage inflicted by his wife afterwards was considerable.

So, what should be done to make sure you are being safe?
Here's a list:

1. Scope out the work before you climb and make a plan and think of anything that could go wrong and plan for it (remember Murphy's Law)
2. Do a complete **HAZARD ASSESSMENT** before beginning the work
3. Check the condition of the roof. Is it covered in snow or is it wet or slippery?
4. What tools do you need and have them available at the time and a convenient way of getting them up to where you need them. Avoid carrying them if possible.
5. Put up a ladder so that it is at least a meter (3 feet) above the roof line and tie it off so it will not fall over
6. By ensuring the ladder is at least a meter above the roofline you will have something to hold on to as you step on and off the roof without having to lean over and thereby disturbing your balance.
7. Keep the three-point contact on the ladder at all times when climbing or descending from it.
8. Do not lean out on either side of a ladder to do the work and make sure you do not stand on the top or the second rung from the top on any kind of ladder
9. ***DO NOT*** lean a stepladder up against a wall. It is not stable and will not be a safe platform on which to work.
10. Make sure the spreader arms on a step ladder are set and locked in place
11. Wear the proper PPE, good boots, hard hat, if necessary, gloves, harness, lanyard, safety belt and line and tie off if necessary.
12. Pull tools up with a lanyard in a basket or bag and tie it off in a convenient place.
13. Do the work according to a well thought out plan and follow it.
14. Think safety at all times and don't take short cuts

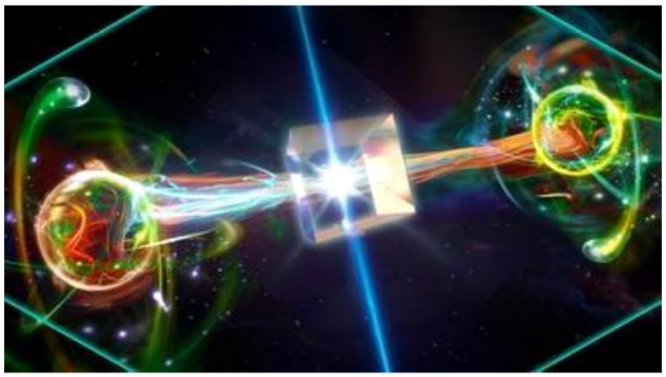
So, you can see it is quite easy to make sure you are going to be safe. Too many of our friends have been seriously injured or even lost their lives because they didn't **THINK IT THROUGH**.

Don't become a statistic.

73
Tom VE6ARG

Quantum Riddle

IEEE Southeastern Michigan
Presents a Video Documentary on
Einstein's Quantum Riddle



IEEE Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

Quantum entanglement is poised to revolutionize technology from networks to code breaking–but first we need to know if it's real. Join physicists as they capture light from across the universe in a bid to prove Einstein's "spooky action at a distance."

Running time: 55 minutes ()

Quick Summary

- **When:**
  Date: May 12th, 2023
  Time: 04:30 – 5:30 PM (EST/EDT)
- **Where:**
  Online via Webex (to be shared only after you have a confirmed registration)
- **Audience: OPEN to ALL***

Sponsored by IEEE Southeastern Michigan Education Society Technical Chapter

***Pre-Registration Required!**

https://events.vtools.ieee.org/m/356228

IEEE Education Society

IEEE Southeastern Michigan Section

The Codebreakers

IEEE Southeastern Michigan
Presents a Video Documentary on
The Codebreakers

IEEE Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

Based on the book *The Woman Who Smashed Codes: A True Story of Love, Spies, and the Unlikely Heroine Who Outwitted America's Enemies*, The Codebreaker reveals the fascinating story of Elizebeth Smith Friedman, the groundbreaking cryptanalyst whose painstaking work to decode thousands of messages for the U.S. government.

Running time: 55 minutes ()

Quick Summary

- **When:**
  Date: May 5th, 2023
  Time: 04:30 – 5:30 PM (EST/EDT)
- **Where:**
  Online via Webex (to be shared only after you have a confirmed registration)
- **Audience: OPEN to ALL***

Sponsored by IEEE Southeastern Michigan Education Society Technical Chapter

***Pre-Registration Required!**

https://events.vtools.ieee.org/m/355697

IEEE Education Society

IEEE Southeastern Michigan Section

EMCFest 2023

Announcing EMC Fest May 25, 2023

Click Here to Register

2023 Speakers:

Dr. Todd Hubing *is a Professor Emeritus of Electrical and Computer Engineering at Clemson University and President of LearnEMC. Dr. Hubing holds a BSEE degree from MIT, an MSEE degree from Purdue University and a Ph.D. from North Carolina State University. He was an engineer at IBM for 7 years and a faculty member at the University of Missouri-Rolla for 17 years before joining Clemson University in 2006. At the University of Missouri-Rolla (now the Missouri University of Science and Technology), he was a founding faculty member of the UMR Electromagnetic Compatibility Laboratory. As the Michelin Professor of Vehicle Electronics at Clemson, he established the Clemson Vehicular Electronics Laboratory where he supervised research projects and taught classes in vehicle electronics, electromagnetic compatibility and digital signal integrity.*

At LearnEMC, he provides EMC instruction, consulting and design assistance to engineers working in the automotive, aerospace and consumer electronics industries.

Dr. Hubing has authored or co-authored over 200 papers and presentations on electromagnetic modeling, electromagnetic compatibility and the design of reliable electronic systems. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), a Fellow of the Applied Computational Electromagnetics Society, and a Past-President of the IEEE Electromagnetic Compatibility Society.

Dr. Eric Bogatin *is a Signal Integrity Evangelist with Teledyne LeCroy and the Dean of the Teledyne LeCroy Signal Integrity Academy, at Be The Signal. Additionally, he is an Adjunct Professor at the University of Colorado – Boulder in the ECEE dept, and technical editor of the Signal Integrity Journal.*

Dr. Bogatin received his BS in physics from MIT in 1976 and MS and PhD in physics from the University of Arizona in Tucson in 1980. He has held senior engineering and management positions at Bell Labs, Raychem, Sun Microsystems, Ansoft and Interconnect Devices. He has written seven technical books in the field and presents classes and lectures on signal integrity worldwide.

In 2011, his company, Bogatin Enterprises, which he founded with his wife, Susan in 1990, was acquired by Teledyne LeCroy. After concluding his live public classes in 2013, he devoted his efforts into creating the Signal Integrity Academy, a web portal to provide all of his classes and training content online, for individuals and for companies.

For Teledyne LeCroy, he lectures worldwide on Best Measurement Practices using high performance oscilloscopes. At UColorado-Boulder, Eric teaches classes on PCB design, high speed digital design and other electronics classes**.**

Important Registration Information – Please read First!

Click Here to Register

Note: Our sister chapter in Chicago has a similar event on May 23, 2023
http://www.emcchicago.org/sectfiles/events.htm

Venue: Embassy Suites in Livonia

To be added or removed from the Southeastern Michigan IEEE EMC email list - send an email to s.r.lytle@ieee.org with ADD or REMOVE as the subject

EMC SIPI2023

Science Fair Report

2023 IEEE Special Awards Judges for the Science & Engineering Fair of Metro Detroit – Bill Quinlan AAM and Don Bramlett – DTE (retired)

Background: The Science and Engineering Fair of Metropolitan Detroit, was established in September 1956, as a nonprofit organization to give students in the 7 county area (Lenawee, Livingston, Macomb, Monroe, Oakland, Washtenaw, and Wayne counties) an opportunity to develop and exhibit science fair projects. Competition is separated into three groups:

- ✓ Elementary Division (3rd, 4th, and 5th grade),
- ✓ Junior Division (which is 6th, 7th and 8th grade) and
- ✓ Senior Division (9th - 12th Grade).

Students are judged within their respective categories. Up to six students (limit of ONE student per school) in the senior category from this regional science fair are then qualified for the International Science Fair competition.

Why: Create student excitement for STEM (Science, Technology, Engineering and Mathematics). These Professional Award judges are above and beyond the other volunteer judges, as they are representing the local IEEE Section and offer first place and second place prizes separate from the normal science fair judging. The IEEE team looks for Engineering, Electrical and Electronic projects which tie closely to the IEEE organization. This year the team shifted through 36 Junior and Senior projects

2023 results: This year the IEEE judges awarded ***2 First*** place and ***2 Second*** place awards.

The 1st Place awardees, each receiving a check for $100 and a personalized certificate were:

a) Mikul Saravanan, a Senior at Cranbrook Upper school in Bloomfield Hills for:

Project # 2480 – “A low cost 6-axis robot arm” in the Senior Division

This student used a 3D printer to print out the components that were assembled and wired into the robotic arm.

b) Pratyush Inturi, a 6th Grader at Larson Middle school in Troy for:

Project # 3250 - “Track your pet” in the Junior Division

This student designed and built a GPS tracker built into an animal collar. They used a 3D printer to create the case for the animal collar. The collar contained an embedded controller and a GPS chip.

The 2nd Place awardees, each receiving a personalized certificate were:

a) Nishin Inampudi, a Junior at Detroit Country Day Upper in Beverly Hills for:

Project # 2132 – “How your electric car can be hijacked” in the Senior Division

This student created a very powerful EMF generator which when tested inside various Tesla vehicles caused the accelerator pedal to be less effective.

b) Amay Nikam, a 7th Grader at Larson Middle School in Troy for:

Project # 3640 – “Is it Red? Al-powered Traffic Control Sensor” in the Junior Division

This student created a sensor which was embedded on a small 4 wheel model and was able to detect the Red signal 100%. They are looking to embed something like this into a car so that people do not run red lights and cause accidents.

SUMMER PICNIC!!

SUMMER POTLUCK PICNIC!

The IEEE Southeastern Michigan Section invites all IEEE members & their families & friends, to join us for a Summer Potluck Picnic.*(In other words, we engineers also know how to play and are not all work all the time!!)*

Plan to join us on Sunday, July 2nd 2023
From 11:30 AM to 6:30 PM (SUMMER TIME) at:

Kiwanis Pavilion
400 Sixth Street
Rochester, Michigan
United States 48307

There is no charge for the gathering but, please register so we know who and how many to expect.

Register at https://events.vtools.ieee.org/m/356581

The event is open to all IEEE Southeastern Michigan Section members, their families AND friends! Please email the sponsors with what dish you will be bringing to share, approximately what time and how many members are expected to join in the fun (RSVP by June 30). We will help provide the napkins, plastic ware, paper plates, water, table covers, etc. Feel free to also let the organizers also know if you are bringing a board game, music, or group activity item, etc. As engineers we too know how to spend a relaxing day with family together! We look forward to seeing you on that Sunday.

About the Municipal Park
The City of Rochester's park system offers a wide variety of recreational opportunities. At Rochester Municipal Park, the recreation opportunities include:

- Open air shelter (the Kiwanis Shelter) - has electrical outlets, so we can use crockpots, etc.
- Duck Pond
- Over a mile of paved walkway
- Restrooms
- Sand volleyball
- Tot lot (at the south end at the end of Pine Street)

Do come join us!



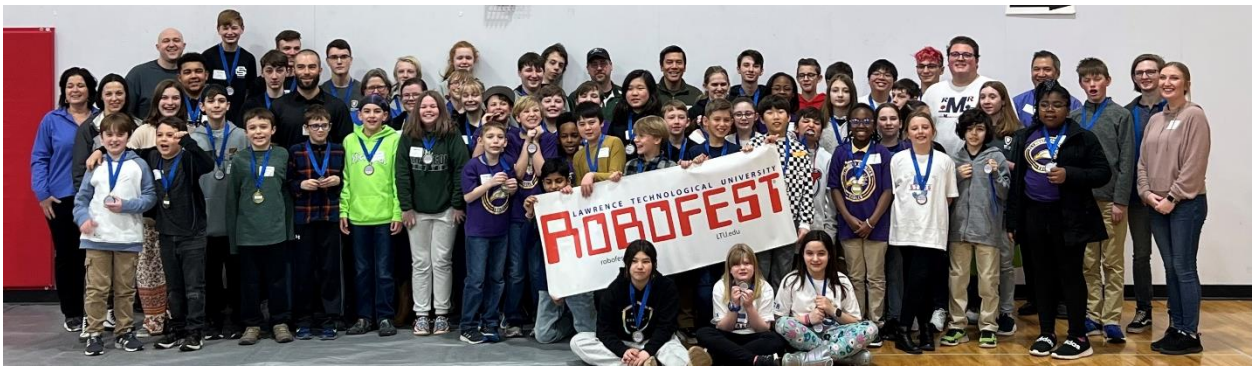
RoboFest News

LAWRENCE TECHNOLOGICAL UNIVERSITY ROBOFEST

Robofest Qualifying Competitions and World Championship in May

IEEE Southeastern Michigan (SEM) Section sponsored Robofest qualifying competitions are being held successfully in-person across the nation and internationally. As of April 28, 539 teams and 1,156 students are registered. Goals of Robofest program that allows only fully autonomous robots are to (1) generate excitement and interest among young people for Science, Technology, Engineering, Arts, and Mathematics (STEAM), AI and Computer Science, (2) develop essential skills such as teamwork, leadership, creativity, communication and problem solving, and (3) prepare students to excel in higher education and technological careers. The following pictures show Michigan qualifying competitions and teams held in this spring.

Feb 11, Warmup at LTU, Southfield, MI



Mar 18, Washtenaw Christian Academy, Saline, MI

Mar 18, Gallimore Elementary School, Canton, MI

Mar 25, Macomb Intermediate School District, Clinton Township, MI

In Florida, IEEE Robotics and Automation society in the Florida West Coast Section supported a Robofest qualifying competition in St Pete Beach.

For the first time after the pandemic, in-person world championship will be held at Lawrence Technological University in Southfield on May 11 ~ 13. IEEE members are encouraged to serve as Judges for Exhibition and RoboArts categories on May 13. Exhibition is like a robotics science fair. Teams of up to 5 students have complete freedom to enter any intelligent, autonomous, and interactive robotics project using sensors. RoboArts category provides a unique STEAM learning opportunity that has visual and/or performing arts sub-categories. Robots must have computational components programmed by participants and must employ sensors.
Please register online at https://events.vtools.ieee.org/m/357480 or contact CJ Chung at cchung@ltu.edu, if you are interested in becoming a Judge on that day from 8 am till 4:30 pm.

Lawrence Technological University / Robofest / J-233 / 21000 W. Ten Mile Rd, Southfield, MI 48075
Dr. Christopher Cartwright, Director, ccartwrig@ltu.edu
Elmer Santos, Assistant Director, esantos@ltu.edu
Shannan Palonis, Coordinator, spalonis@ltu.edu
Pam Sparks, Coordinator, psparks@ltu.edu
Dr. CJ Chung, Advisory Board Chairperson (Volunteer), cchung@ltu.edu

ORG UNITS cheat sheet

Section Unit Name or Affinity Group or Chapter Name (Organizational Unit code is in parentheses)		
Consultants Network Affinity Group:	(CN40035)	
Life Members:	(LM40035)	
Young Professionals:	(YP40035)	
Women in Engineering:	(WE40035)	
Chapter: 01	(CH04049)	(SP01) Signal Processing Society, (CAS04) Circuits and Systems Society and (IT12) Information Theory Society
Chapter: 02	(CH04051)	(VT06) Vehicular Technology Society
Chapter: 03	(CH04053)	(AES10) Aerospace and Electronic Systems Society and (COM19) Communications Society
Chapter: 04	(CH04050)	(AP03) Antennas and Propagation Society, (ED15) Electron Devices Society, (MTT17) Microwave Theory and Techniques Society,
Chapter: 05	(CH04055)	(C16) Computer Society
Chapter: 06	(CH04056)	(GRS29) Geosciences and Remote Sensing Society
Chapter: 07	(CH04057)	(PE31) Power Engineering Society, (IA34) Industrial Applications Society
Chapter: 08	(CH04088)	(EMC27) Electromagnetic Compatibility Society
Chapter: 09	(CH04087)	(IE13) Industrial Electronics Society, (PEL35) Power Electronics Society
Chapter: 10	(CH04142)	(TEM14) Technology and Engineering Management Society
Chapter: 11	(CH04099)	(EMB18) Engineering in Medicine & Biology
Chapter: 12	(CH04103)	(CS23) Control Systems Society
Chapter: 13	(CH04113)	(E25) Education Society
Chapter: 14	(CH04115)	(RA24) Robotics And Automation Society
Chapter: 15	(CH04144)	(NPS05) Nuclear Plasma Sciences Society
Chapter: 16	(CH04125)	(CIS11) Computational Intelligence Society, (SMC28) Systems, Man and Cybernetics Society
Chapter: 17	(CH04128)	(NANO42) Nanotechnology Council

Section Unit Name or Affinity Group or Chapter Name (Organizational Unit code is in parentheses)	
University Of Detroit-Mercy:	(STB00531)
Michigan State University:	(STB01111)
University Of Michigan-Ann Arbor:	(STB01121)
Wayne State University:	(STB02251)
Lawrence Technological University:	(STB03921)
Oakland University:	(STB06741)
Eastern Michigan University:	(STB11091)
University of Michigan-Dearborn:	(STB94911)

Use the Geo-unit ‘Code’ for faster access in the vTools system applications.

HKN Code	HKN Name (Student IEEE Honor Society)
HKN029	University of Michigan-Ann Arbor, Beta Epsilon
HKN042	University of Detroit-Mercy, Beta Sigma
HKN054	Michigan State University, Gamma Zeta
HKN073	Wayne State University, Delta Alpha
HKN163	University of Michigan-Dearborn, Theta Tau
HKN164	Lawrence Institute of Technology, Theta Upsilon
HKN190	Oakland University, Iota Chi
HKN244	Southeastern Michigan Alumni

Organization Unit IEEE Code	Student Technical Chapter name
SBC00531	University of Detroit-Mercy, Computer Society Chapter
SBC02251	Wayne State University, Computer Society Chapter
SBC03921	Lawrence Tech University, Computer Society Chapter
SBC06741	Oakland University, Engineering in Medicine & Biology

Why do we publish this? Well, this is most useful when searching the vTools page for entering L31s or creating new events or searching for existing events!

Curated & Maintained By
Sharan Kalwani,
Chair, IEEE Southeastern Michigan Section (2022-2023)
Editor, Wavelengths (*Serving you as an active newsletter contributor since 2018)*
Enthusiastic IEEE volunteer since 2011

Use the Geo-unit ‘Code’ for faster access in the vTools system applications.

Electric Airplane

IEEE Southeastern Michigan
Presents a Video Documentary on
The Great Electric Airplane Race

IEEE Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

Can new emission-free electric planes replace our polluting airliners and revolutionize personal transportation in our cities? NOVA takes a ride in some quiet, energy-efficient, prototypes that are vying for success as electric flight takes off.

Running time: 55 minutes ()

Quick Summary

- **When:**
  Date: May 19th, 2023
  Time: 04:30 – 5:30 PM (EST/EDT)
- **Where:**
  Online via Webex (to be shared only after you have a confirmed registration)
- **Audience: OPEN to ALL***

Sponsored by IEEE Southeastern Michigan Education Society Technical Chapter

***Pre-Registration Required!**

https://events.vtools.ieee.org/m/356294

IEEE Education Society

IEEE Southeastern Michigan Section

Chapter Chair Profile

This month we are once again activating our volunteer leader profiles. We would like to introduce Robert Hipple, a very active and enthusiastic person. He is heading two chapters – namely:

- Chapter 4 aka Trident. Their IEEE Geographic code is CH04050. This is a joint chapter amalgamating (AP03) Antennas and Propagation Society, (ED15) Electron Devices Society and (MTT17) Microwave Theory and Techniques Society.
- Chapter 15 (their Geo code is CH04144) representing (NPS05) Nuclear Plasma Sciences Society

Robert received the Ph.D. in Physics from Michigan State University and has worked at Niowave as an Accelerator Physicist designing thermionic cathode electron guns and analyzing beam dynamics, and more recently at the MSU Facility for Rare Isotope Beams investigating the beam dynamics of superconducting quarter-wave cavity resonators. Robert's current role is assisting in the coordination of the group's diverse research projects. Robert's external interests include the application of microwaves to quantum computing, particularly superconducting transmon qubits, and he is also an amateur radio enthusiast (callsign KE8UQV, X-band and V-band).

Robert's contact information can be found using the roster at the Section website OR the IEEE Roster page.

Activities & Events

We try to publish IEEE events in several places to ensure that everyone who may want to attend has all the available relevant information. **NOTE: The IEEE SE Michigan section website is located at http://r4.ieee.org/sem/**

SEM Wavelengths:
https://r4.ieee.org/sem/about-sem/sem-history/wavelengths-magazine-archive/

SEM Calendar of events:
https://r4.ieee.org/sem/sem-calendar/
Select "SEM Calendar" button in the top row of the website. This is our 'Active' event listing site where everyone should look first to see what events are scheduled for our Section in the near future.

SEM Collabratec Workspace:
https://ieee-collabratec.ieee.org/app/workspaces/5979/IEEE-Southeastern-Michigan-Section/activities
An IEEE supported space for online chat, discussions, connecting with other global IEEE entities, besides our local Michigan folks.

vTools Meetings:
http://sites.ieee.org/vtools/
Select "Schedule a Meeting" button in the left-hand column of buttons.

Other Happenings

Here are some of the non-IEEE functions that may be of interest to you or someone you know. Let us know if you have a special interest in a field that encourages technical study and learning, and wish to share opportunities for participation with members of the section. NOTE: Copy the URL and paste it into your browser address bar.
These websites were checked in June 2022 and found viable.
Send details to: wavelengths@ieee-sem.org OR letters@ieee-sem.org

Michigan Institute for Plasma Science and Engineering: Seminars for the academic year:
https://mipse.umich.edu/seminars.php

Model RC Aircraft
http://www.skymasters.org

Model Rocketry
https://www.nar.org/find-a-local-club/nar-club-locator/

Astronomy
http://www.go-astronomy.com/astro-clubs-state.php?State=MI

Experimental Aircraft Association
https://www.eaa.org/en/eaa/eaa-chapters/find-an-eaa-chapter

Robots
https://www.robofest.net/index.php/about/contact-us

Science Fiction Conventions
https://2022.penguicon.org/

http://www.confusionsf.org/

Mad Science
http://www.madscience.org/

ESD PE Review Class
https://www.esd.org/programs/pe/

Maker Faire:
https://swm.makerfaire.com/

It appears that the SouthWest Michigan Maker Faire was a casualty of the Global Pandemic, as were many of our friends and several organizations.

However, we retain this link for anyone wishing to make contact and consider pumping life back into what was a wonderful experience.

Executive Committee

The SEM Executive Committee is the primary coordination unit for Southeastern Michigan (SEM) IEEE operations. The basic organization chart below shows the 2019/2020/2021/2022 arrangement of communications links designed to provide inter-unit coordination and collaboration.

The SEM Executive Committee meets in a teleconference each month on usually on a Thursday at 6:30 pm. The specific meeting days, times, phone or WebEx numbers and log in codes are published on the IEEE SEM Website calendar: **http://r4.ieee.org/sem/** Click on the "Calendar" button in the top banner on the first page of the web site.

If you wish to attend, or just monitor the discussions, please contact **Christopher Johnson**, the section secretary at secretary@ieee-sem.org and request to be placed on the distribution list for a monthly copy of the agenda and minutes. More meeting details are available on the next page of this newsletter.

Other Meetings:
About half of our members maintain memberships in one or more of the IEEE technical societies, which automatically makes them members of the local chapter which is affiliated with that society. As a result, they should receive notices of the local chapter meetings each month.

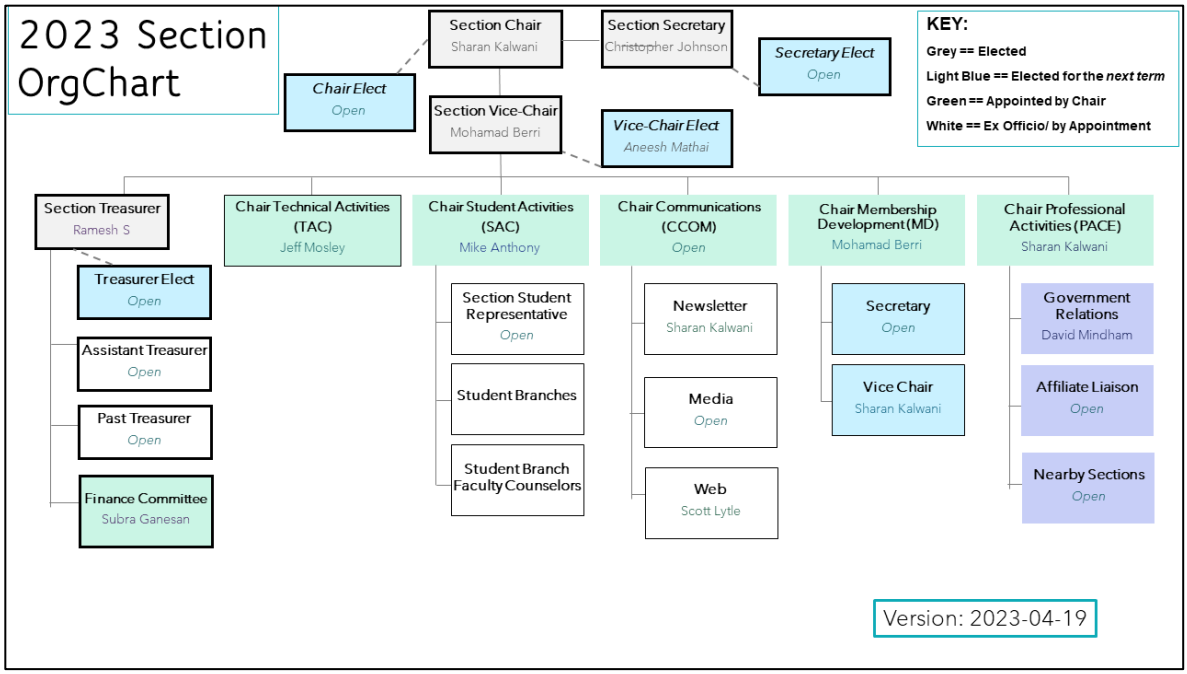
However, members of the section may have multiple technical interests and would like to have meeting information of other chapters. In order to communicate the meeting dates of all the chapters, affinity groups etc., to our members to facilitate their attendance, leaders of the groups are requested to send meeting information to our webmasters for posting on section's calendar.

More detailed information on meetings may be found through the IEEE SEM Website: **http://r4.ieee.org/sem/** and clicking on the **SEM meetings list** button near the bottom of the left-hand banner.

Automatic e-mail notification of web updates may be received using the "**Email Notifications**" button at the top of the **SEM Tools/Links** side banner.

Christopher Johnson (Secretary)
Email: secretary@ieee-sem.org

If you wish to download the complete SEM Organization Chart, in PDF format, it will be made available soon at http://r4.ieee.org/sem/ . In the meantime, you may use the diagram below (recently refreshed!)



ExCom Meeting Schedule

NOTE: All SEM members are invited to attend ALL ExCom (Executive Committee) meetings:

Below is the 2023 schedule for the Section ExCom meetings with links to add the events to your calendar. It is important that ***at least one person*** from each Chapter/Affinity Group attends each scheduled ExCom meeting. Please mark your calendars for the 2023 meetings. Or, link your personal calendar to the SEM Web calendar.

Section Administrative Committee (ExCom) Meeting Schedule for 2023:

Note: All IEEE Members are welcome at any IEEE meeting, at any time but please register so we can be sure to accommodate you. This month's meeting is highlighted in **Bold**.

ExCom Meeting (all clickable links)	*Date & Time*
SEM Section ExCom Monthly Meeting (virtual) For MAY 2023	11 May 6:30 PM
SEM Section ExCom Monthly Meeting (virtual) For JUNE 2023	8 Jun 6:30 PM
SEM Section ExCom Monthly Meeting (virtual) For JULY 2023	13 Jul 6:30 PM
SEM Section ExCom Monthly Meeting (virtual) For AUGUST 2023	10 Aug 6:30 PM
SEM Section ExCom Monthly Meeting (virtual) For SEPTEMBER 2023	14 Sep 6:30 PM
SEM Section ExCom Monthly Meeting (virtual) For OCTOBER 2023	12 Oct 6:30 PM
SEM Section ExCom Monthly Meeting (virtual) For NOVEMBER 2023	9 Nov 6:30 PM
SEM Section ExCom Monthly Meeting (virtual) For DECEMBER 2023	14 Dec 6:30 PM

Christopher Johnson (Secretary)
Email: secretary@ieee-sem.org

Title	Date
SEM Section ExCom Monthly Meeting (virtual) For JA...	12 Jan 202...
SEM Section ExCom Monthly Meeting (virtual) For FE...	09 Feb 202...
SEM Section ExCom Monthly Meeting (virtual) For MA...	09 Mar 202...
SEM Section ExCom Monthly Meeting (virtual) For AP...	13 Apr 202...
SEM Section ExCom Monthly Meeting (virtual) For MA...	11 May 202...
SEM Section ExCom Monthly Meeting (virtual) For JU...	08 Jun 202...
SEM Section ExCom Monthly Meeting (virtual) For JUL...	13 Jul 2023...
SEM Section ExCom Monthly Meeting (virtual) For AU...	10 Aug 202...
SEM Section ExCom Monthly Meeting (virtual) For SE...	14 Sep 202...
SEM Section ExCom Monthly Meeting (virtual) For OC...	12 Oct 202...
SEM Section ExCom Monthly Meeting (virtual) For NO...	09 Nov 202...
SEM Section ExCom Monthly Meeting (virtual) For DE...	14 Dec 202...

Editorial Corner

Previous editions in this series may be found on the IEEE SEM website at: http://r4.ieee.org/sem/. Click on the "Wavelengths" button in the top row of selections.

Comments and suggestions may be sent to the editorial team at wavelengths@ieee-sem.org
OR
sharan.kalwani@ieee.org
d.romanchik@ieee.org
nilesh.dudhaia@ieee.org
k.williams@ieee.org
cgjohnson@ieee.org
lunnmalcolm@me.com
akio@emcsociety.org

We rely on our officers and members to provide the 'copy' that we finally present to readers of the newsletter.
The **Wavelengths Focus Plan and Personal Profiles** plan shown in the matrix below is presented to ensure coverage of section activities and events.

We try to complete the newsletter layout a week before the first of the month to allow time for review and corrections. If you have an article or notice, please submit it two weeks before the first of the month or earlier if possible.

The plan below relies on the contributions of our members and officers, so please do not be shy. If you have something that should be shared with the rest of the section, we want to give you that opportunity.

We always encourage all chapters and student branches to share news of activities (both past and future) in their arenas. Please feel free to share any and all information so your peers, colleagues can hear about all the good work you do.

Quote:
"If a tree falls in a forest and no one hears it, how do you know it actually fell??"

So, publicize your work, one never knows when it can pay off!

Editors:

We are always looking for members interested in helping to edit the newsletter. The process is always more fun with more people to share the duties. Having more participants and contributors also helps us keep the newsletter interesting.

Join the Team:

If you feel you might like to join the team, or would like to train with us, please contact one of us at:
wavelengths@ieee-sem.org

Sharan Kalwani,
Chair, IEEE SE Michigan Education Society Chapter
Vice-Chair, IEEE SE Michigan Computer Society Chapter
Co-Editor, Wavelengths,
2018~2019~2020~2021~2022-2023

Wavelengths Annual Publication Plan for Articles

Month	AG's	Ch's	Ch's	SB's	Special Notice	Reporting Events	Monthly Focus	Awards
Jan		*1*		*OU*	*New Year Officers*	*Officer's Welcome*	*The Year Ahead*	
Feb	*Cons*	*2*		*MSU*	*Science Fair Judges*	*National Engrs Wk.*	*Surviving Winter*	
Mar		*3*	*13*	*EMU*	*Elections - Prep*			
Apr		*4*		*U/M-D*		*ESD Gold Awards*	*Chapter Focus*	
May	*Life*	*5*	*14*			*Science Fair*		
Jun		*6*					*Leadership Skills*	
Jul		*7*	*15*				*Students Issues*	
Aug	*WIE*	*8*			*Nominations Call*		*Womens Issues*	
Sep		*9*	*16*	*LTU*	*Ballots*	*Engineers Day?*	*Professional Skills*	
Oct		*10*		*U/M-AA*	*Elections!*	*IEEE Day*		
Nov	*YP*	*11*	*17*	*WSU*	*Election Results*	*New Fellows*		
Dec		*12*		*U/D-M*	*IEEE-Com Apmts.*		*Happy Holidays*	*R4 Nom*

Wavelengths Annual Publication Plan for Personal Profiles

Month	Profiles	Profiles	Committees
Jan	Chair	New Officers	ExCom
Feb	Treasurer		Communications
Mar	Secretary		Conference
Apr	Stud-Rep		Education
May	V-Chair		Executive
Jun	Sect-Adviser		Finance
Jul	Sr Officers		Membership
Aug			Nominations
Sep			PACE
Oct			Student Activiies
Nov			Technical Activiies
Dec	Editor-WL		

IEEE Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

Web & Social Sites

Southeastern Michigan Section Website
http://r4.ieee.org/sem/

Each of the sites below may be accessed through the Website:

Section Website Event Calendar
(Select the "SEM Calendar" button - top row)

SEM Facebook Page
(Select the "f" button under the top row)
https://www.facebook.com/groups/ieeesemich

SEM LinkedIn Page
(Select the "in" button under the top row)
https://www.linkedin.com/groups/1766687/

SEM Twitter Account (new)
(Select the "t" button under the top row)
https://www.twitter.com/ieeesemich

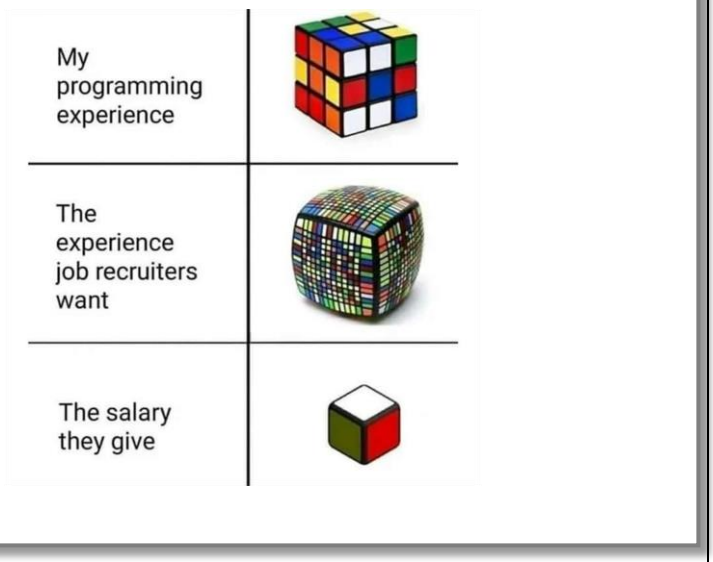
SEM Collabratec Workspace (new)
https://ieee-collabratec.ieee.org/app/workspaces/5979/IEEE-Southeastern-Michigan-Section/activities

SEM Officers:
For a complete listing of all - Section - Standing Committee - Affinity Group - Chapter and Student Branch Officers, see the SEM Officers Roster on the web page (top banner)

IEEE Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

IEEE Southeastern Michigan

Visit Us on the Web at:
http://r4.ieee.org/sem



Advertising Rates

SEM Website & Newsletter

Leadership Meetings

SEM Executive Committee Monthly Teleconferences:

- 2nd Thursday of Each Month @ 6:30 PM
- Check the Section Web Calendar at:
  http://r4.ieee.org/sem/sem-calendar/
  (Select the "SEM Calendar" button in the top row.)

OR

SEM Executive Committee Meetings:

- Find the location, and Registration at:
  http://bit.ly/sem-ieee

SEM Standing Committee Meetings:
SEM Affinity Group Meetings:
SEM Technical Society/Chapter Meetings:
SEM University Student Branch Meetings:

- Meeting schedules are announced on SEM Calendar
  http://r4.ieee.org/sem/
  (Select the "SEM Calendar" button in the top row.)

- Registration for all at:
  http://bit.ly/sem-upcoming