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## Announcements

IEEE Maine Section and our PES/IAS Joint Chapter are hosting an [event](#) on June 24. See the top of page 4 for more info.

Do you know any undergrads interested in a career in power and energy engineering? See page 10 for a scholarship opportunity.

The University of Maine Student Branch held elections. Congratulations to the new officers: Tori Nicholas – president, Ally DiFilippo – vice president, Camden Tweedie – secretary, and Jason Halvorsen – treasurer.

Ashanthi Maxworth has taken on the role of Faculty Advisor to the USM Student Branch, and Rosemary Smith has resumed her role as Maine Section’s Awards and Recognitions Chair.

The deadline for submitting nominations for [IEEE Region 1 \(Northeastern United States\) Awards](#) is June 30. See page 5 for more info.

## Upcoming Events

### IEEE-USA Virtual Town Hall Meeting

*Tuesday, May 25, 8:00 PM to 8:30 PM, via Webex; **Free Registration required***

IEEE-USA offers professional growth and career advancement resources, and through its Government Relations programs, works with the federal government to help shape the workforce and technology policy. This will be IEEE-USA’s first town hall of 2021. Ongoing meetings will be held this year in response to requests for greater interaction between the USA Regions and Sections. Visit <https://events.vtools.ieee.org/m/270975> for more info.



### IEEE Tech Talk: 802.11 Wireless LAN Standards

*Wednesday, May 26, 9:00 AM to 10:00 AM; via ON24; **Free Registration required***

Dorothy Stanley, Head of Standards Strategy at Aruba, and IEEE Fellow Paul Nikolich of YAS Broadband Ventures, will discuss the IEEE 802.11 Wireless Local Area Network Standards. Hosted by [IEEE Educational Activities](#). Click [here](#) for more info.

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## Section Officers

### Executive Committee:

Chair: [Betina Tagle](#)

Vice Chair: [Alisha Chaney](#) (she/her)

Treasurer: [Shengen Chen](#)

Secretary: [Ashanthi Maxworth](#)

### Affinity Group (AG) & Technical Chapter Chairs:

Women in Engineering AG:

[Sonia Naderi](#)

Young Professionals AG:

[Matt Dube](#)

Communications + Computer

Societies Joint Chapter:

[Julia Upton](#)

Electron Device + Solid-State

Circuits Societies Joint Chapter:

[Jifa Hao](#)

Engineering in Medicine & Biology

Society ME/NH/VT Joint Chapter:

[Rosemary Smith](#) (Co-Chair)

Power & Energy + Industry

Applications Societies Joint

Chapter: [Jesse Shank](#)

### Other Committee Chairs and Positions:

Audit: [Ron Brown](#) & [Ali Abedi](#)

Awards and Recognition:

[Rosemary Smith](#)

Educational Activities: [Matt Ring](#)

Member-at-Large: [Daniel Spacek](#)

Membership Development:

[Rich Hilliard](#)

Newsletter Editor: [David Klein](#)

Professional Activities: [Dick Wilkins](#)

Public Relations: [Ron Brown](#)

Student Activities: [Lauren Mayhew](#)

Webmaster and Social Media:

[Doug Sprague](#)

### University Faculty Advisors:

IEEE Student Branches:

[Jude Pearce](#) (UMaine)

[Ashanthi Maxworth](#) (USM)

HKN Delta Kappa Chapter: [Ali Abedi](#)

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## Upcoming Events [continued from page 1]

### Developments in Underwater Communications with Mobile Platforms Through Doppler Compensation

Wednesday, May 26, 1:00 PM to 2:00 PM, Online; **Free Registration required**

The underwater acoustic (UWA) communication channel is challenging and complex. Dr. Ali Bassam, a Post-Doctoral Fellow with the Intelligent Systems Lab at [Dalhousie University](#), will provide: (i) a brief background on UWA channels; (ii) how the Doppler effect makes their treatment unique and receiver designs that mitigate Doppler effects with emphasis on compensation, and (iii) their applicability to strongly time-varying channels like those with autonomous underwater vehicles. Co-hosted by the Canadian Atlantic chapter of the [IEEE Oceanic Engineering Society](#). Visit <https://events.vtools.ieee.org/m/272374> for more info.

### Progress Reports for UMaine's Artificial Intelligence Seed Grants

Thursday, June 3, 12:00 PM to 1:00 PM, via Zoom; **Free Registration required**

In July, 2020, the University of Maine announced seed grant funding for four A.I. projects (<https://ai.umaine.edu/2020/07/17/seed-grant-announcement/>). The project teams will provide an update on their progress. Speakers will include [Sepideh Ghanavati](#), [Caitlin Howell](#), [Salimeh Yasaei Sekeh](#), and [Roy Turner](#). Part of the [University of Maine Artificial Intelligence Webinar Series](#). Visit <https://ai.umaine.edu/webinars/> for more info.



### Data Science Ensemble: Why Fairness in Deep Learning Matters

Thursday, June 3, 4:00 PM to 5:00 PM, **Free** via Zoom; **Launch**

<https://maine.zoom.us/my/usm.datascience> to join

A number of recent high profile news stories have shown machine learning algorithms have troubling blind spots, including potentially discriminatory behavior and biases against specific races and skin color. [Prof. Vikas Singh](#) of the [University of Wisconsin-Madison](#) will explore the machine learning algorithms that underlie a broad range of modern systems, and discuss ongoing research on the design of fairness algorithms that seek to address or minimize some of these problems. Visit <https://usm.maine.edu/college-of-science-technology-health/data-science-ensemble-why-fairness-deep-learning-matters-and-why> for more info.



### IEEE Maine Section Executive Committee (ExCom) Meeting

Monday, June 7, 5:00 PM to 6:30 PM, via Zoom

### Melt Probes for A Future Europa Lander

Tuesday, June 8, 6:00 PM to 7:00 PM, via Zoom; **Free Registration required**

Jupiter's moon Europa is believed to harbor not only liquid water but also easily available energy and biologically-essential elements. However, these are not readily available at the surface—an ice crust up to 30 km thick covers the liquid water. [Paula do Vale Pereira](#), an Aerospace Engineering PhD Candidate at [MIT](#), will discuss having built and experimentally tested the performance of a set of melt probes under thermodynamic conditions similar to those of Europa. The probes are designed to test the fundamental thermal properties of melt probes in cryogenic ice. Hosted by the Boston Chapter of the [IEEE Geoscience and Remote Sensing Society \(GRSS\)](#). Visit <https://events.vtools.ieee.org/m/265360> for more info.

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## Upcoming Events [continued from page 2]

### IEEE Tech Talk: Academic Research in International Standardization

Monday, June 14, 9:00 AM to 10:00 AM; via ON24; **Free Registration required**

Engineer [Edward Au](#) of [Huawei Technologies Canada](#), Consultant [Hermann Koch](#), and Prof. [Sakis Meliopoulos](#) of [Georgia Tech](#) will discuss the role academic research plays in the standards, as well as examples from two IEEE Societies on how academia contributes to standardization for benefits on both sides. Hosted by [IEEE Educational Activities](#). Click [here](#) for more info.

### IEEE International Conference on Communications (Virtual)

Monday, June 14 to Wednesday, June 23, Online; see [registration webpage](#) for admission pricing info

One of the [IEEE Communications Society's](#) two flagship conferences. This 5-day event includes distinguished keynote speakers from industry, academia, and government sectors; panels and forums; technical sessions featuring peer-reviewed technical papers; workshops focusing on the latest trends in various technology; and tutorials delivered by experts in respective disciplines. Hosted by [IEEE Montréal Section](#). Visit <https://icc2021.ieee-icc.org> for more info.



### Codes and Standards Applicable to Generator Sets

Wednesday, June 16, 12:00 PM to 1:00 PM, via Microsoft Teams; **Free Registration required**

[Generator sets](#) are subject to various international, national, state, and local codes and standards. This course will be looking into the codes and standards that most commonly affect the design and application of generator sets. Hosted by the Boston Chapter of the [IEEE Industry Applications Society](#). Visit <https://events.vtools.ieee.org/m/271803> for more info.

### EVOnCampus 1.0 - The Evolution of You Continues

Wednesday, June 16, 1:00 PM to 4:00 PM, Online; **Free Registration required**

EVOnCampus 1.0 will bring thought leaders directly to recent grads and college students, providing insights into the tech trends and pathways that lead to challenging and fulfilling careers. Panelists will include [Amy Peck](#), Founder and CEO of EndeavorVR and [John Collins](#), Director of Engineering at Vinted. The keynote speaker will be [Nate Ball](#), Mechanical Engineer and TV host. Hosted by [IEEE-USA](#). Visit <https://events.vtools.ieee.org/m/270261> for more info.



### Biomedical Informatics Entrepreneurs Salon

Wednesday, June 16, 5:00 PM to 6:00 PM, Online; **Free Registration required**

[Najat S. Khan](#) of [Janssen R&D](#) will lead a conversation about medicine, biology, computers, and entrepreneurship. Hosted by the Harvard's [Office of Technology Development](#) and their Medical School's [Department of Biomedical Informatics](#). Visit [https://events.seas.harvard.edu/event/biomedical\\_informatics\\_entrepreneurs\\_salon\\_7682](https://events.seas.harvard.edu/event/biomedical_informatics_entrepreneurs_salon_7682) for more info.

### Arcs and Sparks - Finding Fault on Live Wires

Tuesday, June 22, 6:00 PM to 7:00 PM, via Webex, **Free Registration required**

Aging electrical wiring is an area of critical concern. Wiring is the leading cause of home and building fires, and is responsible for numerous incidents in transportation, consumer product safety, and power and communication system reliability. IEEE Fellow [Cynthia M. Furse](#) will discuss the real-world challenges in electrical systems and the development and use of spread spectrum time domain reflectometry (SSTDTR) for finding faults on live electrical systems. Hosted by the [IEEE NJ Coast/Princeton/Central Jersey APS/VTS/EMC Joint Chapter](#). Visit <https://events.vtools.ieee.org/m/266793> for more info.

### International Women in Engineering Day

Wednesday, June 23

Celebrating its 8<sup>th</sup> year in 2021. INWED is an international awareness campaign which raises the profile of women in engineering. Sign up for #INWED21 news at <https://www.inwed.org.uk>, or follow on [Twitter](#) or [Instagram](#).



## Upcoming Events [continued from page 3]

### Presentation and Virtual Tour of ReVision Energy

Thursday, June 24, 12:00 PM to 1:00 PM, via Zoom; **Free Registration required**

ReVision Energy, an employee-owned New England solar company, will provide a video tour of their facility, followed by a live half-hour question-and-answer session with the company's co-founder, [Fortunat Mueller](#) (PE). He leads the operational side of the company, overseeing design, engineering, and installation operations. He also is lead engineer on new product development, including microgrids, battery storage, solar parking canopies, electric vehicle charging, and heat pumps. Hosted by [IEEE Maine Section](#) and [IEEE Maine PES/IAS Joint Chapter](#). Visit <https://events.vtools.ieee.org/m/272011> for more info.



### 2021 RiSE Conference

Monday, June 28 to Tuesday, June 29, Online; **E-mail [risecenter@maine.edu](mailto:risecenter@maine.edu) to register (\$0 to \$60)**

The RiSE Center hosts a conference every June and a summit every fall. This year's conference is entitled "Integrating Research and Practice: Moving Forward in STEM Teaching and Learning through Research-Practice Partnerships." Talks and workshops will address a variety of themes such as enhancing education through researcher/practitioner collaborations and exploring science questions in local contexts. Visit <https://umaine.edu/risecenter/conferences/> for more info.



### Engineering Education 2.0: Digital Transformation of Teaching in a Post-Pandemic World

Tuesday, June 29, 12:00 PM to 1:00 PM; via ON24; **Free Registration required**

The widespread shift from traditional teaching to remote learning has dominated the minds of academic teachers, degree program directors, accreditation agencies, and university leadership. What does the future hold? What role will disruptive technologies such as AI, Machine Learning, and Big Data play in the digital transformation of teaching in our fields? [Prof. Arnold Pears](#), Head of the [Department of Learning at the KTH Royal Institute of Technology](#), will explore these issues and the impact of the COVID-19 pandemic on Engineering Education. Hosted by [IEEE Educational Activities](#) and the [IEEE Education Society](#). Click [here](#) for more info.

### Data Science Ensemble: Multi-Class Semantic Segmentation of Medical Images using Deep Learning Computational Methods

Thursday, July 1, 4:00 PM to 5:00 PM, **Free** via Zoom; Launch <https://maine.zoom.us/my/usm.datascience> to join

[Ahmad P. Tafti](#), Assistant Professor of [Computer Science at USM](#), will discuss the role that medical image segmentation plays in a variety of healthcare applications, and offer a tutorial on the computational side of state-of-the-art deep learning-powered image

segmentation used on knee x-ray images. Visit <https://usm.maine.edu/college-of-science-technology-health/data-science-ensemble-multi-class-semantic-segmentation-medical> for more info.



### Simulating the Performance of Ocean-Observing Imaging Payloads for Nanosatellites

Tuesday, July 20, 6:00 PM to 7:00 PM, via Zoom, **Free Registration required**

Consequences of climate change threaten to have substantial and irreversible negative effects on our oceans, making it crucial to quickly understand and quantify behavioral changes resulting from increased human impact. [Candence Brea Payne](#), a PhD Candidate in the [Space Telecommunications, Astronomy, and Radiation Laboratory at MIT](#), will discuss how near-continuous, large-scale monitoring from space is revolutionizing methods for monitoring and forecasting ocean behavior. Hosted by the Boston Chapter of the [IEEE Geoscience and Remote Sensing Society \(GRSS\)](#). Visit <https://ieeeboston.org/event/simulating-the-performance-of-ocean-observing-imaging-payloads-for-nanosatellites/> for more info.

**See the IEEE Region 1 Calendar (<https://r1.ieee.org/calendar/>) and IEEE vTools (<https://meetings.vtools.ieee.org/events/search>) for more events.**

## Chair's Corner



By Dr. Betina Tagle

The season for IEEE awards is here! This is a great time to nominate someone who has made an impact to you or the Section. You can find more information at the Region 1 awards webpage > <https://r1.ieee.org/r1-awards/> (also, see below).

Part of the awards season is looking ahead at how we can improve to make the Maine Section amazing. We would love to be the Outstanding

Small Section and we need everyone's input to make it happen. If you have ideas or input please reach out, we would love to hear from you! You can send us a note through our Contact page on the Maine website: <https://r1.ieee.org/maine/>. Or, please free to [contact me directly](#).

We appreciate our members and rely on each of you!

R/IEEE Maine Section Chair

## 2021 IEEE Region 1 Awards

The **IEEE Region 1 Awards** recognize significant accomplishments and contributions of IEEE volunteers here in the Northeastern U.S.

Submissions to Region 1 are due no later than Wednesday, June 30, 2021 11:59 PM EDT. The

**Professional Achievement Award** categories are:

- **Technological Innovation (Academic):** For distinguished development, advancement and pursuit of the IEEE's technical objectives
- **Technological Innovation (Industry or Government):** For significant patents, discovery of new devices, development of applications or exemplary contributions to industry or government
- **Managerial Excellence in an Engineering Organization:** For managerial excellence in organization, leadership, design and development
- **Outstanding Teaching in an IEEE Area of Interest (University or College):** For outstanding contributions to education in an area of interest to the IEEE
- **Outstanding Teaching in an IEEE Area of Interest (Pre-University or College):** For improving communications between the IEEE and a student body; for support and service to a student body;

for service and leadership to the student community

- **Enhancement of the relationship between IEEE and Industry:** For significant contributions in an enhanced IEEE-Industry relationship
- **Enhancement of the IEEE or Engineering Profession's Image with the Public:** For significant contributions in developing an IEEE-Public relationship
- **Outstanding Support for the Mission of the IEEE, MGA, Region 1 and/or Section:** For outstanding service to the IEEE at the Chapter, Section, Region, MGA, and/or National level

Region 1 is also accepting nominations for:

- A **Lifetime Service Award** to recognize those whose personal efforts have provided leadership, creativity, guidance, hard work and inspiration in a wide range of IEEE activities over a significant and sustained period of time; and
- A **Young Professionals Award** to recognize a young professional (within 15 years from first degree).

Please [contact the Section's Awards Committee](#) if you are interested in making a nomination.

## Spotlight on Maine's Next Generation of Engineers



By *Stefany Burrell*  
STEM Education Specialist,  
Maine Mathematics and Science  
Alliance (MMSA)

Each year, the next generation of scientists and engineers from around Maine compete at the [Maine State Science Fair \(MSSF\)](#). This year, three of those students were selected to be among the 1,833 students from 64 countries competing at the prestigious [Regeneron International Science and Engineering Fair \(ISEF\)](#). I would like to introduce you to those three local teens and their research.



Linh Nguyen

### Removing Arsenic from Well Water

Does your home have a drilled well? If so, have you ever gotten the water tested? While many water treatment companies offer free well water testing, the treatment options for contaminated wells can be quite expensive. This disproportionately impacts underserved Mainers, who can be exposed to arsenic, uranium, or radon among other contaminants.

Linh Nguyen, a senior at Deering High School, sought a low-cost solution for removing arsenic from well water. She learned that carbon nanotubes (CNT) have been used to remove contaminants from water, so she encapsulated CNT within calcium alginate beads and impregnated them with different combinations of titanium dioxide and iron oxide to further the absorption of arsenic. Using arsenic test strips and contaminated water from several Maine sources, Linh discovered that the beads containing titanium oxide were most effective at removing arsenic from the water samples.

“My participation in the Science Fair really taught me that you don't need advanced instruments or even a lab to participate in STEM; you just need curiosity and determination,” said Linh. “At its core, STEM is about answering unresolved questions and finding solutions to the world's most pressing issues. Every setback along the way reaffirms a current belief, engenders a path that is closer to the answer, or opens the door to a completely new field. That's the beauty of STEM — it is messy and frustrating, but it's impact on humanity makes it so rewarding in the end.”

Linh's project certainly impressed the judges at Maine State Science Fair (MSSF). She received a \$5,000 scholarship from the Cary James Water Ride Scholarship Fund, first place in the Environmental Engineering category, and first place overall for the Fair. She represented Maine at the Regeneron International Science & Engineering Fair (ISEF). View Linh's ISEF page [here](#).

Linh plans to attend MIT to major in Chemical-Biological Engineering. She is interested in the intersectionality between social justice and science in the sense that she wants to find scientific solutions to problems through an equity lens.

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Vetri Vel

### Detecting Falls in our Elderly Population

The leading cause of fatal injury in elderly Americans is falling, and getting prompt help reduces the need for hospitalization greatly increases survival rates. Wearable devices are readily available, but some people forget to wear them or prefer not to use them. Built-in devices tend to be expensive and raise privacy concerns.

After a neighbor fell in their home and waited many hours for help to come, Vetri Vel decided to develop a cost-effective solution to this problem. The Bangor High School senior combined an infrared camera with a Raspberry Pi to monitor a living space. He used machine learning methods to classify images for greater accuracy in fall detection. Vetri's device has shown to be highly accurate and provides the added benefit of sending text messages to multiple people alerting them that their loved one may have fallen.

"Science research fairs present a very unique opportunity to go beyond passive learning and actually practice what you have learned," said Vetri. "In some cases, you may even make a contribution to a topic in science. Working on your own science research forces you to think creatively and deeply about science, what people have already done, and the limitations of our knowledge. For me, the most

exciting part of science is what nobody has yet discovered."

This is a continuation project for Vetri, meaning that his work presented at this year's Science Fair builds upon his work last year. After winning first place at last year's Science Fair, Vetri was recognized this spring at the national [Science Talent Search](#) with a sixth-place award. Vetri's project, in its new form, shone again at this year's MSSF. He placed first in the Engineering category, received the Naval Science Award, and placed second overall in the competition. At ISEF, Vetri was awarded a second place award from the U.S. Patent and Trademark Office Society. View Vetri's ISEF page [here](#).

Vetri hopes to spend the summer doing research in engineering, computer science, or physics at UMaine. He, too, will start at MIT in the fall. While he thinks he'll likely major in Electrical Engineering and/or Physics, he's keeping an open mind as he takes the variety of classes that a first-year student experiences.



Mateus Nascimento

### Identifying Pheromones with an Artificial Nose

Animals may not be able to use words the way humans do, but they still have sophisticated ways of

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communicating with one another. One such means is through pheromones. Pheromones can be used to track and control insect pests, as seen in widely-used Japanese beetle traps.

Mateus Nascimento, a junior at Brunswick High School, found pheromones and animal communication fascinating. He learned about the TruffleBot, a mechanized olfactory sensor built at Brown University, and decided to build one of his own. He used synthetic bombykol, a volatile organic compound (VOC) that mimics a pheromone produced by silk moths. Mateus' exploration focused on identifying the compound at varying levels and distinguishing it from other VOCs using K-means clustering, a data science algorithm that attempts to form clusters of similar data points. A device like this artificial nose could detect pest problems in agricultural situations before they become serious issues.

As for his future plans, Mateus writes: "If I had more specific and sensitive sensors, I would try to

integrate electronic noses into drones. Then I would test if the drones could move towards a pheromone source, first inside a gym (relatively controlled environment) and then outdoors. Pheromone-searching drones could be used to monitor animal populations as well as track members of endangered species, which could help in wildlife conservation. They could also be used in agriculture to determine where there is greater pest density for the purpose of pest control."

Mateus earned first place in the Biological Sciences & Engineering category and earned third place overall at MSSF. Mateus also represented Maine at ISEF. View Mateus' ISEF page [here](#).

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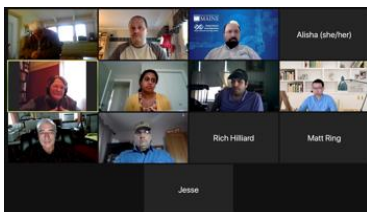
[IEEE Maine Section](#) was one of the sponsors of the 2021 Maine State Science Fair. The presenting sponsors and coordinators of the event are the [Reach project at Maine Mathematics & Science Alliance](#) and [The Jackson Laboratory](#).

## Executive Committee Session

*Editor's synopsis based in-part on draft minutes*

On May 3, the IEEE Maine Section Executive Committee (ExCom) held their monthly session on Zoom.

Starting off the discussion, Section Chair **Betina Tagle** asked ExCom



member **Ali Abedi** for his thoughts on quorum checks. According to IEEE Region 1's comments on the operating procedures, the Section's proposed quorum is too high. Ali mentioned that it is not necessary to consider the entire board when it comes to voting, but counting the chair, vice-chair, treasurer, and the secretary as the quorum might be sufficient. Responding to that, the Section Vice-Chair **Alisha Chaney** mentioned the importance of having an odd number of members in the quorum

in case of an even split. Agreeing with Alisha, Ali discussed some of the different approaches used by other Sections to overcome this issue, such as having a Member-at-Large, or a representative from the affinity groups and technical chapters included in the count to determine quorum. Along the same lines, **Ron Brown** mentioned that the quorum should not exceed 9. Responding to this, Alisha proposed a quorum of 7 members with one of them being either the chairperson or the secretary.

Moving on, Ron moved by motion to approve the minutes from the April ExCom meeting which was seconded by **David Klein**. The minutes were approved unanimously.

David requested that the May meeting minutes reflect that IEEE Power and Energy Society is the largest society in the Maine Section. The

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information about the relative sizes of the technical chapters, as discussed at April's meeting, was incomplete at the time. Also, the presentation from ReVision Energy has since moved to June 24 instead of June 17.

Betina presented the chairperson's report, thanking the Section's Award Committee and expressing her intentions to compete for the best section award. Ali expressed support for this idea. He also mentioned that since he is serving on the IEEE R1 Awards Committee, he is not able to be a part of this process.

Treasurer **Shengen Chen** presented the treasurer's report, informing the Committee of Maine Section's closing balance and interest received. The only payment made was \$300.00 to Eta Kappa Nu. Shengen reminded everyone that IEEE accounts are about to be moved to a different bank, and there will be a training session on May 31 for anyone willing to attend.

Section Membership Development Chair **Rich Hilliard** reported that there were no significant changes to the Section's membership since the last meeting.

Continuing the proposal from the last meeting to create a social media platform for member outreach, Webmaster and Social Media Chair **Doug Sprague** discussed the importance of having a digital footprint for the Section. The Social Media outreach committee will be comprised of David Klein (Section Newsletter Editor), **Matt Dube** (Chair of the Young Professionals affinity group), and Doug Sprague (Webmaster). Doug mentioned that the Section will start by having a Facebook page and then work on developing a LinkedIn group.

Alisha expressed some concerns regarding hiring a student for this project. Her thoughts were based on the fact that this will introduce a heavy workload and a student volunteer might not be capable of

committing much time to this. She mentioned that there might be a need to offset this work with a marketing firm. Adding to this, Ron indicated that marketing firms are expensive. Betina and Doug mentioned that the purpose of hiring a student worker for this project is to give them exposure and experience. Therefore, as long as a student volunteer is willing to put in a fair amount of work, this will be an ideal project for them. Asserting this point Matt emphasized the importance of experience for student volunteers and they might be interested in partaking in this.

Ron mentioned that within some groups, there is a separate electronic communication coordinator to handle social media outreach. He suggested that a student worker can help get the project up and running, while later, the maintenance portion will need to be supervised. He proposed that a possible plan would be that every month, one ExCom member gives the content to the electronics coordinator to be published on social media. Ron also suggested that students might enjoy the small projects.

In conclusion, Ron moved by motion to initiate this project, Matt seconded it, and it was approved unanimously.

PES/IAS Joint Chapter Chair **Jesse Shank** shared that in addition to the ReVision energy presentation in June, there will be an additional presentation or presentations on Tidal Power and Wind Power. These two presentations might be of special interest to the Maine Section given our geographic location.

David said that he will be sending an email to the officers regarding publishing their email addresses on social media. Each officer can opt-in or opt-out as they wish.

Betina mentioned that in the next meeting, she will be presenting the Student Groups' report.



# IEEE Power & Energy Society SCHOLARSHIP PLUS INITIATIVE®

*Preparing the Next Generation of Power & Energy Engineers*

## IEEE Power & Energy Society Scholarship

The PES Scholarship Plus Initiative provides scholarships and real-world experience to undergraduates who are interested in power and energy engineering careers. The aim is to attract highly-qualified engineering students to the field. These students are the very individuals who will one day develop new green technologies, build the smart grid, and change the way we generate and utilize power.

Do you have what it takes to qualify for the PES Scholarship Plus Initiative? If so, you can receive up to three years of financial support (total of US\$7,000) and gain career experience through [internships and co-op work](#). This program offers opportunities to gain experience and build knowledge in power and energy engineering careers, including mentoring and special recognition as a PES Scholar.

**The deadline for completing the online application is Wednesday, June 30, 2021.**

### Eligibility

You can apply for the PES Scholarship as early as your first year in college. You do not need to be an IEEE member to initially apply. You are eligible to receive the scholarship if:

- You are currently enrolled full-time at a university, college, or community college.
- You are considering a career in electric power and energy engineering.
- You are working towards an electrical engineering bachelor's degree (or first professional degree).

- You will be a full-time student in the coming academic year at an ABET-accredited [university or college](#) in the U.S., Puerto Rico, or Canada that offers a 4-year electrical engineering program with undergraduate courses in power engineering. The subjects of typical power engineering courses can be [viewed here](#).
- You will take (or have taken) at least three of the power engineering courses for a total of nine-or-more credits.
- You are a citizen or permanent resident of, and reside in, the U.S., Canada, or Puerto Rico.
- Your current GPA is 3.0 or higher on a 4.0 scale (or equivalent).

### Application Overview

To complete an application, you will need:

- A copy of your unofficial transcript in PDF format, covering at least one year of courses at your current school, as well as any prior college transcripts.
- One letter of reference (although two is better) from an individual who thinks “you would be a worthy recipient of a scholarship for exploring a career in power and energy engineering.” It is preferred that this letter be from a professional acquaintance (NOT from friends and family), such as from professors (science and/or engineering focus), an IEEE Student Branch Adviser, or a person you worked for in an engineering capacity. You will be asked to enter their e-mail addresses on the application form to send them a reference-request e-mail.
- A list of at least three power and engineering course names and course numbers, and when you have taken or plan to take each course.

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- A statement of interests, not more than 500 words, describing your interest in engineering along with your personal interests and career goals, how they relate, and how you got interested in engineering.
- A personal statement, not more than 500 words, describing where you see yourself in 5, 10, or 20 years in the future, and in that regard, explaining why you “deserve” to be selected as a PES scholar.
- A list of your top achievements and/or awards that you have received, with a 50-word minimum and a 500-word maximum. Information on volunteer or employment experience is also helpful.
- A description of any career experience that you have and/or internships you are already committed to for next year (if any), in no more than 500 words.
- If applicable (not required for new applicants), a detailed description of career experience already done or currently in progress in the field of power and energy engineering, in no more than 300 words.
- If applicable (not required for new applicants), a description of opportunities you have taken to learn more about power engineering careers, such as attending conferences and participating in IEEE Chapter events, in no more than 200 words.

Please ask your reference(s) to submit their letter of recommendation prior to the June 30, 2021 application deadline.

### Selection

Selection for first-year PES scholarships is competitive. Your scholarship award application will be ranked based on these factors:

- Academic performance (based on overall GPA).
- The alignment of your technical and personal interests with power and energy engineering.
- Your personal strengths (such as achievements, volunteer activities, work experience, endorsement letter(s), etc.).
- Strength of your academic program.
- Overall assessment of your potential for a successful power and energy engineering career.

### What to Expect

You will be notified whether you have received a scholarship no later than September 30, 2021.

Individuals who are selected as PES Scholars will receive IEEE and PES membership free for one year.

You will have to reapply to receive the scholarships for the second and third year, but as long as you continue to meet the eligibility requirements, including having had a career experience, you will continue to receive the scholarship in those years.

Please check <http://www.ee-scholarship.org> for additional information. Visit [https://www.ee-scholarship.org/images/files/Scholarship\\_pdf/Scholarship\\_checklist\\_calendar.pdf](https://www.ee-scholarship.org/images/files/Scholarship_pdf/Scholarship_checklist_calendar.pdf) for an application checklist with important dates. Visit <https://www.ee-scholarship.org/how-it-works/faq> for answers to frequently asked questions.



### Additional Scholarship Opportunities

All recipients of the IEEE PES Scholarship Plus Initiative are also eligible for the [John W. Estey Outstanding Scholar Award](#), which is distributed annually to the top PES Scholar in each of the six IEEE U.S. regions and Canada. The Award includes an additional US\$5,000 for school expenses, and up to US\$1,000 in travel honorarium to attend the IEEE PES General Meeting.

Honorably discharged U.S. veterans are also eligible for the [IEEE PES G. Ray Ekenstam Memorial Scholarship](#), which is distributed annually to a selected PES Scholar. The scholarship includes a maximum of US\$5,000 for school expenses, and a travel stipend of up to US\$500 for the recipient to travel to and participate in the IEEE PES General Meeting.

## IEEE Life Membership

IEEE Life Membership (LM) is proof of a strong sustained commitment to the profession. In acknowledgement, IEEE dues and regional assessments *are waived for Life Members*. “Life” status is *automatically bestowed* upon an active IEEE member who:

- Has attained the age of 65 years; or
- Has been a member of IEEE for such a period that the sum of his/her age and his/her years of membership equals or exceeds 100 years.

In determining the required years of membership, the following rules apply:

- a) Only years in which membership dues were paid are counted;
- b) Years of Student and Graduate Student membership are counted; and
- c) Years of membership need not be consecutive.

To confirm how many years you have already accrued, check your membership card, or click [here](#) to be taken to your IEEE Member info, or contact the IEEE Contact Center at [contactcenter@ieee.org](mailto:contactcenter@ieee.org).

The designation of Life Member is effective on January 1 of the year *after* you qualify. Members will be notified by mail in the fourth quarter of the qualifying year.

In addition to receiving, free of charge, the services and publication(s) provided for the basic IEEE dues and assessments, Life Members continue to receive [the same benefits available to other IEEE members](#), and may receive [reduced member rates at some IEEE conferences](#)

If you have been a member of a Society or IEEE-Standards Association (IEEE-SA) for not less than five years immediately prior to attaining Life Membership, or you complete such a five-year

period of membership while a Life Member, you can continue that membership without dues payment.

Life Members receive two [Life Members Newsletters](#) per year, which serves as a forum to present ideas and determine the services desired by Life Members.

If you would like more information about life

membership, visit <https://www.ieee.org/communities/life-members/index.html> or contact Section Membership Development Chair Rich Hilliard at [r.hilliard@computer.org](mailto:r.hilliard@computer.org).



### Already a Life Member?

IEEE Maine Section currently has 64 Life Members, including 33 Life Members, 22 Life Senior Members, and 9 Life Fellows.

If there is interest, Maine Section is eligible to form a [Life Member Affinity Group \(LMAG\)](#). Among other activities, LMAGs arrange their own social gatherings, sponsor technical events, support mentoring programs, and assist local student branches. LMAGs are eligible for up to \$2,000 per year in funding from IEEE for activities (subject to oversight by a [regional coordinator](#)). Existing nearby LMAGs include [New Hampshire](#), [Boston](#), [Montréal](#), and [Canadian Atlantic](#).

If you have obtained “life” status and are interested in forming an LMAG, please contact Section Chair Dr. Betina Tagle at [betina.tagle@maine.edu](mailto:betina.tagle@maine.edu).

Also, please be sure to respond when IEEE asks for [your annual confirmation that you would like to continue to receive services and publications](#). If you fail to respond, IEEE will suspend your membership and you would need to contact the [IEEE Contact Center](#) to [request reinstatement](#).

## Special Circumstances for Reduced IEEE Membership Dues

IEEE renewal notices will be sent around the end of October. If economic circumstances impact your ability to pay your IEEE dues, the following [special circumstance categories](#) have been established:

### Minimal Income

If you certify that your prior year's income did not exceed US\$15,300, you may apply for a 50% reduction in dues, assessments, and optional publication fees. You will be asked to submit your written certification with your renewal.

### Retired

A retired member, not gainfully employed and not qualifying for Life Member status (*see page 12*), upon attaining the age of 62 years, may apply for a 50% reduction in dues, assessments, and optional publication fees.

### Unemployed

If you (1) have become involuntarily unemployed and are seeking reemployment, or (2) have become voluntarily unemployed for reasons of raising children, you may apply for a 50% reduction in dues, assessments, and optional publication fees. A statement of continued unemployment must be provided with each annual dues payment. In the case of voluntary unemployment, the dues reduction shall not exceed four years.

### Permanently Disabled

Membership dues and assessments are waived for members who become permanently disabled. "Permanent disability" means a medically determinable physical or mental impairment that (1) renders you incapable of performing any substantial gainful employment, (2) can be expected to be of long-continued and indefinite duration or result in death, and (3) is evidenced by a certification to this effect by a doctor of medicine approved by IEEE's Executive Director.

Only one Special Circumstances category may be claimed in any year.

Special circumstance discounts are not available to Student members, but other discounts are available (*see below*).

Requests for a Special Circumstances reduction can be made at the time of renewal, except for permanent disability, which has its own process.

If you would like to request a Special Circumstances dues reduction and are currently enrolled in [IEEE's automatic membership renewal](#), you must opt out before the second week of October through your member profile in [My Account](#) on [IEEE.org](#). Automatic renewal is not available for the special-circumstance memberships.

If you have any questions or would like additional information, please contact IEEE Member Services: <https://www.ieee.org/about/contact.html>.

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## Dues Reductions for Students

New and renewing IEEE students and graduate students can save 50% on their membership dues by using the promotion code **FUTURE50** during the online check-out process for [joining or renewing](#) your IEEE membership. Students who recently renewed or joined at full price can reach out to the IEEE Contact Center at: [contactcenter@ieee.org](mailto:contactcenter@ieee.org) and request a credit on future membership dues.



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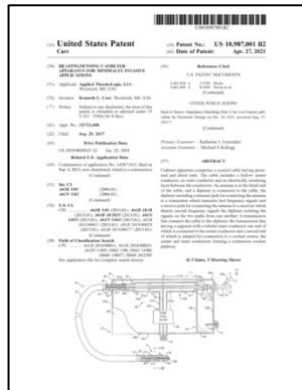
## Dues Reductions for Recent Grads

Recent graduates receive a 50% discount off IEEE dues the first year after graduation. If eligible, you will [automatically](#) receive the appropriate discount when you renew.

## Member Accolades

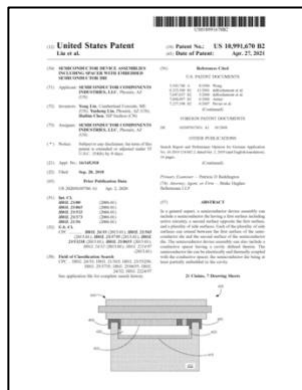
Congratulations to the IEEE Maine Section members who recently received patents or were published:

On April 27, 2021, the U.S. Patent and Trademark Office issued [U.S. Patent 10,987,001 B2](#), entitled “Heating/Sensing Catheter Apparatus for Minimally Invasive Applications.” Maine Section member and IEEE Life Fellow **Kenneth L. Carr** of Woolwich is listed as a co-inventor.



ABSTRACT: Catheter apparatus comprises a coaxial cable having proximal and distal ends. The cable includes a hollow center conductor, an outer conductor and an electrically insulating layer between the conductors. An antenna is at the distal end of the cable, and a diplexer is connected to the cable, the diplexer including a transmit path for connecting the antenna to a transmitter which transmits first frequency signals and a receive path for connecting the antenna to a receiver which detects second frequency signals the diplexer isolating the signals on the two paths from one another. A transmission line connects the cable to the diplexer, the transmission line having a segment with a tubular inner conductor one end of which is connected to the center conductor and a second end of which is adapted for connection to a coolant source, the center and inner conductors forming a continuous coolant pathway.

On April 27, 2021, the U.S. Patent and Trademark Office issued [U.S. Patent 10,991,670 B2](#), entitled “Semiconductor Device Assemblies including Spacer with Embedded Semiconductor Die.” Maine Section member and IEEE Fellow **Yong Liu** of Cumberland Foreside is listed as a co-inventor.



ABSTRACT: In a general aspect, a semiconductor device assembly can include a semiconductor die having a first

surface including active circuitry, a second surface opposite the first surface, and a plurality of side surfaces. Each of the plurality of side surfaces can extend between the first surface of the semiconductor die and the second surface of the semiconductor die. The semiconductor device assembly can also include a conductive spacer having a cavity defined therein. The semiconductor die can be electrically and thermally coupled with the conductive spacer, the semiconductor die being at least partially embedded in the cavity.

On May 5, 2021, in the [Proceedings of the 25<sup>th</sup> International Conference on Pattern Recognition](#), IEEE published “[MINT: Deep Network Compression via Mutual Information-based Neuron Trimming](#).” Maine Section member **Salimeh Yasaei Sekeh** is a co-author.



ABSTRACT: Most approaches to deep neural network compression via pruning either directly evaluate a filter's importance using its weights or optimize an alternative objective function with sparsity constraints. While these methods offer a useful way to approximate contributions from similar filters, they often either ignore the dependency between layers or solve a more difficult optimization objective than standard cross-entropy. Our method, Mutual Information-based Neuron Trimming (MINT), approaches deep compression via pruning by enforcing sparsity based on the strength of the dependency between filters of adjacent layers, across every pair of layers in the network. The dependency is calculated using conditional geometric mutual information which evaluates the amount of similar information exchanged between filters using a graph-based criterion. When pruning a network, we ensure that retained filters contribute the majority of the information towards succeeding layers which ensures high performance. Our novel approach is highly competitive with existing state-of-the-art compression-via-pruning methods on standard benchmarks for this task: MNIST, CIFAR-10, and ILSVRC2012, across a variety of network

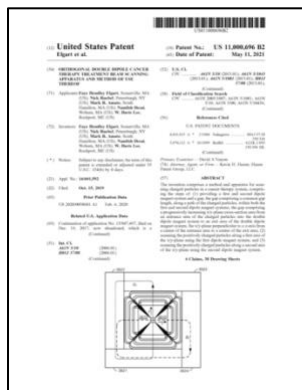
[Continues Next Page]

architectures despite using only a single retraining pass. Also, we discuss our observations of a common denominator between our pruning methodology's response to adversarial attacks and calibration statistics when compared to the original network.

On May 10, 2021, the [Journal of Community Psychology](#) published an early view of “[Using Geographic Information Systems to Assess Community-Level Vulnerability to Housing Insecurity in Rural Areas.](#)” Maine Section member **Matt Dube** is a co-author.

**ABSTRACT:** Research examining homelessness in rural areas has been sparse. The current study aims to expand conceptions of rural homelessness by mapping community-level risk factors related to housing insecurity. Geographic information systems (GIS) techniques were used to map the distribution of select community-level risk indicators in the State of Maine. Three methodological choices related to this process are demonstrated: (1) selection and distribution of housing insecurity risk indicators; (2) use of location quotients; and (3) use of spatial lags. After examining and mapping selected risk factors against the location of homeless service supports, four areas in Maine were identified as communities of concern for housing insecurity. Better understanding the extent and location of areas of high need that are resource poor can help service and funding agencies to plan for the more efficient and effective distribution of homeless prevention and mitigation services. Implications for research in rural areas are discussed.

On May 11, 2021, the U.S. Patent and Trademark Office issued [U.S. Patent 11,000,696 B2](#), entitled “Orthogonal double dipole cancer therapy treatment beam scanning apparatus and method of use thereof.” Maine Section member **W. Davis Lee** of Rockport is listed as a co-inventor.



**ABSTRACT:** The invention comprises a method and apparatus for scanning charged particles in a cancer therapy system, comprising the steps of: (1) providing a first and second dipole magnet system and a gap, the gap comprising a common gap length, along a path of the charged particles, within both the first and second dipole magnet systems, the gap comprising a progressively increasing x/y-plane cross-section area from an entrance area of the charged particles into the double dipole magnet system to an exit area of the double dipole magnet system, the x/y-plane perpendicular to a z-axis from a center of the entrance area to a center of the exit area; (2) scanning the positively charged particles along a first axis of the x/y-plane using the first dipole magnet system; and (3) scanning the positively charged particles along a second axis of the x/y-plane using the second dipole magnet system.

On May 14, 2021, in the proceedings of the [2021 IEEE International Conference on IOT, Electronics and Mechatronics \(IEMTRONICS\)](#), IEEE published “[Explainable Predictions of Industrial Emissions.](#)” Maine Section member **Sudarshan S. Chawathe** is the author.

**ABSTRACT:** Predictive emission monitoring systems for gas turbines are important in the power generation industry. A key task in this context these systems is the prediction of flue gas emissions using process and environmental measurements that are easier to obtain. This paper presents methods for such predictions with an emphasis on explainability. A notable result is that despite the potential restrictions imposed by this emphasis, the numerical accuracy compares very favorably with prior work that uses models that are more difficult to explain.



## Rural Broadband Update



By David Klein  
Newsletter Editor

In follow-up to the article on rural broadband in [April's Beacon](#), New Hampshire Section held their Broadband Forum on April 21. A link to a video of the forum can be found [here](#).

Here in Maine, on April 26, Maine Public [reported](#) that the Governor was backing a bipartisan bill that would overhaul the [ConnectMaine Authority](#), to “create a new [authority] with the power to own and invest in rural broadband infrastructure projects...” News Center Maine articles about that same bill can be found [here](#) and [here](#).

On April 27, the Maine Legislature [Committee on Energy, Utilities and Technology](#) held a public hearing on the bill, [LD 1484/SP0477](#) entitled “An Act To Enhance the ConnectMaine Authority's Capacity To Provide World-class Internet.” The record contains written testimony from the bill's sponsors, and 14 other people and organizations. The text of the bill can found [here](#).

Two other broadband-related bills were also discussed at the April 27 hearing: [LD 848/HP0616](#) entitled “An Act To Increase High-speed Internet In Rural Maine,” and [LD 1432/HP1048](#) “An Act To Update the Municipal Gigabit Broadband Network Access Fund.” All three bills remain pending.

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## Call for Articles and Events

The Beacon and Maine Section website are always looking for content. In particular, please share:

**Events:** Upcoming live engineering, science, and professional development events in Maine. Please let us know about the event at least four weeks beforehand, although we will try to accommodate shorter notice when practical. With your submission, please provide: (1) what organization is presenting the event, (2) the date and time of the event, (3) how/where the event will be presented (e.g., interactive online video, physical in-person location, etc.), (4) whether advanced registration is required (and the deadline to register, if applicable), (5) whether there is any cost to attend, and (6) a URL and/or contact e-mail address where interested parties can obtain more information.

**Articles:** We are interested in original technical, professional development, college-life, and Maine-interest articles, as well as opinion pieces about issues relevant to the engineering community. Original graphics and photographs are encouraged. Length is flexible.

**Patents and Publications:** Please let The Beacon know if you are presenting a paper at a conference, have recently been published in a peer-reviewed journal, or have recently received a U.S. Patent.

**Newsworthy Stories:** Do you know about something that might be of interest to IEEE Maine Section members that might have otherwise escaped their attention? If it is something that you've seen in media or in a press release, please provide a link to the source so that we may provide attribution.

**All submissions are subject to editorial review. Please refrain from submitting content that is intended to promote a commercial product or service.**

Send submissions by e-mail to: [IEEEMaineBeacon@gmail.com](mailto:IEEEMaineBeacon@gmail.com).

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## Regional Calls for Papers

### 2021 IEEE High Performance Extreme Computing Virtual Conference

HPEC is the largest computing conference in New England and is the premier conference in the world on the convergence of High Performance and Embedded Computing. Our community is interested in computing hardware, software, systems, and applications where performance matters. We welcome experts and those new to the field. Hosted by [IEEE Boston Section](#).

*Submission Deadline: Friday, July 9, 2021*

*Notification of Acceptance: Friday, August 13, 2021*

*Camera Ready Deadline: Tuesday, August 31, 2021*

*Conference: Tuesday, September 21 to Thursday, September 23, 2021, Online*

Visit <http://ieee-hpec.org/cfp.htm> for more info.



### 2021 IEEE 5G World Forum

The 5G World Forum aims to bring experts from industry, academia, and research to exchange their vision as well as their achieved advances towards future networks of 5G beyond and encourage innovative cross-domain studies, research, early deployment and large-scale pilot showcases that address the challenges of future networks. Hosted by [IEEE Montréal Section](#), [IEEE ComSoc](#), [IEEE Computer Society](#), and [IEEE Future Networks](#).

*Technical paper submission: Thursday, July 15, 2021*

*Acceptance Notification: Sunday, August 15, 2021*

*Camera-ready submission: Sunday, September 5, 2021*

*Conference: Wednesday, October 13 to Friday, October 15, Virtual with optional in-person in Montréal, QC*

Visit <https://ieee-wf-5g.org> for more info.

### 2021 Virtual IEEE International Symposium on Technologies for Homeland Security

The HST symposium brings together innovators from leading academic, industry, businesses, [Homeland Security Centers of Excellence](#), and government agencies to provide a forum to discuss ideas, concepts, and experimental results. This year's event will showcase emerging technologies in Cyber-Security, Frontier Technologies, Climate Resilience, and Borders Enforcement. Produced by IEEE with support from [IEEE Boston Section](#), [IEEE-USA](#), [MIT Lincoln Laboratory](#), and [Raytheon](#).

*Paper Extended Abstract and Poster Abstract Deadline: Tuesday, June 1, 2021*

*Paper, Poster Acceptance Notification: Friday, July 16, 2021*

*Final Paper Submission Deadline: Friday, September 24, 2021*

*Conference: Monday, November 8 and Tuesday, November 9, 2021, Online*

Visit <http://ieee-hst.org> for more info.

### 2023 IEEE International Ultrasonics Symposium (IUS)

Present the latest developments in the field of ultrasonics, ferroelectrics, and frequency control. Hosted by [IEEE Montréal Section](#).

*Paper Submission Deadline: Saturday, April 1, 2023*

*Conference: Tuesday, September 5 to Friday, September 8, 2023*

Visit [https://conferences.ieee.org/conferences\\_events/conferences/conferencedetails/51837](https://conferences.ieee.org/conferences_events/conferences/conferencedetails/51837) for more info.

**Search IEEE's Call for Papers Database** of over 1,800 conferences for opportunities to submit abstracts and papers in your field of interest by visiting <https://publication-recommender.ieee.org/home>. Provides key data at a glance, including conference titles, locations, submission deadlines, and conference dates. This tool can also be used to search over 190 periodicals for non-conference publishing opportunities.

## Where to find Us Online

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 <p><b>Engineering in Medicine &amp; Biology Society Joint ME/NH/VT Chapter</b> EMB Homepage: <a href="https://www.embs.org">https://www.embs.org</a> Contact for info: Dr. Rosemary Smith &lt;<a href="mailto:rosemary.smith@maine.edu">rosemary.smith@maine.edu</a>&gt;</p>	 <p><b>UMaine IEEE Student Branch</b> Branch Homepage: <a href="https://umaine.edu/ieee/">https://umaine.edu/ieee/</a> Branch Facebook: <a href="https://www.facebook.com/groups/IEEE.UMaine">https://www.facebook.com/groups/IEEE.UMaine</a></p>
 <p><b>IEEE Eta Kappa Nu Delta Kappa Chapter</b> Chapter Info: <a href="https://hkn.ieee.org/hkn-chapters/delta-kappa-chapter/">https://hkn.ieee.org/hkn-chapters/delta-kappa-chapter/</a></p>	 <p><b>USM IEEE Student Branch</b> TBD</p>

## Neighboring Sections:

New Hampshire	New Brunswick	Canadian Atlantic	Worcester	Providence
Boston	Green Mountain	Montréal	Québec	St. Maurice