Boston Section

Supporting students, working engineers and retirees through professional development, education and resources.

THE Reflector

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IEEE
Advancing Technology for Humanity

ieeeboston.org

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The "Reach" of IEEE

by Denise Griffin, IEEE Boston Section

When I started volunteering with IEEE as a college student, I was focused simply on the idea of connecting my Electrical Engineering degree with the "real world" and hoping that the networking I did would someday help me figure out what I wanted to "be". I didn't have a really strong feeling towards a particular area of EE to specialize in.

As I grew in my first job as a Systems Engineer at a defense contractor, I got so tied up working and travelling that I didn't volunteer for a while.   Once I connected with the Boston Section, I realized that there were some interesting ways to volunteer. First, I started helping the Boston Section with their participation in "Engineers Week". I interacted with other non-profits and several corporations, ultimately running the Career Fair at the annual event. This helped me see what other companies were out there and allowed me to meet students from many universities. I even made my first job change during this time. As a result of this volunteering, I learned about myself, and my passion for volunteering in the Boston Section was sparked. I never looked back.

Today, many years later, I volunteer across many parts of IEEE: as a leader in my Section, as a Women in Engineering (WIE) leader in the Region, as part of the IEEE-USA Awards & Recognition Committee, as a Governor for IEEE-HKN supporting student chapters, and even by helping with conferences like "Rising Stars" in other regions.   I am continually finding ways to better myself AND to encourage and motivate others.   I have had the chance to watch many student members grow into amazing engineers and dedicated IEEE volunteers. I have met members who have taken their careers in a variety of directions and found their own unique ways to spend their IEEE volunteer time based on their personal goals and values.   I have learned from them. At every conference I attend, or every event I get involved in, I reconnect with a past IEEE friend, or meet someone new, and come home filled with inspiration about IEEE and the reach that it truly has.

Not only are there numerous technical societies and affinity groups within IEEE, but there are other entities and groups such as Future Networks, and projects such as the IEEE MOVE Truck. There are manga cartoon contests geared towards encouraging K-12 students to consider STEM, and huge initiatives across IEEE related to tackling climate change.   There is the SIGHT program.   There are countless ways to volunteer from a humanitarian perspective alone, on projects related to sustainability and helping the underserved populations.

What I have learned is that it is not just about volunteering in the area where you live – or picking the technical society that most matches your specific area of Electrical Engineering. It's really about what you LIKE, what you CARE ABOUT, who YOU are, and HOW you want to spend your IEEE volunteer time. There is no limit to the ways in which you can get involved and the list of possibilities keeps growing.

So, if you think you already knew all interesting ways you benefit from IEEE AND use IEEE to help "give back", think again!

Call for Articles

Now that the Reflector is all electronic, we are expanding the content of the publication. One of the new features we will be adding are technical, professional development, and general interest articles to our members and the local technology community. These will supplement the existing material already in our publication.

Technical submissions should be of reasonable technical depth and include graphics and, if needed, any supporting files. The length is flexible; however, a four to five page limit should be used as a guide. An appropriate guide may be a technical paper in a conference proceeding rather than one in an IEEE journal or transaction.

Professional development or general interest articles should have broad applicability to the engineering community and should not explicitly promote services for which a fee or payment is required. A maximum length of two to three pages would be best.

To ensure quality, technical submissions will be reviewed by the appropriate technical area(s). Professional/interest articles will be reviewed by the Publications Committee for suitability.The author will be notified of the reviewers' decision.

The Reflector is published the first of each month. The target submission deadline for the articles should be five weeks before the issue date (e.g., June 1st issue date; article submission is April 27). This will allow sufficient time for a thorough review and notification to the author.

We are excited about this new feature and hope you are eager to participate!
Submissions should be sent to;
ieeebostonsection@gmail.com

Call for Course Speakers/Organizers

IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity. The IEEE Boston Section, its dedicated volunteers, and over 8,500 members are committed to fulfilling this core purpose to the local technology community through chapter meetings, conferences, continuing education short courses, and professional and educational activities.

Twice each year a committee of local IEEE volunteers meet to consider course topics for its continuing education program. This committee is comprised of practicing engineers in various technical disciplines. In an effort to expand these course topics for our members and the local technical community at large, the committee is publicizing this CALL FOR COURSE SPEAKERS AND ORGANIZERS.

The Boston Section is one of the largest and most technically divers sections of the IEEE. We have over 20 active chapters and affinity groups.
If you have an expertise that you feel might be of interest to our members, please submit that to our online course proposal form on the section's website (www.ieeeboston.org) and click on the course proposal link (direct course proposal form link is **http://ieeeboston.org/course-proposals/** . Alternatively, you may contact the IEEE Boston Section office at ieeebostonsection@gmail.com or 781 245 5405.

- **Honoraria can be considered for course lecturers**
- Applications oriented, practical focused courses are best (all courses should help attendees expand their knowledge based and help them do their job better after completing a course
- Courses should be no more than 2 full days, or 18 hours for a multi-evening course
- Your course will be publicized to over 10,000 local engineers
- You will be providing a valuable service to your profession
- Previous lecturers include: Dr. Eli Brookner, Dr. Steven Best, Colin Brench, to name a few.

Consumer Technology Society
Call for Volunteers!

We are currently looking for volunteers who would be interested in pushing forward the mission of the Consumer Technology (CT-S), Boston Chapter. The chapter is looking for volunteers to help organize chapter meetings and help meet the needs of the local CT-S member needs.

The Boston Section is organizing chapters into groups of similar technical interest areas to pool their resources for easier and better chapter collaboration in planning the chapter events.

If you have interest in volunteering for a chapter leadership position or are interested in learning more about what these volunteer positions may entail, please send an email to Karen Safina in the IEEE Boston Section office at, ieeebostonsection@gmail.com

Aakash Deliwala, Chair, IEEE Boston Consumer Technology Chapter

Engineering in Medicine & Biology Society
Call for Volunteers!

We are currently looking for volunteers who would be interested in pushing forward the mission of the Engineering in Medicine & Biology Society (EMBS), Boston Chapter. The EMBS - Boston Chapter was recently approved in July 2021, and we're looking to make a significant impact in the area of Biomedicine, Bioengineering, and Biotechnology in the region. The chapter is looking for volunteers to help organize chapter meetings and help meet the needs of the local EMBS members.

The Boston Section is organizing chapters into groups of similar technical interest areas to pool their resources for easier and better chapter collaboration in planning the chapter events.

If you have interest in volunteering for a chapter leadership position or are interested in learning more about what these volunteer positions may entail, please send an email to Karen Safina in the IEEE Boston Section office at, ieeebostonsection@gmail.com.

Aseem Singh, Marie Tupaj, Co-Chairs, Boston EMBS Chapter

IEEE Boston Section Online Courses:
(Students have 180 day access to all online, self-paced courses)

Electronic Reliability Tutorial Series
Full course description and registration at ,
http://ieeeboston.org/electronic-reliability/

High Performance Project Management
Full course description and registration at ,
http://ieeeboston.org/high-performance-project-management-online-course/

Introduction to Embedded Linux Part I
Full course description and registration at ,
http://ieeeboston.org/introduction-to-embedded-linux-part-i-el201-online-course/

Embedded Linux Optimization - Tools and Techniques
Full course description and registration at ,
http://ieeeboston.org/embedded-linux-optimization-tools-techniques-line-course/

Embedded Linux Board Support Packages and Device Drivers
Full course description and registration at ,
http://ieeeboston.org/embedded-linux-bsps-device-drivers-line-course/

Software Development for Medical Device Manufacturers
Full course description and registration at ,
http://ieeeboston.org/software-development-medical-device-manufacturers-line-course/

Fundamental Mathematics Concepts Relating to Electromagnetics
Full course description and registration at ,
http://ieeeboston.org/fundamental-mathematics-concepts-relating-electromagnetics-line-course/

Reliability Engineering for the Business World
Full course description and registration at ,
http://ieeeboston.org/reliability-engineering-business-world-line-course/

Design Thinking for Today's Technical Work
http://ieeeboston.org/design-thinking-technical-work-line-course/

Fundamentals of Real-Time Operating Systems
http://ieeeboston.org/fundamentals-of-real-time-operating-systems-rt201-on-line-course/

IEEE International Symposium on Phased Array Systems and Technology

15 - 18 October 2024
Hynes Convention Center, Boston, Massachusetts, USA
www.ieee-array.org

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Contact:
sponsorships@ieee-array.org

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Microwave Journal

About the Symposium

Phased array systems continue to be a rapidly evolving technology with steady advances motivated by the challenges presented to modern military and commercial applications. This symposium will present the most recent advances in phased array technology and offer a unique opportunity for members of the international community to interact with colleagues in the field of phased array systems and technology.

The committee is thrilled to announce two major changes to the symposium to better reflect the interest and pace of technology development: (1) moving to the larger Hynes Convention Center in the Back-Bay neighborhood of Boston; and (2) increasing the symposium frequency to a two-year cadence.

Be a Symposium Sponsor or Exhibitor

For sponsorship and exhibit opportunities please reach out to Mark McClure and Marc Angelucci at: sponsorships@ieee-array.org.

Suggested Topics

- 5G Arrays
- Array Design
- Array Measurements
- Array Signal Processing
- Automotive Arrays
- Beamforming & Calibration
- Digital Array Architectures
- Dual Polarized Arrays
- Low-Cost Commercial Arrays
- MIMO Arrays
- Medical Applications
- Metamaterial Phased Arrays
- mmWave and Terahertz
- T/R Modules
- Low Frequency Arrays
- SATCOM Arrays
- Weather Arrays
- Wideband Arrays

Paper Template and Submission Procedures

Template and submission procedures are available at:
https://ieee-array.org/paper-submission

Important Dates

- Full paper submission (2-8 pages including figures): 13 May 2024
- Author notification: 22 July 2024
- Author registration deadline: 01 Sept 2024

We are looking forward to seeing you at this next gathering.

Committee

Symposium Chairs
Sean Duffy (C), MIT LL
Wajih Elsallal (VC), MITRE

Technical Program Chairs
David Mooradd (C), MIT LL
Glenn Hopkins (VC), GTRI

Special Sessions Chairs
Matt Facchine, NGC
Kenneth E. Kolodziej, MIT LL

Plenary Session Chair
Will Moulder, MIT LL
William Weedon, Applied Radar

Student Program
Matilda Livadaru, Raytheon Tech
Justin Kasemodel, Raytheon Tech

Tutorials
Cara Kataria, MIT LL
Frank Vliet, TNO

Sponsorship and Exhibits
Marc Angelucci, LMC
Mark McClure, STR

Digital Platforms Chairs
Pierre Dufilie, Raytheon Tech
Jacob Houck, GTRI
Mark Fosberry, MITRE
Shireen Warnock, MIT LL

Publications/Publicity
Philip Zurek, MIT LL
Jack Logan, NRL
Elizabeth Kowalski, MIT LL

Poster Sessions Chair
Honglei Chen, MathWorks

Advisors
Daniel Culkin, NGC
Alan J. Fenn, MIT LL
Jeffery S. Herd, MIT LL
Bradley Perry, MIT LL

Arrangements/Administration
Robert Alongi, IEEE Boston
Kathleen Ballos, Ballos Assoc.

IEEE Video Series

A collaborative discussion panel featuring esteemed members from the Institute of Electrical and Electronics Engineers has convened in 2021 to produce educational video presentations that embrace IEEE's mission of advancing technology for humanity.

Among the programs they've produced include "Electric Vehicles: Fun Saving Our Planet", "Greener Power For More Electric Vehicles", "Overcoming Nuclear Fears To Achieve Net Zero CO_2 By 2050" and "Achieving a Net Zero Carbon Future", "Green Energy's Economic Progress", and "Net-Zero CO_2 with Nuclear, Hydrogen and Geothermal". Projects currently in production include the expansive topic of futurology, with a focus on increasing the efficiency and transformation of aging electrical power generating stations and infrastructure to accommodate nuclear power; reviewing the viability of alternative energy (such as geothermal, wind and solar); and focusing on 'cleaner' fossil fuels that are more environmentally-friendly to slow the rate of climate change.

These shows are produced and directed by Lennart E. Long, IEEE Senior Life Member from the Executive Committee and Past Chair of the Boston Section; Dr. Paul H Carr, BS, MS, MIT; PhD Brandeis U, IEEE Life Fellow; Dr. Ted Kochanski, SB (MIT), Ph.D (U.Texas, Austin), IEEE Global Education for Microelectronic Systems and former Boston Section Chair; and Dr. Ken Laker, B.E. (Manhattan College), M.S. and Ph.D. (New York University), IEEE Life Fellow and past President of IEEE.

The panel is moderated by five-time Boston/New England Emmy Award-winner and television personality and star of "The Folklorist," John Horrigan. These video programs with presentations and discussions can be accessed at the IEEE Boston Section video portal at https://vimeo.com/user18608275.

We are looking for any IEEE members that would like to appear on the program in the role of presenter or discussion expert. Simply reach out to Robert Alongi at the Boston Section at, ieeebostonsection@gmail.com.

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Electromagnetic Compatibility Chapter – 6:00PM, Wednesday, November 1

EMI Testing on Space Systems

Speaker: Jens Medler, Rohde & Schwarz

The IEEE EMC Boston Chapter is pleased to announce a November 1st meeting / technical presentation: EMI Testing on Space Systems –

Hosted at: TÜV Rheinland North America, Technology, and Innovation Center

Sponsored by Rohde & Schwarz

Thank you to our meeting sponsor!

The technical presentation will commence at 7:00PM following a social hour at 6:00 PM.
Food and refreshments are provided.

Agenda:
6:00 PM: Registration/check-in, complimentary food and refreshments
6:45 PM   Welcome from TÜV Rheinland North America and IEEE EMC Boston Chapter
7:00 PM   Presentation by Jens Medler, Rohde & Schwarz
8:00 PM   Optional tour of the new (almost finished) TUV facility

Location: TÜV Rheinland North America, Technology and Innovation Center, 400 Beaver Brook Road, Boxborough, Massachusetts
Parking: Complimentary parking is available

Registration:
https://events.vtools.ieee.org/m/378535

Please register no later than Tuesday, October 31st in order to ensure adequate seating & catering.

EMI Testing on Space Systems By Jens Medler, Product Manager with focus on Standardization and Application Support for EMC Test Equipment., Rohde & Schwarz

The use of FFT-based measuring receivers is motivated by reducing the scan time by several orders of magnitude without degradation of accuracy and to get more insight due to the possibility of applying longer measurement times. Comparison measurements on a nanosatellite were performed using conventional EMI receiver and FFT-based time-domain scanning technique.

Jens Medler joined Rohde & Schwarz, Munich, Germany, a company specializing in test equipment and radio equipment in 1996. He is responsible for the standardization and application support of EMI test receivers and accessories for both hardware and software and is active member of various CISPR Subcommittees since 1999. He also holds a senior membership in the IEEE EMC Society and is acting vice chair of the societies Standards Development and Education Committee.

This includes CIS/A on EMC measurement instrumentation and methods, CIS/D on equipment on vehicles and internal combustion engine powered devices and CIS/I on information technology equipment, multimedia equipment and receivers. Since October 2017 he is acting as convenor of CIS/A WG2; the CISPR Working Group on EMC measurement methods, statistical techniques and uncertainty. He is recipient of the IEC 1906 Award.

IEEE Boston Section Volunteers Wanted!

Are you passionate about technology and eager to contribute to the advancement of your field? The IEEE Boston Section is excited to announce a call for volunteers to join our dynamic team of professionals and enthusiasts. By becoming a volunteer, you'll have the opportunity to collaborate with like-minded individuals, develop new skills, and make a meaningful impact on the local technology community.

About IEEE Boston Section:
The IEEE Boston Section is a thriving community of engineers, researchers, students, and industry professionals dedicated to promoting technological innovation and knowledge sharing. Our section hosts a variety of events, workshops, seminars, and conferences throughout the year, providing members with opportunities to learn, network, and stay updated on the latest developments in their fields.

Volunteer Opportunities:
We are currently seeking volunteers to help on the following committees:

The Fellow and Awards Committee - activities include recommending qualified members of the Section for advancement to Fellow grade and for receipt of the various IEEE (IEEE/Region/MGA/Section) awards. Identifying and building a database of the various IEEE awards available for nomination and searching out qualified candidates, for preparing the necessary written recommendations, and for assembling all required supporting documentation and submit its recommendations directly to the appropriate IEEE body.
Time Commitment: Meets 4 times a year for 1 – 2 hours per meeting (virtual or in person)

Local Conferences Committee - activities include identifying timely topical areas for conference development. Identify champions of these conferences to run the identified conference organizing committees. The section local conference committee is not charged with organizing and executing individual conferences.
Time Commitment: Meets 4 times per year 1 – 2 hours per meeting (virtual or in person)

Professional Development & Education Committee - activities include identifying topics, speakers, and/or organizers for appropriate technical lecture series or seminars. The subject matter should be timely, of interest to a large segment of the membership, and well organized with regard to speakers and written subject matter.
Time Commitment: meets 4 times per year, 1 – 2 hours per meeting (virtual or in person)

The Membership Development Committee - activities include actively promoting membership in the IEEE and shall encourage members to advance to the highest grade of membership for which they are qualified. To these ends this committee shall include wide representation within the Section territory, shall maintain lists of prospects and members qualified for advancement, and shall provide information and assistance to preparing applications.
Time Commitment: meets 4 times per year, 1 – 2 hours per meeting (virtual or in person)

Student Activities Committee - activities include attracting a broad and diverse group of undergraduate and graduate students to IEEE and to engage them in activities that promote their own professional development as well as the ongoing growth of IEEE. The Student Activities Committee shall include among its members the IEEE Counselors at the universities, colleges, and technical institutes that lie within the Section territory. It shall be responsible for liaison with the Student Branches at these institutions and advise the Executive Committee on all other matters affecting the Student Members of the Section.
Time Commitment: meets 4 times per year, 1 – 2 hours per meeting (virtual or in person)

Young Professionals Affinity Group - activities include organizing programs, and initiatives aimed to address the needs of early-career professionals pursuing technology-related careers in engineering, business, management, marketing, and law. This committee is committed to helping young professionals evaluate their career goals, polish their professional image, and create the building blocks of a lifelong and diverse professional network.
Time Commitment: meets 4 times per year, 1 – 2 hours per meeting (virtual or in person)

Benefits of Volunteering:
Volunteering with IEEE Boston Section offers numerous benefits, including:

• Networking opportunities with professionals in your field.
• Skill development and enhancement through hands-on experience.
• Contribution to the local technology community and its growth.
Access to cutting-edge information and discussions.

How to Get Involved:
If you're enthusiastic about technology and want to make a difference, we invite you to join us as a volunteer. To express your interest and learn more about specific roles, please visit our website and fill out the volunteer application form. Our team will get in touch with you to discuss opportunities that align with your interests and skills.

Thank you for considering this opportunity to contribute to the IEEE Boston Section. Your dedication and passion are what drive the success of our community and its impact on the world of technology.

Volunteer Here!
https://ieeeboston.org/volunteer/

Signal Processing Society – 11:00AM, Thursday, November 2

Sample Complexity of Q-learning: from Single-agent to Federated Learning

Speaker: Dr. Yuejie Chi, Carnegie Mellon University

Meeting Location: Boston University, 8 St. Mary's Street, Boston, MA 02215. Department of Electrical and Computer Engineering, PH0339.

Q-learning, which seeks to learn the optimal Q-function of a Markov decision process (MDP) in a model-free fashion, lies at the heart of reinforcement learning practices. However, theoretical understandings on its non-asymptotic sample complexity remain unsatisfactory, despite significant recent efforts. In this talk, we first show a tight sample complexity bound of Q-learning in the single-agent setting, together with a matching lower bound to establish its minimax sub-optimality. We then show how federated versions of Q-learning allow collaborative learning using data collected by multiple agents without central sharing, where an importance averaging scheme is introduced to unveil the blessing of heterogeneity.

Dr. Yuejie Chi is the Sense of Wonder Group Endowed Professor of Electrical and Computer Engineering in AI Systems at Carnegie Mellon University, with courtesy appointments in the Machine Learning department and CyLab. She received her Ph.D. and M.A. from Princeton University, and B. Eng. (Hon.) from Tsinghua University, all in Electrical Engineering. Her research interests lie in the theoretical and algorithmic foundations of data science, signal processing, machine learning and inverse problems, with applications in sensing, imaging, decision making, and societal systems, broadly defined. Among others, Dr. Chi received the Presidential Early Career Award for Scientists and Engineers (PECASE) and the inaugural IEEE Signal Processing Society Early Career Technical Achievement Award for contributions to high-dimensional structured signal processing. She is an IEEE Fellow (Class of 2023) for contributions to statistical signal processing with low-dimensional structures.

Registration:
https://events.vtools.ieee.org/m/380556

IEEE Boston Section Social Media Links:

Twitter: https://twitter.com/ieeeboston

Facebook: https://www.facebook.com/IEEEBoston

YouTube: https://www.youtube.com/user/IEEEBostonSection

LinkedIn: https://www.linkedin.com/groups/IEEE-Boston-Section-3763694/about

Microwave Theory and Technology Society – 6:00PM, Wednesday November 8

High-Capacity Millimeter-Wave Imaging System for On-The-Move People Screening & PA Characterization And Evaluation Metrics For DPD Performance Enhancement

Speakers: Weite Zhang, Anis Ben Arfi, Analog Devices, Inc.

During this Young Professional event we'll have two short (~30min) talks by two YPs. The first talk will be by Dr. Weite Zhang, titled "High-capacity Millimeter-wave Imaging System for On-the-move People Screening" and the second by Dr. Anis Ben Arfi titled "PA characterization and evaluation metrics for DPD performance enhancement".

Refreshments (finger-foods) will be provided for those attending in-person and a Zoom link will be provided for those attending virtually.

Location:
Zoom information will be emailed to those who registered the day of the event.
125 Summer Street, Boston, MA. Building: Analog Devices, Boston. Room Number: Ste 2100

Registration:
https://events.vtools.ieee.org/m/377977

Speakers:

Weite Zhang - High-capacity Millimeter-wave Imaging System for On-the-move People Screening

Weite Zhang received the M.S. degree from Zhejiang University, Hangzhou, China, in March 2017, and the Ph.D. degree from Northeastern University, Boston, MA, USA, in May 2022. He was a Senior Research Engineer at Northeastern University from May 2022 to March 2023. His research mainly focuses on high-capacity sensing and wireless communication systems. Since March 2023, he has been a Senior Engineer at Analog Devices Incs., where he is working on digital pre-distortion (DPD) and integrated sensing and communication (ISAC) for 5G and beyond networks.

Anis Ben Arfi - PA characterization and evaluation metrics for DPD performance enhancement

Dr. Anis Ben Arfi received his PhD in 2019 from the University of Calgary and currently works at Analog Devices in Ottawa where he focuses on 5G Wireless Systems and digital processing algorithms. Anis has been actively volunteering with IEEE MTT-S where he served as a coordinator of the Distinguished Microwave Lecturer and Young Professional Representative for IEEE Region 7 (Canada). He is leading the IEEE MTT-S Student Ambassador Program established this year. Dr. Anis has participated in several national and international events and conferences and has won prestigious awards.

Photonics Society – 6:00PM, Thursday, November 9

Topologically Engineered Sources of Quantum Light

Speaker: Prof. Sunil Mittal, Northeastern, University

Meeting Location:
MIT Lincoln Laboratory, 3 Forbes Rd, Lexington, Massachusetts. Building: Cafeteria

Photonic quantum technologies rely on sources of quantum light that are compact, scalable, and at the same time, allow engineering of the quantum state of light. The most versatile and scalable platform to generate quantum states of light is via nonlinear spontaneous parametric processes in integrated photonic devices, such as a ring resonator. Though a variety of quantum states of light have been generated using single-ring resonators, they usually suffer from very low efficiencies, offer limited ability to engineer quantum states of light, and their scalability is hindered due to fabrication-induced defects and disorders.

In this talk, I will describe a topologically robust platform to generate quantum states of light on a photonic chip. Specifically, I will show how the unique properties of topological edge states, implemented in a two-dimensional array of ring resonators, can be used to both, enhance, and engineer the generation of distinguishable energy-time entangled photon pairs in a robust manner. As another example, I will demonstrate the generation of indistinguishable photon pairs with tunable spectral-temporal correlations. I will also discuss the generation of high-efficiency topological optical frequency combs and nested solitons using edge states. Finally, I will outline the prospects of generating squeezed states and cluster states of light using frequency-time multiplexing.

Speaker:
Sunil Mittal is an Assistant Professor in the Department of Electrical and Computer Engineering at Northeastern University. He received his Ph.D. in Electrical Engineering from the University of Maryland at College Park. Thereafter, he continued at Maryland as a Postdoctoral Researcher in the Joint Quantum Institute. His research interests span quantum and nonlinear photonics, topological physics, and two-dimensional materials.

Agenda
6:00 pm Networking starts
6:15 pm Light meal served
7:00 pm Seminar starts

Registration Link:
https://events.vtools.ieee.org/event/register/379589

IEEE Boston Section Social Media Links:

Twitter: https://twitter.com/ieeeboston

Facebook: https://www.facebook.com/IEEEBoston

YouTube: https://www.youtube.com/user/IEEEBostonSection

LinkedIn: https://www.linkedin.com/groups/IEEE-Boston-Section-3763694/about

Life Members (cosponsored by NH Life Members) – 4:00PM, Wednesday, November 29

SPARC and the High-Field Path to Fusion

Speaker: Dr. Dennis Whyte, Director, MIT Plasma Science & Fusion Center, Hitachi America Professor of Engineering, and Professor, Nuclear Science & Engineering

The advent of REBCO high-temperature superconductors at commercial scale has changed the development path for producing fusion energy with magnetic confinement.

The design and test of a large-bore B>20 tesla peak field superconducting magnet at MIT PSFC, in collaboration with Commonwealth Fusion Systems, realizes a doubling of the allowed B field compared to previous state of the art. This realizes extremely large gains in fusion performance fusion power density scales as B^4 and access to ignition as $\sim B^5$ at fixed plasma physics.

These gains in turn allow for operation away from limits, yet in much smaller and less expensive devices. CFS is presently constructing the high-B tokamak SPARC outside Boston with MIT as its major scientific collaborator, with the goal of demonstrating high fusion energy gain and fusion power density that propels fusion into the commercial energy sector. In addition to describing SPARC, parallel key fusion technology development programs will be described.

Dennis G. Whyte is the Hitachi America Professor of Engineering, and director of the Plasma Science and Fusion Center at the Massachusetts Institute of Technology. A recognized leader in fusion research, especially in the magnetic confinement of plasmas, Whyte has paved an innovative and faster path to producing fusion energy. He leads the fusion project, SPARC —

a compact, high-field, net fusion energy fusion device — in collaboration with private fusion startup Commonwealth Fusion Systems (CFS). The core of the SPARC project was formed over eight years ago during a design course led by Whyte to challenge assumptions in fusion. Many of the ideas underpinning the high-field approach — including the use of HTS for high-field, demountable magnets, liquid blankets, and ARC (a fusion power plant concept) — have been conceived of or significantly advanced in his design courses. Whyte has over 350 publications, is a fellow of the American Physical Society, and has served on panels for the National Academies, the United States government, and the Royal Society. In 2018, Whyte received The Fusion Power Associates (FPA) Board of Directors Leadership Award which is given annually to individuals who have shown outstanding leadership qualities in accelerating the development of fusion. Whyte earned a B.Eng from the University of Saskatchewan, and an MS and PhD from Université du Québec.

This talk will be held at MIT Lincoln Laboratory's Main Cafeteria, 244 Wood St, Lexington MA.

The talk is 4-5 p.m., with refreshments available at 3:30. Use the Wood St gate, and after parking, follow signs to the Main Cafeteria. For directions, see https://www.ll.mit.edu/.

Registration:
https://events.vtools.ieee.org/m/380547

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New Hampshire Section, New Hampshire Section Jt. Affinity Group, WIE/YP and
Southern New Hampshire University - 5:30PM, Wednesday, November 29

Elevation and Networking Event

Have you considered raising your membership grade to senior member? Come and find out more about IEEE senior member level, other membership levels and possibilities for growth. Learn about the elevation application process. Network with senior members who can provide references for your application. Meet our students who will be part of the event and will be learning about professional careers. Whether you want to mentor professionals or students or are looking for the next step in your career come to the IEEE PACE (Professional Activities Committee for Engineers) event. All are welcome.

Location: 2500 North River Road, Manchester, New Hampshire. Building: SETA IDE Engineering Building, Room Number: 204 A/B

Agenda
5:30PM - Arrival. Light dinner (pizza) is served.
5:40PM - Introduction and presentation
6:00PM - Small group interviews
7:00PM - Raffle
7:15PM – Wrap-up

Registration:
https://events.vtools.ieee.org/m/377721

Call for Course Speakers/Organizers

IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity. The IEEE Boston Section, its dedicated volunteers, and over 8,500 members are committed to fulfilling this core purpose to the local technology community through chapter meetings, conferences, continuing education short courses, and professional and educational activities.

Twice each year a committee of local IEEE volunteers meet to consider course topics for its continuing education program. This committee is comprised of practicing engineers in various technical disciplines. In an effort to expand these course topics for our members and the local technical community at large, the committee is publicizing this CALL FOR COURSE SPEAKERS AND ORGANIZERS.

The Boston Section is one of the largest and most technically divers sections of the IEEE. We have over 20 active chapters and affinity groups.
If you have an expertise that you feel might be of interest to our members, please submit that to our online course proposal form on the section's website (www.ieeeboston.org) and click on the course proposal link (direct course proposal form link is **http://ieeeboston.org/course-proposals/** . Alternatively, you may contact the IEEE Boston Section office at ieeebostonsection@gmail.com or 781 245 5405.

- **Honoraria can be considered for course lecturers**
- Applications oriented, practical focused courses are best (all courses should help attendees expand their knowledge based and help them do their job better after completing a course
- Courses should be no more than 2 full days, or 18 hours for a multi-evening course
- Your course will be publicized to over 10,000 local engineers
- You will be providing a valuable service to your profession
- Previous lecturers include: Dr. Eli Brookner, Dr. Steven Best, Colin Brench, to name a few.

Computer Society – 7:00PM, Thursday, November 30

Engineering Ecosystems with AI

Speaker: Sandy Pentland, MIT

Location: MIT Room 32-G449 (Kiva) and online via Zoom

Please register in advance for this webinar/seminar even if you plan to attend in person at:
https://acm-org.zoom.us/webinar/register/9116977451705/WN_4z6KkwZbRxq_WpTR6R-rEBA

After registering, you will receive a confirmation email containing information about joining the webinar.

Indicate on the registration form if you plan to attend in person. This will help us determine whether the room is close to reaching capacity.

We may make some auxiliary material such as slides and access to the recording available after the seminar to people who have registered.

Our society is having difficulties engineering heterogeneous systems of people and technology. For instance, our systems for dealing with pandemics, climate change, and financial stress have been less than completely successful, in significant part because of unanticipated human behaviors. This talk will cover new approaches to engineering ecosystems that better integrate human behavior and discuss how new technologies like Large Language Models (LLMs) can help.

Professor Alex 'Sandy' Pentland directs MIT Connection Science, an MIT-wide initiative, and previously helped create and direct the MIT Media Lab and the Media Lab Asia in India. He is one of the most-cited computational scientists in the world. Forbes declared him one of the "7 most powerful data scientists in the world" along with Google founders and the Chief Technical Officer of the United States. He is on the Board of the UN Foundations' Global Partnership for Sustainable that led to the EU privacy regulation GDPR and was one of the UN Secretary General's "Data Revolutionaries" helping to forge the transparency and accountability mechanisms in the UN's Sustainable Development Goals. He has received numerous awards and prizes such as the McKinsey Award from Harvard Business Review, the 40th Anniversary of the Internet from DARPA, and the Brandeis Award for work in privacy. Recent invited keynotes include annual meetings of OECD, G20, World Bank, and JP Morgan.

He is a member of advisory boards for the UN Secretary General, the UN Foundation, Consumers Union, and OECD, and formerly the American Bar Association, Google, AT&T, and Nissan. He is a member of the U.S. National Academy of Engineering and council member within the World Economic Forum.

Over the years Sandy has advised more than 80 PhD students. Together Sandy and his students have pioneered computational social science, organizational engineering, wearable computing (Google Glass), image understanding, and modern biometrics. His most recent books are Building the New Economy and Trusted Data, both published by MIT Press, Social Physics, published by Penguin Press, and Honest Signals, published by MIT Press.

This meeting of the Boston Chapter of the IEEE Computer Society will be hybrid (in person and online), part of getting back to normal after the COVID-19 lockdown.

Power and Energy Society Boston Chapter is conducting a 6-hour course on:

Power Electronics for Modern Power Systems

Eventbrite link: Power Electronics for Modern Power Systems Tickets, Wed, Nov 8, 2023 at 6:00 PM | Eventbrite
Linkedin: https://www.linkedin.com/company/96238081
Location: Online

Live Meeting via WebEx will be provided. This course offers 0.6 CEUs or 6 PDH credits.

Session 1: Nov 8, 2023, 6-8pm
Bi-directional AC/DC Topologies from Microgrids to HVDC Applications
by Prof. Ali Bazzi, University of Connecticut
The session will cover basics of voltage-source converters (VSC) and current-source converters (CSC) for grid-tied applications with bidirectional power flow analysis and control. Some multi-level topologies will be introduced and specific considerations from low-voltage to high-voltage applications are discussed.

Session 2: Nov 15, 2023, 6-8pm
Soft-switching Inverters in Power Systems
by Dr. Weiqiang Chen, ABB
Soft-switching techniques are being widely employed in three-phase inverters in modem power systems due to its low power losses and good controllability during switching events. In this session, popular topologies, typical applications, and the challenges of soft-switching inverters in power systems will be discussed.

Session 3: Nov 29, 2023, 6-8pm
DC Fast Charging Converters and their Penetration in Modern AC Grids
by Dr. Zhe Zhang, Eaton
DC fast charging infrastructure is being rapidly deployed all around the world. Different power converter topologies for DC fast charging will be presented. The critical consequences of DC fast charging stations on AC grids will also be discussed in the short course .
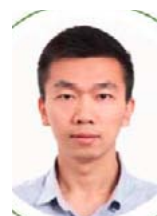
Boston EMBS Chapter Wins Chapter of the Year Award

We're thrilled to announce that the EMBS Boston Chapter was recognized as the 2023 EMBS Professional Chapter of North America!

The award was presented at the opening ceremony of the 45th Annual International Conference of the IEEE EMBS in Sydney, Australia on July 24, 2023, with an estimated 2500 attendees.

This recognition reflects our dedication to fostering a vibrant social community, expanding technical knowledge, and facilitating networking opportunities. We extend our heartfelt thanks to our members, attendees, and EM BS officers for their integral roles in our success.

EMBS- Boston Officers:
Aseem Singh, Rabeeh Majidi, Ph.D., Brian Telfer, Divya Krishnagiri, Kamaldeep Singh, Vladimir Vakhter,Vignesh Mandalapa

Congratulations for the Boston EMBS Chapter and its officers

IEEE EMBS Boston
62 followers
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Don't miss out! Swing by the IEEE EMBS Boston booth at the Body Sensor Networks conference (bsn.embs.org/2023/). Come chat with us and learn about our professional, technical, and social events that can supercharge your career and network. We will be at the conference from Oct 9-11 so stop by!

Advanced Digital Design:
Implementing Deep Machine Learning on FPGA

Times & Dates: 6 - PM ET, Mondays, Jan. 22, 29, Feb. 5, 12, 19, 26, 2024

Speaker: Kendall Farnham, Dartmouth College

Location: MITRE Corporation, Bedford, MA

Hosted by

MITRE | SOLVING PROBLEMS FOR A SAFER WORLD®

Course Overview:

Field-programmable gate arrays (FPGAs) are versatile integrated circuits that offer a flexible and reconfigurable hardware platform for implementing custom digital circuits, particularly in applications requiring specialized architectures. Unlike application-specific integrated circuits (ASICs), FPGAs can be programmed and re-programmed after manufacturing using hardware description languages (HDLs), enabling rapid prototyping and iterative design processes. FPGAs can be found in telecommunications, signal processing, aerospace, and other scenarios demanding high-performance computing, parallel processing, low-latency data processing, and real-time operations. The newest trends include integrating FPGAs with systems on chip (SoCs) for implementing low-latency machine learning (ML) and artificial intelligence.

This Advanced Digital Design course is an intensive program designed to build upon foundational concepts in digital logic design and equip students with the skills needed to implement robust high-speed ML algorithms on an FPGA. Through a combination of theoretical lectures, hands-on exercises, and practical projects, students will explore advanced FPGA topics encompassing architectural considerations, signal integrity, timing analysis, and optimization techniques to achieve reliable and efficient high-speed designs. Additionally, this course will encourage students to explore current research papers and real-world industry applications to foster a deeper appreciation for advancements in state-of-the-art FPGA design.

Target audience:

Students and professionals with a base knowledge of FPGA design looking to advance hardware design skills for developing complex customized circuits for efficient implementation of ML.

Benefits of attending:

• Valuable professional development creating skills that lead to job offers
• Reinforce and expand knowledge of VHDL and FPGA-specific design methodology.
• Develop skills for implementing high-speed, robust, reliable circuits on FPGAs.
• Gain understanding of real-world industry applications of FPGAs and SoCs.

Course Objectives:

By the end of this course, students will possess the expertise needed to tackle complex high-speed hardware design challenges using FPGAs. They will be well-prepared to contribute to cutting-edge research, industry projects, and advancements in areas such as telecommunications, data centers, embedded systems, and high-performance computing.

Prerequisites:

• Understanding of digital logic design principles and methodology (e.g., Boolean algebra, finite state machines, data path elements)
• Familiarity with VHDL programming (or Verilog)
• Experience with FPGA development boards and tools (e.g., Vivado)

Speaker Bio:

Kendall Farnham is a PhD candidate in Dr. Ryan Halter's bioimpedance lab at the Thayer School of Engineering, Dartmouth College. She has 10+ years of experience in the electrical and computer engineering (ECE) field and 5+ years of teaching and mentoring experience, having held several leadership positions within academia and industry. She received her bachelor's degree in ECE in 2014, worked in the defense industry as a software engineer for 4 years where she discovered her passion for research, and returned to

school to expand her education to include hardware design for space medicine applications. Specifically, she is interested in FPGA-based biomedical device design, currently working to develop space-compatible technologies that use impedance to monitor and detect physiological effects of space travel. Her expertise includes high-performance FPGA-based digital system design, analog circuit design, multi-modal imaging algorithms, and system integration.

Course Outline:

1.   Review of Digital Logic Design and FPGA Programming
•   Boolean algebra, combinational and sequential circuits, finite state machines
•   FPGA, SoC, and SoM architectures and toolchains
•   VHDL programming techniques and design methodology
•   Writing effective testbenches, RTL simulation in Vivado
•   Introduction to ML algorithms and FPGA-specific optimization strategies

2.   High-throughput Communication on FPGAs
•   Pipelining and parallelism for high-speed designs
•   Synchronous vs. asynchronous communication protocols (SPI, SCI, UART, LVDS, I2C, PCIe, USB, Ethernet, etc.)
•   Compare hardware/software/firmware implementations of ML: throughput speeds, resource utilization, and latency
•   Methods used to achieve ultra-high sampling rates (>> system clock, GS/s range)
•   Utilizing advanced IP cores and IO buffers for high-speed interfaces and data storage

3.   Advanced FPGA Techniques for High-speed Systems
•   Clock domain crossing verification and synchronization techniques

•   Resource utilization, critical path identification, and optimization strategies
•   Timing constraints, static and dynamic timing analysis
•   Signal integrity analysis

4.   High-Speed Design Verification and Testing
•   Simulation-based verification techniques, advanced debugging, and waveform analysis
•   Post-layout verification and back-annotation
•   Test and validation strategies for high-speed designs
•   Utilizing debug cores for real-time logic analysis

5.   Machine Learning on FPGAs
•   Algorithm validation and verification in software
•   Compare capabilities and implementation strategies of ML on FPGAs, SoCs, and SoMs
•   Optimization strategies for efficient ML implementation in hardware (e.g., convolution)

6.   Digital Systems in Industry
•   Techniques and best practices for scalable, reusable, reliable, and robust FPGA design
•   Board-level considerations for high-speed signals: PCB layout guidelines, power distribution and decoupling, transmission line theory and termination techniques
•   Emerging trends for FPGA-based digital signal processing (DSP) applications

CEU/PDH are are availabe upon request. A small fee may apply for the credits

Decision (Run/Cancel) Date for this Course is Friday, January 12, 2024		
Payment	**By Jan. 5**	**After Jan.5**
IEEE Members	$120	$140
Non-members	$300	$400

https://ieeeboston.org/event/advanced-digital-design/?instance_id=3481

Preserving Innovation:
Navigating the Essentials of Intellectual Property Protection

Dates & Times: 6 - 7PM, Wednesday, January 17, 2024

Speaker: Greg Gerstenzang, and John Spangenberger, Lando & Anastasi

Location: Free Webinar

Overview
In high tech industries intellectual property may be a company's most valuable asset. Protection of a company's IP – patents, trademarks, copyright, and trade secrets – can be a key strategy for obtaining and maintaining competitive advantage in the marketplace. This webinar will focus primarily on patents, including what might makes a patent essential for a protecting innovation, the legal requirements necessary for obtaining a patent in the U.S., and the particulars of the application process in the U.S.

Target Audience
This webinar is intended for corporate counsel or persons in other leadership positions in companies that are developing innovations that they would like to protect from being copied by competitors. The content would also be beneficial to inventors within such companies that are involved in developing the innovations.

Benefits of Attending
To obtain a better understanding of intellectual property, in particular patent law, as well as an understanding of when a patent might be the best vehicle for protecting an innovation and when other forms of protection my be more appropriate as well as to gain a better understanding about what hurdles must be overcome to obtain a patent and the process involved in doing so.

Agenda/Topics
•   Forms of intellectual property and how they might be protected
•   What rights/benefits a patent conveys to a patentee
•   Legal Requirements for obtaining a patent
o   Anticipation
o   Obviousness
o   Written description/enablement
o   Patent Eligible Subject Matter
•   Procedure for applying for a patent

The notes/slide deck will be available for all that attend the session on January 17

Speaker Bios:
Greg Gerstenzang:
https://www.lalaw.com/people/gregory-k-gerstenzang/

John Spangenberger:
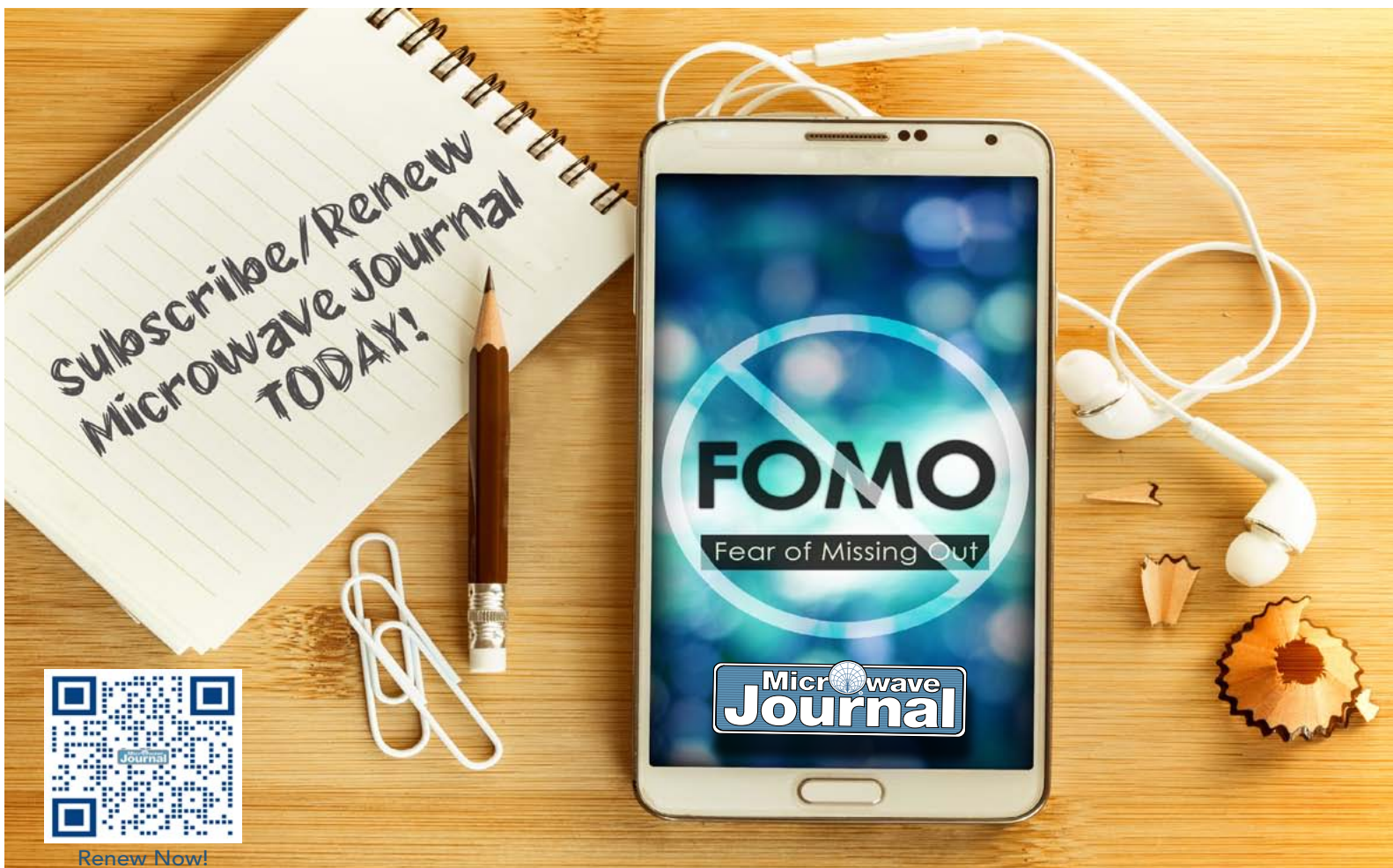https://www.lalaw.com/people/john-t-spangenberger/

There is no charge for this webinar but registration is required.

Registration closes on January 17, 2024 at 12PM) noon ET.

Registration:
https://events.vtools.ieee.org/m/380844