# Boston Section

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

# THE Reflector

ISSUE #5
MAY 2024



IEEE
Boston Section

ieeeboston.org

# TABLE OF CONTENTS

# On Being in IEEE

by Bala Prasanna, Director, IEEE Region One

"May the Force of others be with you."
—Guardian Chirrut Îmwe

As an incoming IEEE region director and board member, the last 6-8 months have been filled with time knowing firsthand the breadth, depth and impact of our beloved IEEE's reach on its members and the people that the members cause to bring to help experience IEEE. Our interest, intent and purpose could not be any truer – "Advancing Technology for Humanity".

My recent experiences – both in person and virtual – have taken me to pretty much all over the world and my sense of the privilege of being an IEEE member/volunteer and the responsibilities and possibilities that come with it have been getting ever more clear.

Being with Young Professionals at the Rising Stars Conference, seeing first hand the clout we have with large hospitality vendors when we arrange large conferences, attend board retreats learning about technology trends in coming years by industry future tellers and visionaries and imploring us to define and adjust our near-term and long-term (Think 2050) strategies, casting one of my first votes as a board member to a Big Bang Theory related milestone, proving the Oneness of IEEE through a workshop held in Kingston Jamaica, meeting and learning from the likeminded member volunteers in nearby and faraway places like Canada & Malaysia, and being a part of a great milestone dedication ceremony in Boston, and oh, by the way , Boston playing host to IEEE VICS Awards ceremony on 3rd May 2024 –remind me of two sayings that I have grown up with –

This time, like all times, is a very good one – if we but know what to do with it. (R W Emerson)

Our problems are many, but our capacity to solve them is limitless. (Ronald Reagan)

So, it is in this context, combined with a certain urgency and emphasis for call to action by our IEEE President, Tom Coughlin to focus on IEEE member engagement, I would like to remind ourselves of the One IEEE through various things that happen at IEEE.

Established over a century ago, IEEE has continually adapted to the changing times, solidifying its position as a global leader in advancing engineering and technology.

**STEM Outreach:** At the heart of IEEE's mission lies a commitment to nurturing the next generation of innovators and problem solvers. Through a myriad of outreach programs, educational initiatives, and collaborations with educational institutions, IEEE ignites curiosity and fosters a passion for science, technology, engineering, and mathematics (STEM) among students of all ages. Whether through robotics competitions, coding workshops, or mentorship programs, IEEE empowers individuals to explore their potential and pursue careers in STEM fields, thus addressing the critical need for a skilled workforce in an increasingly technology-driven world.

Pathway from Undergrad to Life Member: IEEE's engagement with members spans a lifelong journey, beginning from undergraduate studies and extending well into retirement. As students, individuals benefit from access to resources, networking opportunities, and career guidance through IEEE student branches and affinity groups. As they transition into young and beyond-young professional life, IEEE continues to support their growth through conferences, technical publications, and pro-

fessional development workshops. Moreover, IEEE offers avenues for continued involvement and recognition, culminating in life membership, a testament to one's enduring commitment to the advancement of technology and the IEEE community.

**Fellowship:** The IEEE Fellowship program stands as a pinnacle of recognition within the engineering and technology community. Awarded to individuals whose contributions have significantly impacted their respective fields, IEEE Fellowships honor excellence, innovation, and leadership. Beyond the prestige associated with the title, IEEE Fellows serve as ambassadors of progress, inspiring others through their groundbreaking research, technological advancements, and contributions to society at large. By celebrating outstanding achievement, IEEE fosters a culture of excellence and encourages continuous innovation among its members.

**Educational Courses:** In an era marked by rapid technological advancement, staying abreast of the latest developments is paramount for professionals in the field of engineering and technology. IEEE meets this need through a comprehensive array of educational courses, workshops, and conferences. Whether seeking to deepen expertise in a specific domain, explore emerging trends, or acquire new skills, IEEE offers unparalleled opportunities for lifelong learning and professional growth. From online courses accessible worldwide to hands-on workshops conducted by industry experts, IEEE's educational offerings empower individuals to thrive in an ever-changing landscape.

**Networking Opportunities:** Networking lies at the core of IEEE's vibrant community, connecting professionals, researchers, academics, and industry leaders across the globe. Through conferences, symposia, and local chapter meetings, IEEE provides a platform for collaboration, knowledge exchange, and professional networking. These interactions not only facilitate the sharing of ideas and best practices but also foster partnerships that drive innovation and technological advancement. By fostering a robust ecosystem of collaboration, IEEE empowers its members to tackle complex challenges and unlock new opportunities in their respective fields.
Technical Journals: IEEE's portfolio of technical journals stands as a cornerstone of scholarly discourse and scientific advancement in the field of engineering and technology. Renowned for their rigor, relevance, and impact, IEEE journals serve as authoritative sources of cutting-edge research, theoretical insights, and practical applications. Whether publishing fundamental discoveries or applied innovations, IEEE journals contribute to the collective body of knowledge, shaping the trajectory of technological progress. Moreover, the peer-reviewed nature of IEEE publications ensures the highest standards of quality and integrity, maintaining the credibility and trustworthiness of the information disseminated.

**IEEE Press:** In addition to scholarly publications, IEEE Press plays a vital role in disseminating knowledge and fostering intellectual discourse within the engineering community. Through the publication of books, monographs, and educational materials, IEEE Press serves as a conduit for sharing expertise, insights, and best practices across diverse domains of engineering and technology. From foundational textbooks to specialized reference works, IEEE Press publications cater to a broad spectrum of readers, spanning students, researchers, practitioners, and educators. By curating and disseminating high-quality content, IEEE Press contributes to the advancement of learning and scholarship in the field.

**Leadership Opportunities:** IEEE empowers its members to assume leadership roles and make meaningful contributions to the organization and the broader community. Whether serving on committees, leading technical chapters, or volunteering for outreach initiatives, IEEE members have ample opportunities to shape the direction of the organization and drive positive change. Through leadership development programs, mentoring initiatives, and recognition awards, IEEE cultivates a culture of leadership excellence, empowering individuals to leverage their skills, expertise, and passion for the betterment of society.

**Setting Standards:** IEEE's impact extends beyond research and education to the realm of standardization, where it plays a pivotal role in shaping the technological landscape. By developing and maintaining technical standards, such as the ubiquitous IEEE 802.11 Wi-Fi standard, IEEE ensures interoperability, compatibility, and reliability across diverse systems and devices. These standards serve as the foundation for innovation, facilitating the seamless integration of technologies and the widespread adoption of emerging appli-

cations. Moreover, IEEE's commitment to openness, transparency, and consensus-building ensures that standards reflect the collective expertise and interests of stakeholders, thereby enhancing trust, reliability, and interoperability in the global marketplace.

**History Center:** The IEEE History Center is a guardian of engineering history, dedicated to preserving the legacy of electrical, electronics and computer engineering. Through extensive archives and oral history interviews, it provides valuable insights into technological evolution and its societal impact. By documenting the stories of pioneering engineers and groundbreaking inventions, the History Center celebrates the ingenuity that has shaped the modern world.

A flagship initiative of the History Center is its Milestone Recognition Program, which honors significant technical achievements. These milestones, such as the invention of the transistor or the development of the Internet, highlight human ingenuity and collective effort. Through plaques at historic sites and commemorative events, IEEE ensures these milestones are cherished symbols of progress and inspiration.

**Technical Activities and Technical Societies** - Technical societies play a pivotal role in shaping the landscape of technical activities within IEEE chapters and among society members, exerting significant influence on professional development, knowledge dissemination, and community engagement.

At the heart of technical societies within IEEE is a commitment to advancing specific domains of engineering and technology. These societies serve as hubs of expertise, bringing together professionals, researchers, and enthusiasts with a shared passion for a particular field. By organizing conferences, workshops, and technical sessions, technical societies provide platforms for the exchange of ideas, the presentation of cutting-edge research, and the discussion of emerging trends. Through these activities, society members gain valuable insights, expand their networks, and stay abreast of the latest developments in their respective fields.

Moreover, technical societies within IEEE play a crucial role in fostering collaboration and interdisciplinary synergy. By transcending organizational boundaries and facilitating cross-disciplinary dialogue, these societies catalyze innovation and drive progress at the intersection of multiple domains. Whether through joint initiatives, collaborative projects, or interdisciplinary conferences, society members leverage their diverse expertise to tackle complex challenges and explore new frontiers of technology.

Furthermore, technical societies exert influence beyond the confines of IEEE chapters, shaping the broader discourse and trajectory of their respective fields. Through the publication of journals, the development of standards, and the establishment of best practices, these societies contribute to the advancement of knowledge and the dissemination of expertise on a global scale.

My perspective about IEEE was greatly influenced by a good friend and mentor during my early years in IEEE. When anybody would ask him what is the value of my membership in IEEE, he would throw a Duhhh look that was probably 10,000 words or long – that would simply have said .. Go Ahead, Engage Yourself, for yourself and others around you!

## IEEE Boston Section Social Media Links:

**Twitter: https://twitter.com/ieeeboston**

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

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

**Instagram: https://www.instagram.com/ieeeboston/**

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

## 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/**

### 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/**

## Last Notice Before Submission Deadline!!

### CALL FOR PAPERS

# IEEE International Symposium on Phased Array Systems and Technology

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

**Gold Sponsors**

samtec
Swissto12
str
MITRE

**Silver Sponsors**

EXTREME WAVES

**Technical Co-Sponsors**

MTT-S
AESS
APS

**Media Sponsor**

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 CO2 By 2050" and "Achieving a Net Zero Carbon Future", "Green Energy's Economic Progress", and "Net-Zero CO2 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.

# 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**

# 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/**

Call for Papers


**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.**

**The technical committee seeks new submissions that clearly describe advances in high performance extreme computing technologies, emphasizing one or more of the following topics:**

- High Performance Computing
- AI / Machine Learning
- Performance Engineering for AI
- AI for Performance Engineering
- AI at Scale and AI on the Edge
- LLMs, CNNs, DNNs, other AI/ML Methods
- Low/Mixed Precision Approaches
- Big Data and Distributed Computing
- Data Intensive Computing
- High Performance Data Analysis
- General Purpose GPU Computing
- Cyber Analysis and Secure Computing
- Interactive and Real-Time Supercomputing
- Supercomputing
- Graph Analytics and Network Science
- ASIC and FPGA Advances
- Advanced Multicore Software Technologies
- Advanced Processor Architectures
- Automated Design Tools
- Case Studies and Benchmarking of Applications
- Mapping and Scheduling of Parallel and Real-Time Applications
- Quantum and Non-Deterministic Computing
- New Application Frontiers
- Computing Technologies for Challenging Form Factors
- High Performance Embedded Computing
- Fault-Tolerant Computing

## Commitee

**Co-Chair & SIAM Liaison**
Dr. Jeremy Kepner / MIT Lincoln Laboratory

**Co-Chair**
Dr. Albert Reuther / MIT Lincoln Laboratory

**Senior Advisory Board Chair**
Mr. Robert Bond / MIT Lincoln Laboratory

**Senior Advisory Board**
Prof. Anant Agarwal / MIT CSAIL
Prof. Nadya Bliss / Arizona State University
Dr. Richard Games / MITRE
Mr. John Goodhue / MGHPCC
Dr. Bernadette Johnson / NATO DIANA
Hon. Zachary J. Lemnios / ZJL Consulting
Dr. Richard Linderman / AFRL (emeritus)
Mr. David Martinez / MIT Lincoln Laboratory
Dr. John Reynders / Reynders Consulting
Dr. Michael Stonebraker / MIT CSAIL

**Publicity Chair**
Mr. Dan Campbell, NVIDIA

**CFP Co-Chairs**
Dr. Franz Franchetti / CMU

**Publications Chair**
Prof. Miriam Leeser / Northeastern University

**Administrative Contact**
Mr. Robert Alongi / IEEE Boston Section

**Submission Deadline:**
**07 July 2024**

**Submission Guidelines:**
**https://ieee-hpec.org/index.php/submit/**

HPEC@IEEE-HPEC.ORG IEEE-HPEC.ORG


# IEEE SiPS 2024

## IEEE Workshop on Signal Processing Systems

4–6 November 2024
Cambridge, Massachusetts, U.S.A.

**The 37th IEEE Workshop on Signal Processing Systems (SiPS) is a premier international forum in the area of design and implementation of signal processing systems. It addresses all aspects of architecture and design methods of these systems. Emphasis is on current and future challenges in research and development in both academia and industry.**

## Submitting a Paper

We invite prospective authors to submit original papers (up to 6 pages) in areas including, but not limited to:

**Software Implementation of Signal Processing Systems**
- Software on programmable digital signal processors
- Application-specific instruction-set processor (ASIP) architectures and systems
- SIMD, VLIW, and multi-core CPU architectures
- GPU-based massively parallel implementations

**Hardware Implementation of Signal Processing Systems**
- Low-power signal processing circuits and applications
- High-performance VLSI systems
- FPGA and reconfigurable architecture-based systems
- System-on-chip and network-on-chip
- VLSI for sensor network and RF identification systems
- Quantum signal processing
- Processing-in-memory signal processing systems

**Design Methods of Signal Processing Systems**
- Optimization of signal processing algorithms
- Compilers and tools for signal processing systems
- Algorithm-to-architecture transformation
- Dataflow-based design methodologies
- Error-tolerant techniques for signal processing

**Machine Learning for Signal Processing**
- Circuits and systems for AI
- Deep learning/machine learning/AI algorithms
- Tools/platforms for AI
- Transfer learning
- Distributed/federated learning
- Hardware/neuromorphic accelerators
- Hardware/software co-design and automation for AI

**Signal Processing Application Systems**
- Audio, speech, and language processing
- Biomedical signal processing and bioinformatics
- Image, video, and multimedia signal processing
- Information forensics, security, and cryptography
- Sensing and sensor signal processing
- Signal processing for non-volatile memory systems
- Latency-and power-constrained signal processing
- Wireless communications and MIMO systems
- Coding and compression
- Signal processing for mixed-signal technologies

## Important Dates

| | |
|---|---|
| Technical Papers: | 03 April 2024 |
| Paper Notifications: | 26 June 2024 |
| Special Session Proposals: | 31 July 2024 |
| Tutorial Proposals: | 31 July 2024 |

## Committee

**General Chairs**
John McAllister, QUB
Joe Cavallaro, Rice

**Program Chairs**
Jari Nurmi, Tampere Univ.
Jani Boutellier, Univ. of Vaasa

**Finance Chair**
Warren Gross, McGill University

**Local Organizing Chair**
Brian Telfer, MIT Lincoln Laboratory

**eee-sips.org**

IEEE CAS IEEE Signal Processing Society

# IEEE RFID 2024 - SUBMIT NOW!

The 18th IEEE International Conference on RFID (IEEE RFID 2024) is seeking high-quality submissions for papers and posters (see submission options below) in all areas of technical RFID research and application.

IEEE RFID 2024 offers a unique opportunity to share, discuss, and witness research results in all areas of RFID technologies and their applications.

## COME JOIN US IN BOSTON, JUNE 4–6, 2024!

Date: June 4-6, 2024

MIT Media Lab, Cambridge MA

## IMPORTANT DATES

**PAPER SUBMISSION DEADLINE:**
**FEBRUARY 26TH, 2024**

**WORKSHOP PROPOSAL DEADLINE:**
**MARCH 11TH, 2024**

**NOTIFICATION OF ACCEPTANCE:**
**APRIL 22ND, 2024**

**POSTER SUBMISSION:**
**APRIL 29TH, 2024**

**FINAL PAPER SUBMISSION:**
**MAY 13TH, 2024**

**ALL DEADLINES ARE AT 11:59PM UTC-12**

## CALL FOR PAPERS

The IEEE RFID 2024 accepts paper and poster submissions formatted in the IEEE conference style. Manuscripts should be 6 pages, submitted by the advertised conference deadline (Feb 26, 2024). Posters follow the 1-page format (deadline April 29, 2024)

Selected papers will be invited to be published in Journal of Radio Frequency Identification (JRFID)

## General Track Topics and Workshops

| GENERAL TRACK TOPICS | GENERAL TRACK TOPICS |
|---|---|
| ANTENNAS & PROPAGATIONS | ENERGY HARVESTING |
| APPLICATIONS & SOFTWARE | ARTIFICIAL INTELLIGENCE (AI) FOR RFID |
| PROTOCOLS & SECURITY | DIGITAL TWINS |
| CIRCUITS, DEVICES & INTERROGATIONS | OCEAN INTERNET OF THINGS (IOT) |
| NEXT-GEN RFID & ID+ | BIOMEDICAL SYSTEMS |
| SENSORS | SMART MATERIALS |
| MOTION CAPTURE (MOCAP) | GEN. 3 RFID |

IEEE RFID IEEE Council on RFID

IEEE Region 1

IEEE Boston Section

**Visit the website:**

*Computer Society – 8:00PM, Wednesday, May 1*

# Achieving Optimal Compute Schedules in Heterogeneous Cyber-Physical Systems

Dr. M. Belviranli, Colorado School of Mines

Dr. Mehmet Belviranli is an Assistant Professor in the Computer Science Department at the Colorado School of Mines. Since transitioning from his role as a Staff Computer Scientist at Oak Ridge National Laboratory in Fall 2019, Mehmet's research is driven by a passion for enhancing performance and efficiency within diversely heterogeneous embedded systems. He specializes in developing runtimes, scheduling algorithms, analytical models, extended memory spaces, programming abstractions, and providing OS & architecture-level support to improve the efficiency of heterogeneous computing. His contributions to the field are recognized through his publications in respected HPC and architecture conferences, including MICRO, PPoPP, SC, ICS, DAC, PACT, and DATE.
https://cs.mines.edu/project/belviranli-mehmet/

Cyber-physical systems (CPS), such as robots and self-driving cars, demand rigorous scheduling to prevent failure, where every millisecond of processing time can be critical. These systems often rely on heterogeneous computing environments, which include CPUs, GPUs, and specialized accelerators, to meet their computational needs efficiently. However, leveraging these diverse processing units to fulfill strict physical constraints remains a significant challenge, as existing scheduling solutions often fall short of addressing the complexities involved in a comprehensive manner.
This talk by Dr. Mehmet E. Belviranli delves into the intricate world of creating efficient compute schedules for CPS that not only cater to their diverse computational hardware but also adhere to real-world constraints critical for system safety. We begin by examining the role of neural network (NN) inference in CPS, exploring strategies to balance energy consumption, latency and throughput by distributing the layers of NN across different accelerators. We then introduce a novel, end-to-end framework that integrates physical constraints, heterogeneous computational resources, and latency considerations into a cohesive mixed-integer linear problem, demonstrating through case studies how this approach yields optimal scheduling solutions under varied conditions.

Through this exploration, we aim to shed light on the untapped potential of heterogeneous computing in enhancing the reliability and performance of CPS. We will also outline future directions in developing a more robust ecosystem for these complex computing environments, highlighting our contribution to this evolving field.

**Registration:**
**https://events.vtools.ieee.org/event/register/417666**

## IEEE Boston Section Social Media Links:

**Twitter: https://twitter.com/ieeeboston**

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

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

**Instagram: https://www.instagram.com/ieeeboston/**

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

*Consultants' Network – 6:00PM, Monday, May 6*

# CNET Meeting: Board of Directors *(members only)*

Free Dinner starts at 6:00 PM

***Consultants' Network: https://boston-consult.org***
***Meeting Location: Great Wall Restaurant – Bedford, MA***
***Meeting starts at 7:00 PM - On-site and Zoom***

Members in good standing are encouraged to attend. If you are unable to attend, then we will also be on Zoom.

Your registration confirmation email contains the Zoom details.

As a group of skilled consultants associated with IEEE Boston Section, CNET offers high value professional services for a diverse audience.

**For CNET members:**
1. Professional interactions with peers in a supporting environment.
2. General information from insiders about the condition of industry.
3. Practical information exchanges about consulting practice.
4. Communication improvement across multiple specialties.
5. Participation in info-professional events on themes of interest.
6. Opportunity to give presentations and hone speaking effectiveness.
7. Credibility and visibility within the engineering and technology development community as an IEEE associated consultant.

**For engineers interested in becoming consultants:**
1. Basic information on consulting practice requirements.
2. Participation in events and idea exchanges with industry peers.
3. Access to established consultants in the area for mentoring.
4. Opportunities for improving professional communications skills.

For enquirers on CNET services:
1. Convenient access to local consultants with multi-disciplinary expertise.
2. Opportunities to enter into consulting agreements without agency fees.
3. Direct, easy connection with consultants over the CNET web page.
4. Dealing with consultants with multi-year experience validated by IEEE.

Join us!

## IEEE Boston Section Social Media Links:

**Twitter: https://twitter.com/ieeeboston**

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

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

**Instagram: https://www.instagram.com/ieeeboston/**

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

*Entrepreneurs' Network – 7:00PM, Tuesday, May 7*

# Founders and Funders

In-person at Lasell University, Newton MA and Online via Zoom

Register at
https://bostonenet.org/events/funders_and_founders

The startup world can only exist with founders and funders (customers help, too). For entrepreneurs with big ideas, it can be difficult to ask for money. Where do you go to ask, how do you approach someone, and what may be most effective? In this program, you'll hear from pros on both sides of the table.

A large segment of the population struggles to secure the funds to be successful: people of color and women. Panelists will talk about the obstacles and how to get around them.

You'll learn to:
- Gain self-confidence to ask for funding.
- Identify potential sources to help launch your business.
- Determine what agreements may be best for the founder and funder.
- Hear from a founder who is actively seeking investors.

Event Schedule
7:00 pm Introduction, ENET Chairperson's announcements
7:10 pm eMinute Pitch, up to 3 Startup pitches
7:25 pm Expert Panel, expert speakers on the night's topic
8:15 pm Q & A Moderator and Audience Q & A with the speakers
8:30 pm Networking, panelists will be available afterward for responses to individual questions.

**Speakers:**
Dr. Cassandravictoria (Cvic) Innocent

Cvic is the General Partner of Frankenbuild Ventures — or F(v) — a MA-based VC firm investing in companies building hardtech to function in extreme environments. Her professional background blends experiences of being an investment director with her experiences in instrument development of deep-tech. As such, she is very well-networked in the prototype-development communities, and the start-up ecosystem in Boston and beyond. Having previously worked for NASA (2007-2009), in 2023 she was invited to give a six-seminar series of videos explaining and promoting NASA's SBIR efforts with engineering founders and in 2024 she was listed as a Woman to Watch in VC by Amplify.

Collette Phillips - CEO and President/Chief Strategist/Visionary Colette Phillips Communications, Inc.

Colette Phillips is an extraordinary leader, an iconic cultural change catalyst, DE&I pioneer, thought leader, innovator, practical visionary, influencer, PR and marketing Maven, social commentator, philanthropist, serial social entrepreneur and uber connector. A passionate advocate for diversity and inclusion, and a driving force behind positive social change here. As the CEO of Colette Phillips Communications and the Founder of the award-winning cross-cultural Get Konnected! business networking organization. She has dedicated her life and career to empowering individuals, bridging communities, and fostering a more inclusive society and has played a pivotal role in reshaping the landscape of Boston's business and social scenes. With her dynamic leadership at the helm of her agency, a strategic communications and public relations firm, she has spearheaded groundbreaking initiatives that have elevated the voices of underrepresented communities. She is the Founder and President of The GK Fund (A Non-Profit Social Impact Fund) that provides capital, technical and legal support, mentorship, and access to opportunities to help small BIPOC and immigrant owned businesses scale. In 2021 her company served as the lead agency for the groundbreaking multiple award-winning All Inclusive Boston Campaign in partnership with Proverb Agency and the Greater Boston Convention and Visitors Bureau to reimagine and re-energize Boston's tourism and image. For more than three decades, Colette has been a powerful voice and effective agent of change in one of America's oldest and most tribal cities. An immigrant Black woman from the Caribbean Island of Antigua, Boston Business Journal named her on its annual Power 50 list five times, calling her a Game-changer and a Movement Maker; Boston Magazine dubbed her "Boston's Great Connector," and listed multiple times on its annual Most Influential Bos-

tonians list and she has been cited by Boston Globe for "Changing the Conversation about Diversity in Boston." As a testament to her exceptional contributions, in 2023 she was the subject of a Harvard Business School case study for creating a DE&I ecosystem with her initiatives including the GK Fund; the groundbreaking GK! Market a digital e-commerce platform and marketplace for BIPOC and women-owned small businesses to sell their good and service as well as help corporations and nonprofit organizations create an inclusive procurement approach to their supplier diversity program; the GK! Execu-Search to connect corporate and nonprofit organizations to the Get Konnected network of robust culturally diverse talent pool for mid- level, c-suite and board positions; and the GK! Job Hub helping diverse talents find jobs with some of the best companies in Boston and beyond.

She is the recipient of numerous awards and accolades for her personal, philanthropic, and professional accomplishments including a Pinnacle Award from the Greater Boston Chamber of Commerce; Massachusetts Women's Political Caucus' Abigail Adams Award; The American Jewish Committee (AJC) Coexistence Award the Boston Municipal Bureau's Shattuck City Champion Award and Boston Business Journal's Lifetime Achievement Award for Diversity and the Boston Chapter of the Public Relations Society of America's Lifetime Achievement Award. Her newly released book The Includers: The 7 Traits of Culturally Savvy Anti-racist Leaders has been receiving rave reviews from media and business leaders for its strategic, practical actionable insights.

She holds a BS and MS from Emerson College and an Honorary Doctor of Laws from Mount Ida College.
Colette currently serves on the Advisory board of Eastern Bank; the Board of Directors for the Greater Boston Chamber of Commerce; the American Jewish Committee; The Women's Edge and is an honorary trustee for Massachusetts General Hospital.

Ahmed Fazly - Co-founder / CEO of Modicure Therapeutics

Ahmed Fazly earned his doctoral degree in Biomedical Sciences from the Mayo Clinic College of Medicine in Rochester, MN. He began his postdoctoral journey at the University of Massachusetts Medical School in Worcester, where his research produced promising antifungal drug candidates. After teaching high school chemistry and biology at a Boston charter school, he returned to research as a postdoctoral associate in Biological Engineering at MIT, specializing in RNA modifications. His work at MIT secured STTR funding from the NIH and the Congressionally Directed Medical Research Program of the Department of Defense.

Transitioning into finance, Ahmed became a wall street sell-side analyst specializing in the rare disease therapeutics sector. His entrepreneurial drive was fostered through the Wharton School at the University of Pennsylvania's VIP program. After contributing to commercial strategy at a biotech company in Cambridge and completing his MBA, he once again embraced entrepreneurship as the co-founder of a startup dedicated to pioneering gene editing therapies for severe genetic diseases lacking effective treatments.

Moderator - Howard Sholkin, VP ENET

Howard Sholkin has several decades of marketing communication experience across industry sectors. Since 2018, he has served as President of Newton Community Pride, a non-profit supporting a few dozen events in the city where he is a lifelong resident. In 2014, he formed Sholkin Consulting to deliver digital marketing services to technology and financial services companies. He also served on the adjunct faculty of Boston University and Lasell College for five years.

In 2003, he was hired as director of corporate communications at International Data Group (IDG) where he served Founder Pat McGovern. Sholkin later became director of communication and marketing programs for the CEO of IDG Communications, a global technology media and events subsidiary. IDG brands include Computerworld, PCWorld, Macworld, and CIO. Sholkin has held senior marketing and communication positions at technology product and services companies such as Computervision; Technology Concepts, a subsidiary of Bell Atlantic; Corporate Software; and, Digital Equipment Corp./Compaq. He was a columnist for PR News and for Personal Branding magazine, one of the first publications on social media.

Since 1990, Sholkin has been active in the Public Relations Society of America (PRSA) where he once served as president of the Boston chapter. Currently, he is co-chair of the national PRSA Investment Committee. He serves on the boards of three non-profits: Newton Community Pride, Boston Entrepreneurs Network (ENET) and Temple Shalom of Newton.

*Photonics Society – 6:00PM, Thursday, May 9*

# High-throughput 3D Nanofabrication for Optics and Photonics

Speaker: Dr. Amos Meeks

Irradiant seeks to unlock the full potential of truly 3D optics and nanophotonics. We achieve this through two fundamental innovations: first, by using two-photon lithography to pattern material within a 3D nanoporous scaffold, we are able to pattern arbitrary 3D gradients of refractive index with index contrast up to 0.6 with <50 nm features. Second, we have achieved two-photon lithography throughputs thousands of times faster than existing systems through a combination of novel two-photon chemistries and a line-scanning DLP configuration. This ultra-high throughput facilitates the cost-effective manufacturing of parts at volumes exceeding millions per year. This enables the same platform to be used for small-scale prototyping and testing through to high-volume manufacturing. To date we have fabricated several novel demonstrations of 3D devices that could not otherwise be made, including multi-layered metalenses, nanoscale free space optics, and more. In addition to passive dielectric materials, we have also demonstrated nanoscale patterning of conductors, quantum dots, and biomolecules, paving the way for future applications in more active and advanced applications.

Amos Meeks is the co-founder and Chief Technology Officer at Irradiant Technologies, where he works to commercialize a cutting-edge process for patterning large refractive index gradients in complex 3D geometries with nanoscale resolution. In 2021 he received a Ph.D. in Applied Physics from Harvard University in the lab of Joanna Aizenberg, where he conducted research on light-responsive hydrogels as nonlinear optical materials. He received a Bachelor's degree in engineering from Olin College. His other experiences span a wide range of entrepreneurship, engineering, and materials science.

**Location: 3 Forbes Road, Lexington MA**
**Event Link: https://events.vtools.ieee.org/m/418561**

# 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**

*Aerospace and Electronic Systems Society (co-sponsored by AESS Boston (Chair Dr. Francesca Scire-Scappuzzo) and AESS London (Chair Dr. Julien Le Kernec) – 12:30PM (Eastern Time), Tuesday, May 14*

# Towards the Assurance of AI-based Systems via Formal Verification

Speaker: Prof. Alessio Lomuscio, PhD, Imperial College, London, UK. Safe AI Lab. Royal Academy Engineering Chair in Emerging Technologies.

***Registration is Required!***

***Agenda: (Please note that since this is taking place in London, for USA remote attendees the event will be a lunch time event 12:30PM – 1:30PM (Eastern Time)***

***6:00-6:30 – In-Person Networking***
***6:30-7:30 – WebEx Presentation***
***7:30-8:00 – In-Person Networking***

A major challenge in deploying ML-based systems, such as ML-based computer vision, is the inherent difficulty in ensuring their performance in the operational design domain. The standard approach consists in extensively testing models for inputs. However, testing is inherently limited in coverage, and it is expensive in several domains. Novel verification methods provide guarantees that a neural model meets its specifications in dense neighborhood of selected inputs. For example, by using verification methods we can establish whether a model is robust with respect to infinitely many lighting perturbations, or particular noise patterns in the vicinity to an input.

Verification methods can also be tailored to specifications in the latent space and establish the robustness of models against semantic perturbations not definable in the input space (3D pose changes, background changes, etc). Additionally, verification methods can be paired with learning to obtain robust learning methods capable of generating models inherently more robust than those that may be derived with standard methods.

In this presentation I will succinctly cover the key theoretical results leading to some of the present ML verification technology, illustrate the resulting toolsets and capabilities, and describe some of the use cases developed with our colleagues at Boeing Research, including centerline distance estimation, object detection, and runway detection. I will argue that verification and robust learning can be used to obtain models that are inherently more robust and better understood than present learning and testing approaches, thereby unlocking the deployment of applications in the industry.

Dr. Lomuscio is Professor of AI Safety and Director of the Safe AI Lab, Department of Computing, Imperial College London, UK. He is founding co-director of the UKRI Doctoral Training Centre in Safe and Trusted Artificial Intelligence. Alessio's research interests concern the development of verification methods for artificial intelligence. Since 2000 he has pioneered the development of formal methods for the verification of autonomous systems and multi-agent systems, both symbolic and ML-based. He has published over 200 papers in leading AI and formal methods conferences and journals. He is distinguished ACM member, a Fellow of the European Association of Artificial Intelligence and currently holds a Royal Academy of Engineering Chair in Emerging Technologies. Prof. Lomuscio is the founder and CEO of Safe Intelligence, a VC-backed Imperial College London spinout helping users build and assure robust ML systems.

**Registration is Required:**
**https://events.vtools.ieee.org/m/413287**

*Power & Energy Society – 6:00PM, Tuesday, May 14*

# 2024 Annual Banquet
# Panel Discussion on the Energy Sources in New England: A Comparative Conversation

Come and join us for an evening of fun and networking!!!

Featuring: Buffet style dinner, cash bar and live jazz from Beacon Street Band
Time: Pre-Dinner drinks at 6:00PM - Program Commences at 6:30PM
Location: Four Points by Sheraton Boston Newton, 320 Washington Street, Newton, MA 02468

Registration Details:
$65 per Member* / $75 per non-Member / $30 per student. *Please email ami.vyas@atlanticshoreswind.com with your IEEE PES member number for the member discount code
$560 per table of eight

Parking passes available for $10 – please bring cash to the event. Parking is $15 without pass

Online Registration*: https://www.eventbrite.com/e/ieee-pes-boston-chapters-2024-annual-banquet-tickets-890421092457 **A small convenience fee will apply to online ticket transactions.

Checks are also acceptable. Please make the check payable to IEEE PES Boston Chapter and mail it to:
Jack Martin, IEEE PES Boston Treasurer, 50 Church Street, Westwood, MA 02090

Registration Closing Date and Time: 10AM on Monday, May 6, 2024

Sponsorship opportunities available. Send inquiries to Amsa.Mangga@Eversource.com

Visit IEEE PES Boston Chapter's website for details: https://site.ieee.org/boston-pes/

# IEEE Boston Section Awards
# Call for Nominations

The IEEE Boston Section is seeking qualified candidates for its section awards.
The three section awards are,

- **Distinguished Service Award**
- **Distinguished Member Award**
- **Student Achievement Award**

**More information about the awards can be found here,**
**https://ieeeboston.org/ieee-boston-section-awards/**
**The deadline for nominations is August 1, 2024**

*Entrepreneurs' Network – 7:00PM, Tuesday, May 21*

# Partnerships and Joint Ventures

Attendees will have the option to join us in-person or online via Zoom.

The meeting description will be posted soon!

A question-and-answer session will follow the panel discussion, and the panelists will be available afterward for responses to individual questions.

(All times are USA Eastern time, webinars will not be recorded, except that ENET members can review a recording of this webinar after the meeting.)

More information: This is a hybrid event. You may choose to participate in-person or online. In-person Participation (check-in begins at 6:00 PM):

LOCATION: Location to be determined

REFRESHMENTS: Pizza and soft drinks will be served.

Online Participation: Zoom links will be sent to all registrants after registration.

Cost and Reservations: This event is free for ENET members and $15 for non-members. Click here to learn how to become a member. To expedite sign-in for the event, we ask that everyone — members as well as non-members — pre-register. If you cannot pre-register, you are welcome to register in person at the door while seats are available.

Registration: https://bostonenet.org/events/partnerships-and-joint-ventures/

## IEEE Microsystems Boston Chapter
## Call for Nominations

We are now accepting nominations for all Officers of the IEEE Microsystem Boston Chapter (https://ieee-boston.org/microsystems-society/) for the term of July 1st 2024 to December 31 2025.

Please use this link (usehttps://docs.google.com/forms/d/e/1FAIpQLSe75nW3_TiZRLZPC-STP2Helz-hhwdCE5OPzQ0_L4ztBY-Nd3Q/viewform) should you wish to nominate a candidate. Be sure to include the nominee's name, IEEE membership number, and the office for which you are submitting the nomination. The submission of a brief biography of the nominee is suggested and must be received prior to the close of the nomination period if the nomination is to be included on the ballot. Self-nominations are welcome. Nominee's must be members of the both the IEEE Microsystem Boston Chapters sponsors - the IEEE Sensor Council (https://ieee-sensors.org/) and the IEEE Ultrasonics Ferroelectrics and Frequency Control Society (https://ieee-uffc.org/). Note also that only members IEEE Boston Section are eligible to run for election.

If you are not already a member, now would be a great time to join the IEEE Sensor Council or IEEE Ultrasonics Ferroelectrics and Frequency Control Society (UFFC-S so that you can vote in the upcoming election and help us promote our organization as a member of the Advisory/Program Committee or as a chapter officer.

***The nomination period will remain open through Monday, 13 May 2024.***

Michael Judy
Elections Officer
IEEE Microsystem Boston Chapter
ieee.microsystems.boston@gmail.com

*Electromagnetic Compatibility Society – 6:00PM, Wednesday, May 22*

# RF radiated emissions from Electric Vehicles – Regulatory Challenges

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

***Sponsored by Silent Solutions, LLC***
***http://www.silent-solutions.com/***

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

Time: 6:00 pm: Registration/check-in, complimentary food and refreshments
6:50 pm: Welcome from TÜV Rheinland North America and IEEE EMC Boston Chapter
7:00 pm: Presentation by Keith Frazier, Ford Motor Company (abstract and bio below)
7:45 pm: Q&A
8:00 pm: Optional tour of the new TUV facility

Location: TÜV Rheinland North America, Technology and Innovation Center,
400 Beaver Brook Road, Boxborough, MA

Parking: Complimentary parking is available
Register: Click here to register online: https://events.vtools.ieee.org/event/register/417496
Please register no later than May 15 in order to ensure adequate seating & catering.

***Thank you to our meeting host TUV and sponsor - Silent Solutions!***

RF radiated emissions from Electric Vehicles – Regulatory challenges.
By Keith Frazier, Senior Technical Leader of Electromagnetic Compatibility, Ford Motor Company

Unlike internal combustion engines, electric powertrain in automotive applications pose much greater challenges in meeting regulatory requirements with respect to far field radiated RF emissions. This talk will review the basic physical mechanisms of the EV powertrain that contribute toward RF emissions from the vehicle. Various mitigation techniques are summarized along with the engineering tradeoffs they create. Current and future regulatory requirements are also reviewed.

Keith Frazier, Senior Technical Leader of Electromagnetic Compatibility, Ford Motor Company, is responsible for oversite of all EMC design of Ford automotive products worldwide. His interests include system/subsystem design and analysis for EMC. Between receiving his BSEE from Purdue University in 1976 and joining Ford in 1990, Keith served as an EMC and TEMPEST design engineer for various automotive and aerospace firms including GM, Lockheed and Magnavox Government Electronics.

He is a Life Senior member of IEEE and has authored and presented over 12 technical papers and presentations at regional and international symposia. Keith has authored and co-authored multiple SAE and ISO immunity standards as an active member of the USTAG to CISPR D and ISO international standards committees. In 2008, Keith served as Technical Papers Co-chair for the 2008 IEEE EMC Symposium held in Detroit Michigan. In the fall of 2023, he was elected as member at large of the EMC Society's Board of Governors.

Directions: TUV Rheinland Technology and Innovation Center; 400 Beaver Brook Road, Boxborough, MA 01719
https://maps.app.goo.gl/JskKZrYbDBkQRDpeA

In case of questions regarding location, please contact:
Robert Mitchell
EMC & Envir. Servs Segment Mgr-America
rmitchell@us.tuv.com

# Introduction to Neural Networks and Deep Learning (Part I)

## Web-based Course with live Instructor!

**Times & Dates:** 8:30AM - 12:30PM ET, Saturday, October 26, 2024

**Speaker:** CL Kim

**Course Format: Live Webinar, 4 hours of instruction!**

**Series Overview:** Neural networks and deep learning currently provides the best solutions to many problems in image recognition, speech recognition, and natural language processing."

Reference book: "Neural Networks and Deep Learning" by Michael Nielsen, http://neuralnetworksanddeeplearning.com/

This Part 1 and the planned Part 2 (to be confirmed) series of courses will teach many of the core concepts behind neural networks and deep learning.

More from the book introduction: We'll learn the core principles behind neural networks and deep learning by attacking a concrete problem: the problem of teaching a computer to recognize handwritten digits. …it can be solved pretty well using a simple neural network, with just a few tens of lines of code, and no special libraries."

"But you don't need to be a professional programmer."

The code provided is in Python, which even if you don't program in Python, should be easy to understand with just a little effort.

**Benefits of attending the series:**
* Learn the core principles behind neural networks and deep learning.
* See a simple Python program that solves a concrete problem: teaching a computer to recognize a handwritten digit.
* Improve the result through incorporating more and more core ideas about neural networks and deep learning.
* Understand the theory, with worked-out proofs of fundamental equations of backpropagation for those interested.
* Run straightforward Python demo code example.

The demo Python program (updated from version provided in the book) can be downloaded from the speaker's GitHub account. The demo program is run in a Docker container that runs on your Mac, Windows, or Linux personal computer; we plan to provide instructions on doing that in advance of the class.

(That would be one good reason to register early if you plan to attend, in order that you can receive the straightforward instructions and leave yourself with plenty of time to prepare the Git and Docker software that are widely used among software professionals.)

**Course Background and Content:** This is a live instructor-led introductory course on Neural Networks and Deep Learning. It is planned to be a two-part series of courses. The first course is complete by itself and covers a feedforward neural network (but not convolutional neural network in Part 1). It will be a pre-requisite for the planned Part 2 second course. The class material is mostly from the highly-regarded and free online book "Neural Networks and Deep Learning" by Michael Nielsen, plus additional material such as some proofs of fundamental equations not provided in the book.

**Outline:**
Feedforward Neural Networks.
* Simple (Python) Network to classify a handwritten digit
* Learning with Stochastic Gradient Descent
* How the backpropagation algorithm works
* Improving the way neural networks learn:
    ** Cross-entropy cost function
    ** Softmax activation function and log-likelihood cost function
    ** Rectified Linear Unit
    ** Overfitting and Regularization:
        *** L2 regularization
        *** Dropout
        *** Artificially expanding data set

**Pre-requisites:** There is some heavier mathematics in learning the four fundamental equations behind backpropagation, so a basic familiarity with multivariable calculus and matrix algebra is expected, but nothing advanced is required. (The backpropagation equations can be also just accepted without bothering with the proofs since the provided Python code for the simple network just make use of the equations.) Basic familiarity with Python or similar computer language.

**Speaker Background:** CL Kim works in Software Engineering at CarGurus, Inc. He has graduate degrees in Business Administration and in Computer and Information Science from the University of Pennsylvania. He had previously taught for a few years the well-rated IEEE Boston Section class on introduction to the Android platform and API.

**Decision (Run/Cancel) Date for this Course is Friday, October 18, 2024**

| Payment | on/by Oct. 1 | After Oct. 1 |
|---|---|---|
| IEEE Members | $95 | $110 |
| Non-members | $115 | $130 |

**https://ieeeboston.org/event/neuralnetworks/?instance_id=3598**

# 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.

# Digital Signal Processing (DSP) for Software Radio

**Dates & Times:** **Course Kick-off/Orientation, 6 - 6:30PM ET, Thursday, June 13**
**Live Workshops: 6:00 - 7:30PM ET; Thursdays, June 20, 27, July 11, 18, 25**
**First Video Release, Thursday, June 13, 2024, additional videos released weekly in advance of that week's live session!**

**Speaker:** **Dan Boschen**
**Location:** **Zoom**

*Attendees will have access to the recorded session and exercises for two months (until August 20, 2024) after the last live session ends!*

This is a hands-on course providing pre-recorded lectures that students can watch on their own schedule and an unlimited number of times prior to live Q&A/Workshop sessions with the instructor. Ten 1.5 hour videos released 2 per week while the course is in session will be available for up to two months after the conclusion of the course.

**Course Summary** This course builds on the IEEE course "DSP for Wireless Communications" also taught by Dan Boschen, further detailing digital signal processing most applicable to practical real-world problems and applications in radio communication systems. Students need not have taken the prior course if they are familiar with fundamental DSP concepts such as the Laplace and Z transform and basic digital filter design principles.

This course brings together core DSP concepts to address signal processing challenges encountered in radios and modems for modern wireless communications. Specific areas covered include carrier and timing recovery, equalization, automatic gain control, and considerations to mitigate the effects of RF and channel distortions such as multipath, phase noise and amplitude/phase offsets.

Dan builds an intuitive understanding of the underlying mathematics through the use of graphics, visual demonstrations, and real-world applications for mixed signal (analog/digital) modern transceivers. This course is applicable to DSP algorithm development with a focus on meeting practical hardware development challenges, rather than a tutorial on implementations with DSP processors.

**Now with Jupyter Notebooks!** This long-running IEEE Course has been updated to include Jupyter Notebooks which incorporates graphics together with Python simulation code to provide a "take-it-with-you" interactive user experience. No knowledge of Python is required but the notebooks will provide a basic framework for proceeding with further signal processing development using that tools for those that have interest in doing so.

This course will not be teaching Python, but using it for demonstration. A more detailed course on Python itself is covered in a separate IEEE Course routinely taught by Dan titled "Python Applications for Digital Design and Signal Processing".

***All set-up information for installation of all tools used will be provided prior to the start of class.***

**Target Audience:** All engineers involved in or interested in signal processing for wireless communications. Students should have either taken the earlier course "DSP for Wireless Communications" or have been sufficiently exposed to basic signal processing concepts such as Fourier, Laplace, and Z-transforms, Digital filter (FIR/IIR) structures, and representation of complex digital and analog signals in the time and frequency do-

if you are uncertain about your background or if you would like more information on the course.

**Benefits of Attending/ Goals of Course:**
Attendees will gain a strong intuitive understanding of the practical and common signal processing implementations found in modern radio and modem architectures and be able to apply these concepts directly to communications system design.

**Topics / Schedule:**
***Class 1:*** DSP Review, Radio Architectures, Digital Mapping, Pulse Shaping, Eye Diagrams

***Class 2:*** ADC Receiver, CORDIC Rotator, Digital Down Converters, Numerically Controlled Oscillators

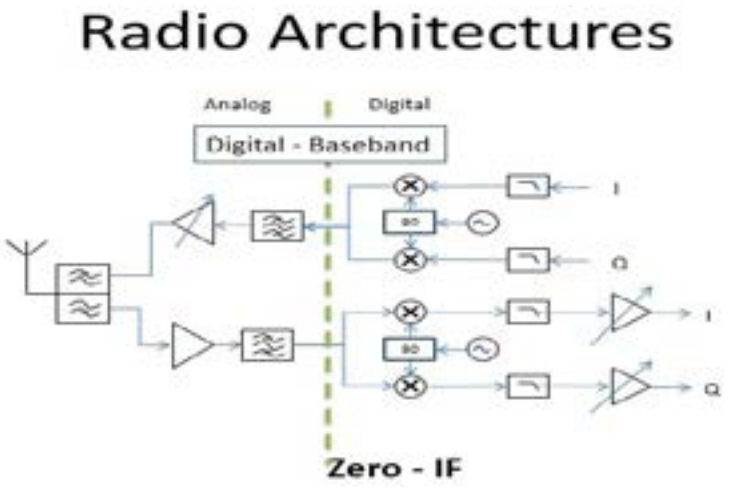
***Class 3:*** Digital Control Loops; Output Power Control, Automatic Gain Control

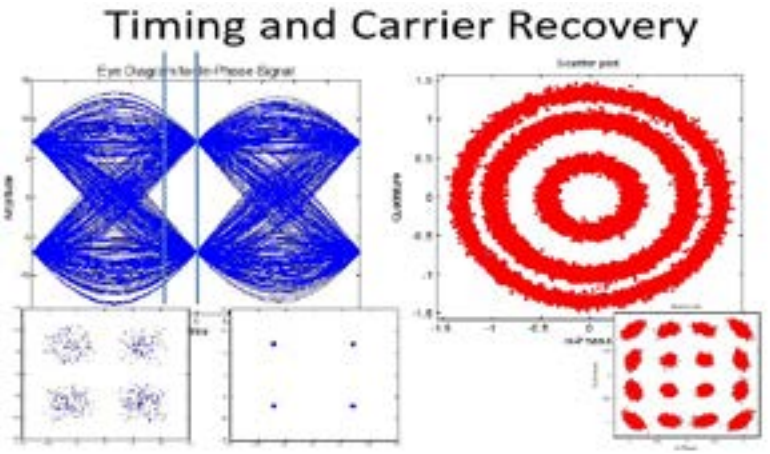
***Class 4:*** Digital Control Loops; Carrier and Timing Recovery, Sigma Delta Converters

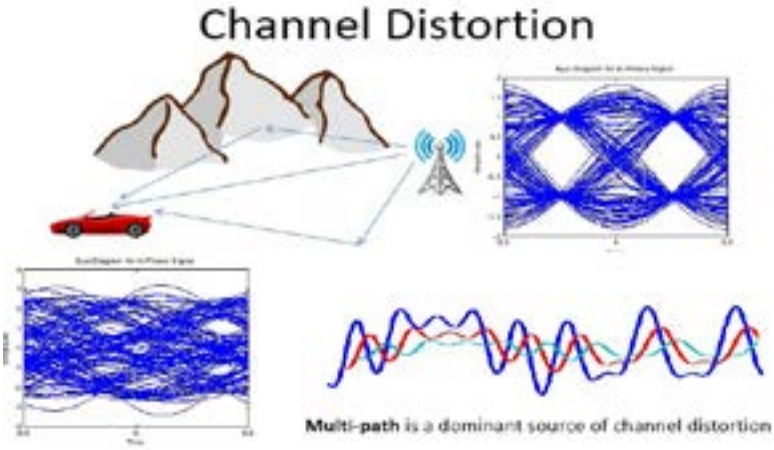
***Class 5:*** RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers

**Speaker's Bio:**
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing transceiver hardware from baseband to antenna for wireless communications systems and has taught courses on DSP to international audiences for over 15 years. Dan is a contributor to Signal Processing Stack Exchange https://dsp.stackexchange.com/, and is currently at Microchip (formerly Microsemi and Symmetricom) leading design efforts for advanced frequency and time solutions.

For more background information, please view Dan's Linked-In page at: http://www.linkedin.com/in/dan-boschen




**Decision (Run/Cancel) Date for this Course is Thursday, June 6, 2024**

| | By May 30 | After May 30 |
|---|---|---|
| IEEE Members | $190 | $285 |
| Non-members | $210 | $315 |

https://ieeeboston.org/event/dspswradio/?instance_id=3560

# Advanced Digital Design:
## Implementing Deep Machine Learning on FPGA

**Times & Dates:** 6 - 7:30PM, Mondays, September 16, 23, 30, October 7
**Speaker:** Kendall Farnham, Dartmouth College

**Location:** MITRE Corporation, Bedford, MA
(This course will be offered in person and live online)

***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 reprogrammed 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 Monday, September 9, 2024**

| Payment | By Sept. 3 | After Sept. 3 |
|---|---|---|
| IEEE Members | $120 | $140 |
| Non-members | $250 | $300 |

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