

Boston Section

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

THE *Reflector*

ISSUE #4
APRIL 2024

2024 IEEE INTERNATIONAL
SYMPOSIUM ON PHASED
ARRAY SYSTEMS AND
TECHNOLOGY

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(LAST NOTICE BEFORE COURSE
BEGINS, PLEASE REGISTER
NOW!!)

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Boston Section

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Who Wants to be an Engineer?

Karen Panetta, Reflector Editor

I met with my department chair for a cup of coffee to talk. He needed to discuss something with me and promised we wouldn't be discussing anything bad. When we met, he asked me to teach the circuit theory course. My response was, "I thought you said we wouldn't be talking about anything bad?"

In case you didn't know, circuit theory is the number one reason students leave, actually run, from the electrical engineering major. It is considered the plague for most U.S. engineering institutions.

Upon informing my husband that I would be teaching this course, I returned home to find he bought me a beautiful shirt embossed with a sequined lighting bolt with the word "BOOM" written below it. This is what I call a sympathy gift, with a sense of humor.

I received many other condolences from friends and colleagues when they heard my news. They shared their circuit theory memories, or should I say horror stories. They even cited that it was a good thing computer science programs did not exist when they were in school, or they too would have fled electrical engineering and changed majors.

I decided to investigate why this course is considered the scourge of the earth for engineers. Moreover, why did all of us stay in Electrical Engineering, if we were tortured so badly by this course?

Students say, "I don't want to solder for the rest of my life", or "I don't care about how to turn on a light bulb." Obviously, their view is very limited, but whose fault is it if this is the way they think after taking a circuit theory course?

I try to explain to them that they are learning fundamentals and that I don't know a single engineer that solders all day. They nod in agreement and then continue to hand me a form requiring my signature allowing them to drop the course, despite my best reassurances.

I could tell them they would be millionaires if they would stay in Electrical Engineering, but not even money sways them. My dad used this line on me to make me go into Electrical Engineering, but today's kids are much smarter than when I was in school. Back then, we thought our parents knew more than we did, and we actually listened to their advice.

My colleagues also condemned to teach this course, try to ease my pain by offering me their notes and labs. It is a nice gesture, but turning on light bulbs doesn't turn me on either. I am with the students on this one. I have to bite the bullet and tame this beast myself.

Now, if we are talking about controlling airport runway lighting during all weather conditions, I am more interested. If we are talking about using sound signals to diagnose oncoming mechanical failures in helicopter gearboxes or to do audio forensics, I am all ears.

Ah ha! The light bulb is going on now. Students hate circuit theory because they don't see how any of it is useful or where it is used.

I told this to one of my seasoned colleagues. His response was, "Who said Electrical Engineering had to be easy, fun or enjoyable?" I interpreted this to be the equivalent of saying, "let them eat cake."

Telling students to wait a few years to see how it all comes together in their academic career is like telling

your kid, “some day you will thank me for punishing you.” It just doesn’t sell.

Our nation suffers from a horrendous shortage of young people pursuing engineering. If we don’t change our recruitment efforts and public awareness to show the impact engineers have on humanity, then we will never overcome this sad reality.

One of the most successful ways to do this is to have role models. We need role models who show us the “big picture”, lead by example and the best part is that to be a role model doesn’t mean the person has to be dead!

IEEE Boston is very proud that we have many wonderful role models among us.

There are many more of you out there that are great role models and we need you! With your help, those of us in the trenches of education may be able to find more exciting ways to make topics like voltage division cool.

Reprint from July 2017

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

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 diverse 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



What + If = IEEE

420,000+ members in 160 countries.
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People Driving Technological Innovation.

iee.org/membership

#IEEEmember



KNOWLEDGE

COMMUNITY

PROFESSIONAL DEVELOPMENT

CAREER ADVANCEMENT

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/>

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



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](https://www.hynesconventioncenter.com) 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 Dufile, Raytheon Tech
Jacob Houck, GTRI
Mark Fosberry, MITRE
Shireen Warnock, MIT LL

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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.

Silver Sponsors



Technical Co-Sponsors



Media Sponsor



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, ieebostonsection@gmail.com.

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ieebostonsection@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:

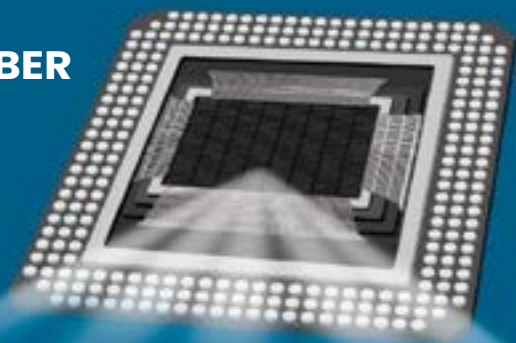
If you're enthusiastic about technology and want to make a difference, we invite you to join us as a volunteer. To express your interest and learn more about specific roles, please visit our website and fill out the volunteer application form. Our team will get in touch with you to discuss opportunities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

**23 – 27
SEPTEMBER
2024**



IEEE HPEC
High Performance Extreme Computing

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

Committee

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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

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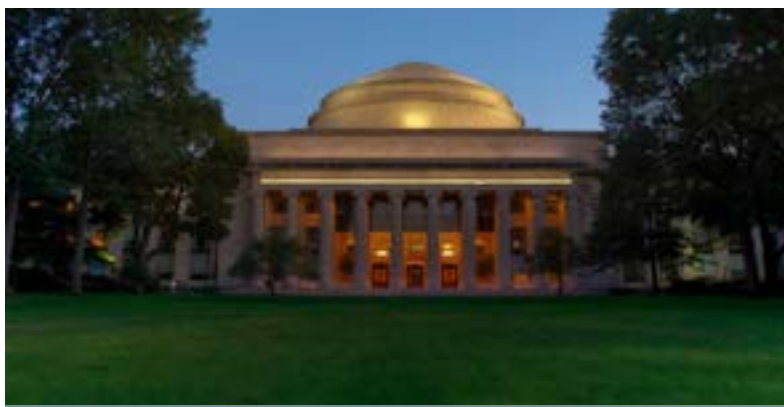
Mr. Robert Alongi / IEEE Boston Section

Submission Deadline:

07 July 2024

Submission Guidelines:

<https://iee-hpec.org/index.php/submit/>



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

Finance Chair

Warren Gross, McGill University

Program Chairs

Jari Nurmi, Tampere Univ.
Jani Boutellier, Univ. of Vaasa

Local Organizing Chair

Brian Telfer, MIT Lincoln Laboratory

eee-sips.org



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

ANTENNAS & PROPAGATIONS
APPLICATIONS & SOFTWARE
PROTOCOLS & SECURITY
CIRCUITS, DEVICES & INTERROGATIONS
NEXT-GEN RFID & ID+
SENSORS
MOTION CAPTURE (MOCAP)

GENERAL TRACK TOPICS

ENERGY HARVESTING
ARTIFICIAL INTELLIGENCE (AI) FOR RFID
DIGITAL TWINS
OCEAN INTERNET OF THINGS (IOT)
BIOMEDICAL SYSTEMS
SMART MATERIALS
GEN. 3 RFID



Visit the website:



Entrepreneurs' Network – 7:00PM, Tuesday, April 2

Networking Strategies Post-Covid for Startups

Lasell University, Newton MA
In-person and Online

Register at <https://bostonenet.org/events/networking-strategies-post-covid-for-startups/>

Join us for an immersive event for passionate entrepreneurs navigating the dynamic landscape of business in a post-pandemic world. "Networking Strategies Post-COVID for Startups" is a groundbreaking gathering designed to empower startups and founders with the tools, insights, and connections necessary to thrive in the new era of entrepreneurship.

In the wake of the global pandemic, the traditional paradigms of networking have evolved. This event provides a unique opportunity to delve into innovative strategies and approaches that can drive growth, foster collaboration, and ignite success for startups in the current environment. Whether you're a seasoned entrepreneur seeking to adapt your networking tactics or a budding startup founder looking to establish valuable connections, this event promises to be a transformative experience.

Attendees will have the chance to engage with industry experts, thought leaders, and fellow entrepreneurs during our event, learn from our expert speaker, and then engage during an interactive workshop to practice networking. Gain actionable insights on leveraging digital platforms, building authentic relationships, and navigating the challenges and opportunities presented by the post-COVID landscape.

Whether you're seeking investment opportunities, strategic partnerships, or mentorship, "Networking Strategies Post-COVID for Startups" offers a dynamic platform to connect, learn, and grow. Don't miss this chance to position your startup for success in the post-pandemic era. Join us and be part of the conversation shaping the future of entrepreneurship at Boston ENET!

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, 4 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



Diane Darling

Diane Darling is a consultant, keynote speaker, instructor, and leadership coach with over 20 years of experience in researching, developing, and educating on the role of professional networking strategies in individual career development and business performance. She offers virtual and in-person speaking engagements, one-on-one leadership coaching, and strategic consulting tailored to meet the specific needs of each client in a variety of industries, including accounting, architecture, law firms, and higher education. McGraw Hill has published Diane's networking strategies in over nine languages, including her popular books, *The Networking Survival Guide* and *Networking for Career Success*.

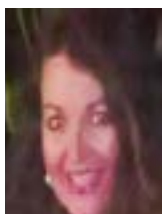
Diane's passion for networking and public speaking started at an early age when she attended six new schools before her senior year of high school. Her experience of learning to make friends and connect with strangers has become a lifelong skill, and one that she now teaches to others. She overcame her fear of public speaking by taking acting and standup comedy classes, which has contributed to her success and is now incorporated into her teachings, especially for introverts.

Diane has traveled to all seven continents and approximately 60 countries, enriching her understanding of human encounters and communication.

<https://www.linkedin.com/in/dianedarling/>

Moderator

Maureen Dorman Mansfield, Vice-Chair, Boston ENET Founder, ~Protect Your Passion~
Maureen Dorman Mansfield is an award-winning stra-



tegic leader with a passion for business development, data analytics, and contract management who co-founded a startup to a funding event. As a Vice Chair of the Boston Entrepreneurs' Network (ENET), Maureen plays a key role in shaping the organization's strategic direction and fos-

tering strategic alliance partnerships and data governance on digital platforms in a thriving entrepreneurial ecosystem.

With over 25 years of experience in strategy, business development, and data management, Maureen has a proven track record of driving growth and creating value for organizations of all sizes, helping several companies have their most profitable years in business while expanding marketshares, identifying new markets, and increasing staff. She is skilled in identifying new business opportunities, forging strategic partnerships, and negotiating complex contracts.

Maureen is also a seasoned expert in contract management, with a keen understanding of legal and compliance issues. Her attention to detail and strategic approach to contract negotiations have helped her clients mitigate risks and exceed their business objectives.

In addition to her role at Boston ENET, Maureen is actively involved in the business community, serving as a mentor and advisor to emerging entrepreneurs. She has founded two charities. Maureen is passionate about helping others succeed and believes that networking is a powerful tool for professional growth.

Maureen is a dynamic speaker and panelist on topics related to strategy, business development, and networking. Her insights and practical advice have helped countless professionals expand their networks and advance their careers. As a classically trained saxophonist, Maureen credits her mom for buying her the saxophones and earning a full scholarship in music.

Organizer:



William A.M. Mansfield, Co-Chair, Boston ENET

Managing Partner, MANSFIELD LAW
~Protect Your Passion~

William Mansfield is an attorney and patent attorney with a passion for helping entrepreneurs, founders, inventors, creatives, and startups navigate the complexities of business law, corporate law, and intellectual property law, including patent law, on national and international matters. As a Co-Chair of the Boston Entrepreneurs' Network (ENET), William plays a pivotal role in fostering connections and providing valuable resources to the entrepreneurial community.

With over 15 years of experience in the legal field, and as a recipient of the prestigious CALI Award in IP and earning an honorary waiver into the D.C. Bar, William has developed a reputation for his strategic business counsel and legal counsel, as well as an in-depth understanding of intellectual property issues. He has worked with a diverse range of clients, from early-stage startups to established corporations, helping them protect their innovations, scale, and navigate the complex legal, IP, and patent processes.

In addition to his legal practice, William is a passionate advocate for continuous learning, professional development, and mentoring. He believes that building strong relationships and giving back is essential for success in any field and is committed to helping others hone their skills.

William is a frequent speaker and panelist on topics related to entrepreneurship and startup law, business law, intellectual property law, and patent law. His insights and practical advice have helped countless professionals expand their networks and achieve their goals.

Power Electronics Society and Northeastern University – 6:00PM, Thursday, April 4

Industry Night – Power Electronics & Energy Showcase

Join us for an exciting evening of innovation and networking at the Northeastern University (NU) Industry Night!

When: 6:00 PM - 7:30 PM, April 4, 2024

Where: EXP Building, Room 201 Northeastern University Boston, MA USA

Hosted by the IEEE PELS Boston Chapter, NU Power Electronics class (EECE5684), NU Co-op Office.

This event is your opportunity to explore cutting-edge technologies in power electronics and energy. Most companies attending will be accepting applications for either full-time or coop positions!

What to Expect:

- Engage with leading power electronics and energy companies
- Discover high-tech products, presentations, and advanced technologies
- Learn about potential co-op or full-time positions
- Network with industry professionals and fellow students

Food Reception: 5:30 PM - 6:30 PM (Exclusive to Power Electronics Class Students and IEEE PELS Chapter Attendees)

Admission: Free for students and IEEE PELS members
If you are a company & interested

Fill out this google form:

<https://forms.gle/6XtCETVSxYuaoNuR9>

If you are a student & interested

Fill out this google form:

<https://forms.gle/Bofwmo8JePf9VgnV6>



Hosted by the IEEE PELS Boston Chapter, NU Power Electronics class (EECE5684), NU Co-op Office.

This event is your opportunity to explore cutting-edge technologies in power electronics and energy. Most companies attending will be accepting applications for either full-time or coop positions!

What to Expect:

- Engage with leading power electronics and energy companies
- Discover high-tech products, presentations, and advanced technologies
- Learn about potential co-op or full-time positions
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When 6:00 PM - 7:30 PM, April 4, 2024

Where EXP Building, Room 201
Northeastern University
Boston, MA USA

Food Reception 5:30 PM - 6:30 PM (Exclusive to Power Electronics Class Students and IEEE PELS Chapter Attendees)

Admission: Free for students and IEEE PELS members

If you are a company & interested

Fill out this google form:

<https://forms.gle/6XtCETVSxYuaoNuR9>

If you are a student & interested

Fill out this google form:

<https://forms.gle/Bofwmo8JePf9VgnV6>

GET IN TOUCH

For inquiries or to register your company, please email us at arshiah.mirza@ieee.org



Join our Email list

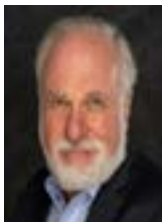


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Photonics Society – 6:00PM, Thursday, April 11

Monolithic, Heterogeneous and Hybrid Photonic Integration – There is a role for all

Dr. Daniel Renner, Distinguished Lecturer of the IEEE Photonics Society.



This seminar will discuss the driving motivations for and technical approaches to photonic integration, by Dr. Daniel Renner, Distinguished Lecturer of the IEEE Photonics Society.

Location: MIT Lincoln Laboratory, 3 Forbes Rd., Lexington MA

Agenda:

6:00 pm Networking starts

6:15 pm Light meals served

7:00 pm Seminar starts

Speaker: Dr. Daniel Renner

Photonic integration has been at the center of photonic activity for several years. Over this period, great strides have been made to increase the integration density and integrated chip functionality. This talk will work its way up from the drivers for photonic integration – why do we need Photonic Integrated Circuits (PICs)? What are their similarities and differences with Electronic Integrated Circuits (EICs)? This analysis of integration drivers will lead to a discussion of recent progress on the main paths: monolithic, heterogeneous and hybrid. The talk will conclude with possible approaches to meet the

additional demanding considerations for future Quantum PICs.

Dr. Daniel Renner grew up in the southern part of Chile, in South America. He received his Bachelor of Engineering Degree from the Universidad de Chile and then, in his early twenties, he went to the University of Cambridge in England to do a Ph.D. in opto-electronics, a new field of studies at the time. Now, decades later, he has lived through the whole range of experiences that relate to the research, development, manufacturing and commercialization of complex photonic devices and systems, used in communication, sensor and industrial applications. In the past 30 years, Daniel has been directly involved with the growth of four photonic start-ups in the United States, Ortel Corporation, Agility Communications, Aerius Photonics and Freedom Photonics. This gives him a unique perspective on the workings of a high-tech small business. Daniel is currently the Chair of the IEEE Photonics Society Industry Engagement Committee, from where he is trying to help other photonic small businesses.

Event Link and registration:

<https://events.vtools.ieee.org/m/411887>

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>

Entrepreneurs' Network – 7:00PM, Tuesday, April 16

Raising Capital

In-Person and Online

Register at

<https://bostonenet.org/events/raising-capital/>

Join us at the Boston Entrepreneurs' Network (ENET) for an exclusive event designed to empower founders, entrepreneurs, and startups with the knowledge and expertise needed to navigate the challenging landscape of raising capital. Our panel of expert speakers brings views from seasoned venture capitalist, debt financier, and an angel investor, each offering sage wisdom and invaluable advice drawn from their extensive experience in the field. Guiding the discussion will be a distinguished moderator—a serial entrepreneur and founder of a private equity firm—who brings a wealth of practical insights to the table.

Don't miss this opportunity to glean insights from seasoned investors and industry experts, and arm yourself

with the knowledge and strategies needed to successfully raise capital for your startup. Join us at the Boston ENET event and take your fundraising efforts to the next level!

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, 4 expert speakers on the night's topic
- 8:10 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.

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 pay-

ment 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

Introduction to Neural Networks and Deep Learning (Part I)

Web-based Course with live Instructor!

Times & Dates: 9AM - 12:30PM ET, Saturday, October 26, 2024

Speaker: CL Kim

Course Format: Live Webinar, 3.5 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 diverse 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

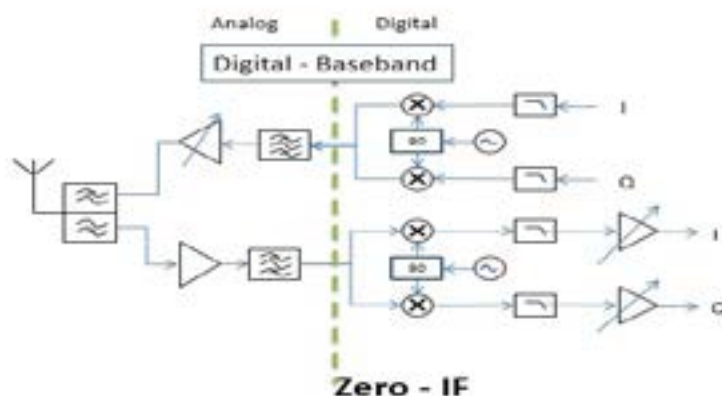
Class 5: RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers

Speaker's Bio:

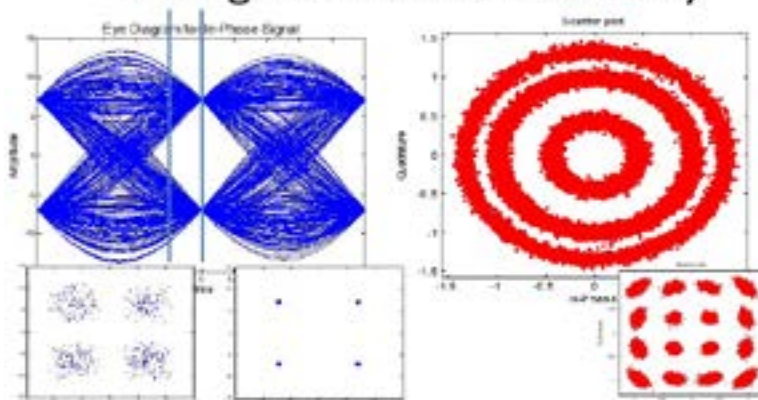
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing 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>

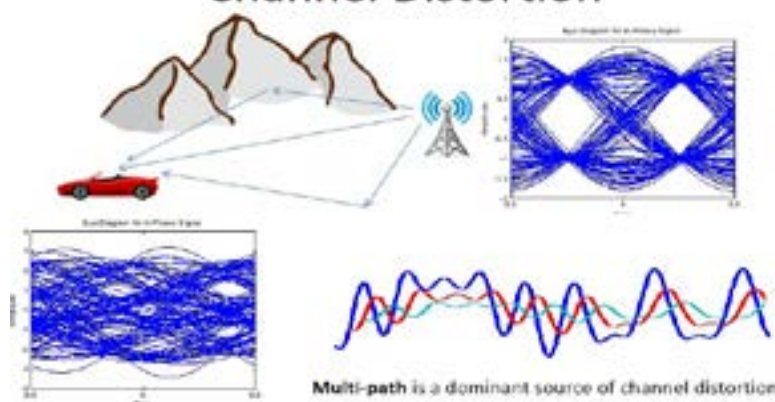
Radio Architectures



Timing and Carrier Recovery



Channel Distortion



**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

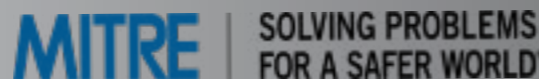
https://ieeeboston.org/event/dspswradio/?instance_id=3560

Advanced Digital Design: Implementing Deep Machine Learning on FPGA

Times & Dates: Postponed until September 2024. See Future Reflectors for Details
Speaker: Kendall Farnham, Dartmouth College

Hosted by

Location: MITRE Corporation, Bedford, MA



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 tool-chains
- 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 ($\gg$ 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 available upon request. A small fee may apply for the credits

Decision (Run/Cancel) Date for this Course is

**Payment
IEEE Members
Non-members**

Will be updated at a later date

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

DSP for Wireless Communications

Dates & Times: Course Kick-off/Orientation, 6 - 6:30PM ET, Thursday, April 18
Live Workshops: 6:00 - 7:30PM ET; Thursdays, April 25, May 2, 9, 16, 23
First Video Release, Thursday, April 18, 2024 additional videos released weekly in advance of that week's live session!

Speaker: Dan Boschen
Location: Zoom

**Last Notice Before
 Course Begins, Please
 Register Now!!!**

New Format Combining Live Workshops with Pre-recorded Video - 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...until July 23, 2024

Course Summary

This course is a fresh view of the fundamental and practical concepts of digital signal processing applicable to the design of mixed signal design with A/D conversion, digital filters, operations with the FFT, and multi-rate signal processing. This course will build an intuitive understanding of the underlying mathematics through the use of graphics, visual demonstrations, and applications in GPS and mixed signal (analog/digital) modern transceivers. This course is applicable to DSP algorithm development with a focus on meeting practical hardware development challenges in both the analog and digital domains, and not a tutorial on working with specific DSP processor hardware.

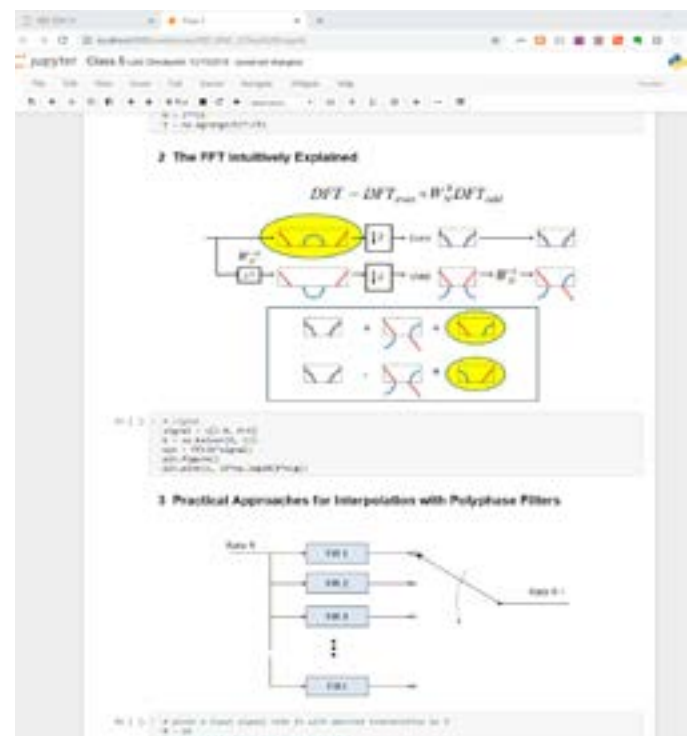
Now with Jupyter Notebooks!

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

is covered in a separate IEEE Course "Python Applications for Digital Design and Signal Processing".

Students will be encouraged but not required to load all the Python tools needed, and all set-up information for installation will be provided prior to the start of class.



Target Audience:

All engineers involved in or interested in signal processing applications. Engineers with significant experience with DSP will also appreciate this opportunity for an in-depth review of the fundamental DSP concepts from a different perspective than that given in a traditional introductory DSP course.

Benefits of Attending/ Goals of Course:

Attendees will build a stronger intuitive understanding of the fundamental signal processing concepts involved with digital filtering and mixed signal analog and digital design. With this, attendees will be able to implement more creative and efficient signal processing architectures in both the analog and digital domains. The knowledge gained from this course will have immediate practical value for any work in the signal processing field.

Topics / Schedule:

Class 1: Correlation, Fourier Transform, Laplace Transform

Class 2: Sampling and A/D Conversion, Z –transform, D/A Conversion

Class 3: IIR and FIR Digital filters, Direct Fourier Transform

Class 4: Windowing, Digital Filter Design, Fixed Point vs Floating Point

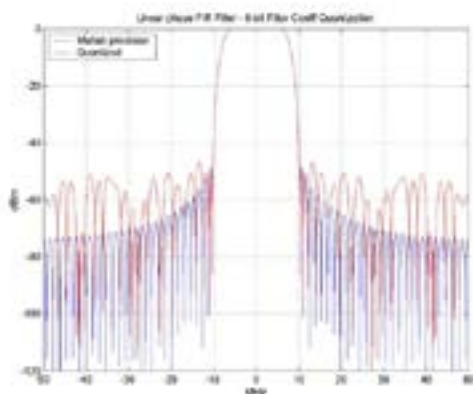
Class 5: Fast Fourier Transform, Multi-rate Signal Processing, Multi-rate Filters

Speaker's Bio:

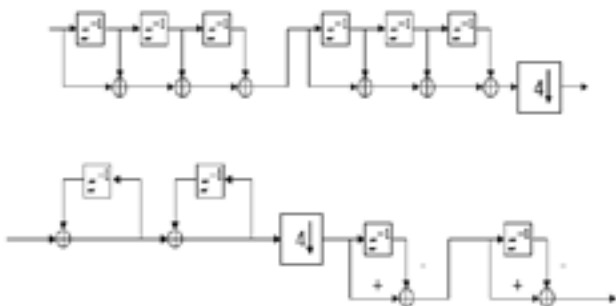
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing transceiver hardware from baseband to antenna for wireless communications systems. Dan 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>

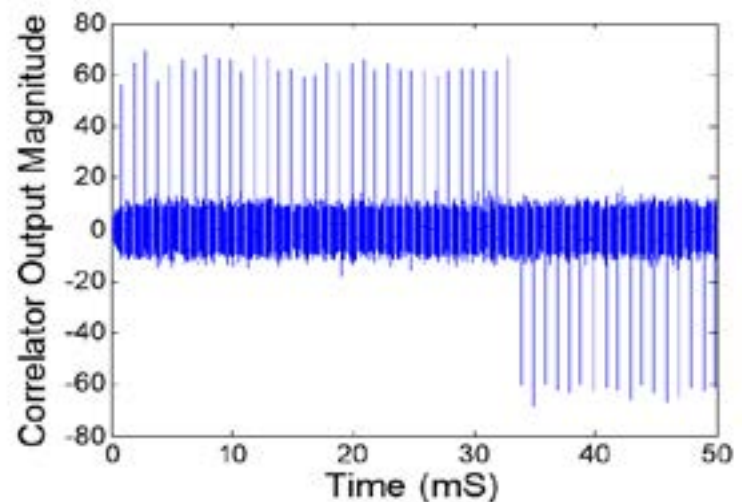
Linear Phase FIR Filter
(8-bit quantized filter coefficients)



Multi-stage CIC



Sliding Correlation



**Decision (Run/Cancel) Date for this Course is
Friday, April 12, 2024**

	By April 11	After April 11
IEEE Members	\$190	\$285
Non-members	\$210	\$315



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