



THE REFLECTOR

ISSUE #5
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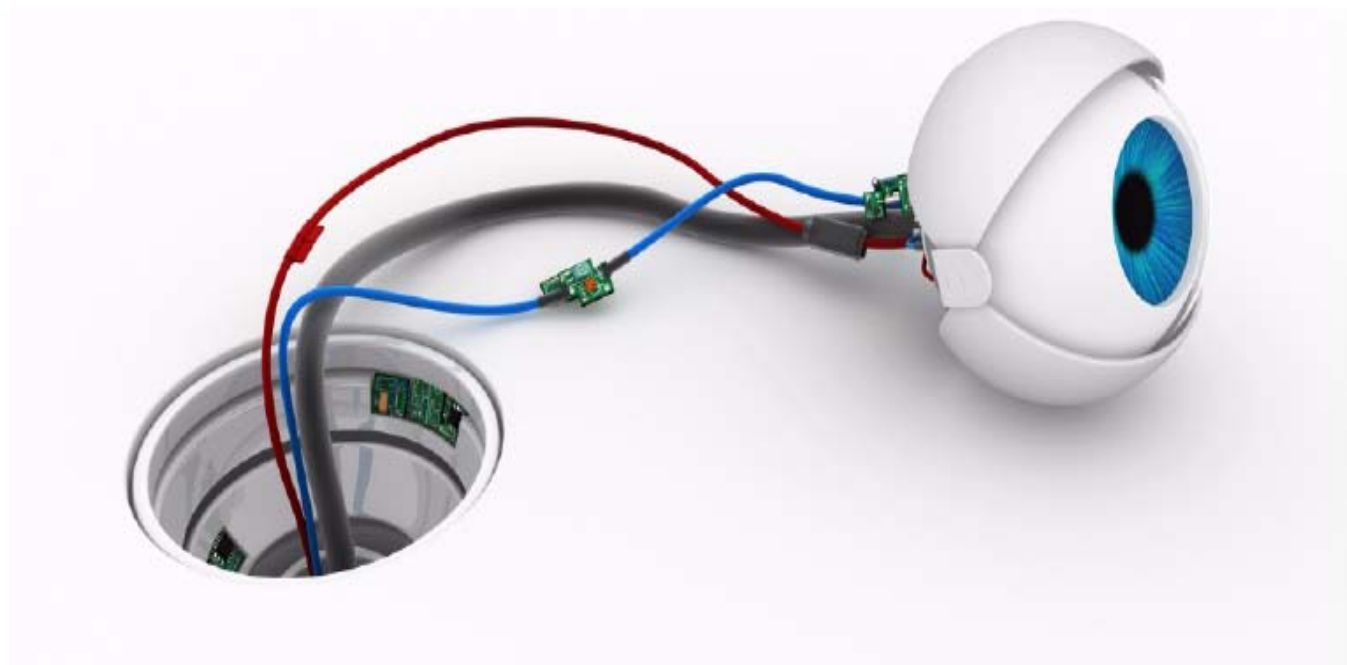


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Call for Wisdom and Learning from the Brattle Theatre, Cambridge, MA

by Bruce Hecht, IEEE Boston Section Executive Committee

On a recent warm evening, with the spring day's sun still out, a small crowd gathered at the Brattle Theatre. Outside, the city streets were flowing with people, cars, and buses. Inside, the smell of popcorn was present before the start of the event. The neighborhood is fortunate to have its local cinema and screenings, and even more so for this night was set for a live event hosted by the Harvard Book Store. The occasion was a celebration of the launch day with Simon Winchester for his new book: "Knowing What We Know." I was excited to hear the talk, and more so for the discussion on the book's subtitle "The Transmission of Knowledge from Ancient Wisdom to Modern Magic" published by HarperCollins.

As people are "inventing the future" to build the kinds of technology that represent what Arthur C. Clarke described as "indistinguishable from magic," these are essential conversations to have. Originally from London, Simon Winchester now lives on a farm in the Berkshires, as our neighbor in the Berkshire Section. An opening question he asked was how does improving the transmission of knowledge change our ability to think? With a brief overview of the topics, he presented a quick tour of the invention of technologies and their origins, such as writing, paper, and to more recent examples of digital storage, computing, and hypertext.

What happens as new machines provide access to knowledge? With the introduction of the electronic pocket calculator, according to Simon Winchester, this "magical event" presented individual access to have answers to questions at the press of a button. For those interested in the history of technology, a resonant story was that of Jerry Merryman, while at Texas Instruments, who led a team to invent the Cal-Tech, a 3-pound brick of aluminum containing some of the first integrated circuits and achieving the "pocket calculator" in 1967. It's now on display at the Smithsonian Mu-

seum in Washington, D.C. I found in a quick search in the IEEE history site, that IEEE Milestones recognized earlier electronic desk calculators from the Sharp Corporation in the years 1964-1973 and the famous HP-35 Scientific Calculator from Hewlett Packard in 1972. All of these personal devices followed still earlier work for example the Mark I electromechanical computer developed with Howard Aiken and team together with the inventor of related programming languages, Admiral Grace Hopper. The Mark I was celebrated this past year at an IEEE Milestone Ceremony in November 2022 and can be visited closer to home, at the Harvard School of Engineering and Applied Science in Allston. Connect with the Boston Section's Gil Cooke and Ramon De La Cruz to learn more about the milestones and thanks to their team that brought this recognition together.

As a short talk introducing his new book, Simon Winchester only provided a first sampling of the topics. I will be looking forward to reading more in depth in the future. For now, I will be reflecting in the upcoming weeks on the range of interesting questions raised in the Q&A session. One member of the audience, Ellen Brodsky, asked in the context of our new devices continuing to change how we think with our brains, what should we be thinking about now and in the future? This led to a response from Simon Winchester as a call to action: "let's gather the village together, having debate and discussion" for the next steps to what we will do.

For those seeking to get started on these dialogues, our local IEEE volunteer leaders invite you to participate in activities in the IEEE Boston Section, as well around our Region. Recently, the IEEE Planet Positive 2030 initiative is a gathering of people working to develop approaches to future flourishing. It is my hope for your spring awakenings that you will find your way into these conversations – I look forward to hearing what you think and discover!

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



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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/>

High Performance Project Management

Full course description and registration at ,
<http://ieeeboston.org/high-performance-project-management-online-course/>

Introduction to Embedded Linux Part I

Full course description and registration at ,
<http://ieeeboston.org/introduction-to-embedded-linux-part-i-el201-online-course/>

Embedded Linux Optimization - Tools and Techniques

Full course description and registration at ,
<http://ieeeboston.org/embedded-linux-optimization-tools-techniques-line-course/>

Embedded Linux Board Support Packages and Device Drivers

Full course description and registration at ,
<http://ieeeboston.org/embedded-linux-bsps-device-drivers-line-course/>

Software Development for Medical Device Manufacturers

Full course description and registration at ,
<http://ieeeboston.org/software-development-medical-device-manufacturers-line-course/>

Fundamental Mathematics Concepts Relating to Electromagnetics

Full course description and registration at ,
<http://ieeeboston.org/fundamental-mathematics-concepts-relating-electromagnetics-line-course/>

Reliability Engineering for the Business World

Full course description and registration at ,
<http://ieeeboston.org/reliability-engineering-business-world-line-course/>

Design Thinking for Today's Technical Work

<http://ieeeboston.org/design-thinking-technical-work-line-course/>

Fundamentals of Real-Time Operating Systems

<http://ieeeboston.org/fundamentals-of-real-time-operating-systems-rt201-on-line-course/>



2024 IEEE INTERNATIONAL SYMPOSIUM ON PHASED ARRAY SYSTEMS AND TECHNOLOGY

Returning to Boston in the Fall of 2024

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 present a unique opportunity for members of the international community to interact with colleagues in the field of Phased Array Systems and Technology.



Important Dates and Call for Papers will be posted to the Symposium Web Site after May 1, 2023!

IEEE-ARRAY.org

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.

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.

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;
ieebostonsection@gmail.com

27th Annual IEEE High Performance Extreme Computing Virtual Conference 25 - 29 September 2023

CALL FOR PAPERS

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Mr. Robert Alongi
IEEE Boston Section

The IEEE High Performance Extreme Computing Conference (HPEC '23) will be held virtually 25 – 29 September 2023. The HPEC charter is to be the premier conference in the world on the confluence of HPC and Embedded Computing.

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

- AI / Machine Learning
- Graph Analytics & Network Science
- Advanced Multicore Software Technologies
- Advanced Processor Architectures
- Automated Design Tools
- Big Data & Distributed Computing
- Big Data Meets Big Compute
- Case Studies & Benchmarking of Applications
- Cloud HPEC
- Computing Technologies for Challenging Form Factors
- ASIC & FPGA Advances
- Quantum and Non-Deterministic Computing
- Data Intensive Computing
- Digital Front Ends
- Fault-Tolerant Computing
- Embedded Cloud Computing
- General Purpose GPU Computing
- High Performance Data Analysis
- Interactive and Real-Time Supercomputing
- Mapping & Scheduling of Parallel & Real-Time Applications
- New Application Frontiers
- Open System Architectures
- Cyber Analysis and Secure Computing

HPEC accepts two types of submissions:

1. Full papers (up to 6 pages, references not included. Additional pages can be purchased for \$200/page).
2. Extended abstracts (up to 2 pages, references included).

IMPORTANT DATES:

Submission Deadline: **JUL 07, 2023**
Notification of Acceptance: **AUG 15, 2023**
Camera Ready Deadline: **AUG 31, 2023**

Submissions to HPEC '23 will be accepted through the CMT submission site at:

<https://cmt3.research.microsoft.com/HPEC2023/>

Preference will be given to papers with strong, quantitative results, demonstrating novel approaches or describing high quality prototypes. Authors of full papers can mark their preference for a poster display or an oral presentation. Presenters who wish to have hardware demonstrations are encouraged to mark their preference for a poster display. Accepted extended abstracts will be displayed as posters. Papers can be declared "student paper" if the first author was a student when doing the presented work and will be eligible for the "IEEE HPEC Best Student Paper Award." Papers should not be anonymized. All paper and extended abstract submissions need to use the approved IEEE templates. Full paper submissions with the highest peer review ratings will be published by IEEE in the official HPEC proceedings and may be available on IEEE eXplore. All other accepted submissions and extended abstracts are published on ieee-hpec.org.

Vendors are encouraged to sign up for vendor booths. This will allow vendors to present their HPEC technologies in an interactive atmosphere suitable for product demonstration and promotion. We welcome input (hpec@ieee-hpec.org) on tutorials, invited talks, special sessions, peer reviewed presentations, and vendor demos. Instructions for submitting will be posted on the conference web site shortly.

IEEE-HPEC.org

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

Strategic Alliances as a Growth Strategy

Location: *Science and Technology Center, Lasell University, Newton, MA*

Registration: <https://bostonenet.org/events/strategic-alliances-as-a-growth-strategy/>

While a truly gifted entrepreneur certainly can build a successful company organically, hiring the right expertise at the right time, and essentially going it alone, Strategic Alliances can be leveraged to speed the process, and can even be an integral part of the product monetization strategy. Whether the goal is speed to market by securing specialized expertise and resources, tapping established regulatory infrastructure and distribution channels, or paving a path to a lucrative financial exit, well considered collaborations can nicely complement a brilliant entrepreneur's innovative thinking.

Tonight's panelists include an entrepreneur who will share his experience growing his company with strategic alliances, and an industry expert on best practices and know-how in the life-sciences.

Event Schedule

6:00 pm ET – Registration – In-person registration and networking

7:00 pm ET – Introduction - ENET Chairperson's announcements

7:10 pm ET - eMinute Pitch - Up to 3 Startup pitches

7:25 pm ET - Expert Panel – 4 expert speakers on the night's topic

8:10 pm ET - Q & A - Moderator and Audience Q & A with the speakers

8:30 pm ET – Networking - Panelists will be available afterward for responses to individual questions.

Speakers

Brendan Stack

Manager, Corporate Development & Strategic Partnerships at Halloran Consulting Group, Inc.



Isaac Stoner

CEO & Founder, Octagon Therapeutics
Passionate about building companies based on novel science that can positively impact human health. Leader with biomedical engineering background and biotech investment experience.

Isaac raised Seed financing, established operational team and infrastructure. Executed multi-year partnership with a top-10 global pharmaceutical company. Octagon is developing new medicines for autoimmune disease. The company is pioneering a selective immunomodulation approach that allows for precise targeting of disease-driving immune processes.

Isaac is an advisor and investor at KdT Ventures, Digital Onboarding and Thrive Bioscience. His specialties include company building, technology development, life sciences, biotechnology, startups. He has a Bachelor of Science from Brown University and an MBA of Entrepreneurship and Innovation from MIT.



Moderator & Organizer

David Hall

Founder & CEO, DLH Technology Advisors, Startup Strategy & Venture Capital Consulting

Dave is Founder and CEO of DLH Technology Advisors. He is a startup & strategy Executive, Innovation Consultant, Advisor, Connector, Evangelist, Angel Investor and Speaker for growth companies looking to implement, optimize, and fund their Go-to-Market plan. DLH Technology Advisors offers consulting services including Startup Strategy, Product Development, Startup Frameworks, Business Development, Startup Marketing, Go-to-Market Strategy, Executive Coaching and Startup Funding Channels. DLH has resources for CRM development services including Salesforce implementation, AppExchange App Development, QuickStarts, Lead Architect and Admin Services for the entire Salesforce product line.

Electromagnetic Compatibility Society – 6:00PM, Wednesday, May 3

Unintentional Antennas

Presenter: Ms. Karen Burnham, Principal Scientist, Electro Magnetic Applications, Denver, CO



One of the biggest causes of EMC test failures is radiating structures in a unit, whether from the PCB or cabling, that are acting in ways designers never intended. This talk covers basics of antenna theory and how to identify potential radiating “antennas” in your product.

Location: *This will be an in-person presentation at Bureau Veritas (BV) facility.*

Bureau Veritas, 1 Distribution Center Circle - Suite 1, Littleton MA 01460

Directions to Bureau Veritas Littleton lab (1 Distribution Center Circle - Suite 1, Littleton MA 01460): From 495 North or South take Exit 79 (King St/MA 110/2A West). Go west on MA Route 2A approx. 1.6 miles, take right onto Distribution Center Circle. Take the service road approx. 0.5 mile to the first large building on the left (look for the sign). The main entrance for BV is on the left side of the building, and parking is in front. Call Bill O'Brien at 508-797-2389 with any problems.

Free snacks and soft drinks will be available.

Please, arrive by 5:30PM, we plan to start the presentation at 6:00PM. Non-members of IEEE are welcome.

Ms. Karen Burnham

Karen Burnham is a Principal Scientist at Electro Magnetic Applications in Denver, CO. She is an iN-ARTE-certified EMC engineer with experience in both the aerospace/defense and automotive industries. At NASA JSC, she worked on the Orion spacecraft and pyrotechnic systems. She was able to work on the Dream Chaser spacecraft and the F-35 fighter jet. She spent several years working at Ford Motor Company on traditional vehicles like the Ford Edge and Lincoln Continental as well as on their line of electric hybrid vehicles such as the Ford Explorer and Lincoln Aviator. Ms. Burnham is a member of the IEEE EMC Society Board of Directors where she serves as Assistant Vice President of Standards. She holds a BS degree in Physics from Northern Arizona University and an MS degree in Electrical Engineering from the University of Houston.

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>

Boston/Providence/New Hampshire Reliability Chapters – 11:00AM, Wednesday, May 10

Condition Based Monitoring for Industrial Machines

Please visit <https://r1.ieee.org/boston-rl/>

More than 38% of global energy is consumed by industry, and within industry almost 70% of electricity is consumed by electric motors. Given the huge energy cost associated with running these motors, even a 1% increase in operational efficiency will result in huge cost savings. Equipment maintenance is key to optimal motor performance.

In general, equipment maintenance can be divided into two broad categories. In the first, equipment is taken out of service on a regular schedule (Preventative Maintenance- PM) and in the second, maintenance occurs when the equipment fails (Corrective Maintenance or “run-to failure”). One occurs too early, the other too late; both are wasteful in terms of time and resources.

A third option is Condition-Based Maintenance/Condition-Based Monitoring (CbM). This places sensors where they can detect subsystem trends or excursions from baseline performance to alert process owners about specific problems- before failures occur- allowing replacement parts to be on hand at a conveniently planned repair time. The process owner is no longer replacing good parts on a scheduled maintenance plan, nor is he or she in crisis hair-on-fire mode because the equipment failed unexpectedly.

Please join us as Richard Anslow, System Applications Manager within the Industrial Automation Business Unit at Analog Devices, gives us a fascinating introduction to CbM, and how it can improve the availability and reduce costs of systems that we support and work with!

Presentation Overview:

Background for CbM

- What is CbM?
- What are the benefits? What are the limitations?
- Real life examples.
- o How do I spot faults from FFT signatures of a motor?

Insights from Different CbM Sensor technologies

- Vibration
- Temperature
- Magnetic

Sensor types and Market outlook

Market outlook for wired and wireless sensors

Wireless sensor examples

Wired sensor examples

Cloud and Edge Artificial Intelligence

Speaker:

Richard Anslow of Analog Devices, Inc.

Richard Anslow is a System Applications Manager within the Industrial Automation Business Unit at Analog Devices.

His areas of expertise are condition-based monitoring, motor control, and industrial communication design.

He received his B.Eng. and M.Eng. degrees from the University of Limerick, Limerick, Ireland. Recently he completed a postgraduate program in AI and ML with Purdue University. He can be reached at richard.anslow@analog.com

Location: This Webinar is to be delivered virtually.

At registration, you must provide a valid e-mail address to receive the Webinar Session link approximately 15 hours before the event. The link will only be sent to the e-mail address entered with your registration. Please double-check for spelling errors. If you haven't received the e-mail as scheduled, please check your spam folder and alternate e-mail accounts before contacting the host.

Contact Event Host: Michael W. Bannan. Chair IEEE Boston/Providence/New Hampshire Reliability Chapter
Registration Starts 12 April 2023 12:00 AM Ends 09 May 2023 05:30 PM All times are (UTC-05:00) Eastern Time (US & Canada) No Admission Charge

Agenda

11:00 AM - Technical Presentation

11:45 AM - Questions and Answers

12:00 PM - Adjournment

The meeting is open to all. You do not need to belong to the IEEE to attend this event; however, we welcome your consideration of IEEE membership as a career enhancing technical affiliation.

There is no cost to register or attend, but registration is required.

Registration: <https://events.vtools.ieee.org/m/356460>

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

Co-founders and Advisors and Equity as Currency

Location: CIC, One Broadway, Cambridge, MA

More Information and registration for this event will be posted shortly at: <https://bostonenet.org/events/co-founders-and-advisors-and-equity-as-currency/>

Event Schedule

7:00 PM ET – Introduction - ENET Chairperson's announcements

7:10 PM ET - eMinute Pitch - Up to 3 Startup pitches

7:25 PM ET - Expert Panel - 4 expert speakers on the night's topic

8:10 PM ET - Q & A - Moderator and Audience Q & A with the speakers

8:30 PM ET – Networking - Panelists will be available afterward for responses to individual questions.

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Advertising with the IEEE Boston Section affords you access to a highly educated, highly skilled and valuable consumer. Whether you are looking to reach students with a bright future and active minds, or whether you are reaching households with priorities that may include a family, planning for vacations, retirement, or like-values, the IEEE Boston Section is fortunate to enjoy a consistent relationship. The IEEE Boston Section provides education, career enhancement, and training programs throughout the year. Our members, and consumers, are looking for valuable connections with companies that provide outstanding products. For qualified advertisers, the IEEE Boston Section advertising options are very flexible. Through our affiliate, we will even help you design, develop, and host your ads for maximum efficiency. A few important features of the IEEE Boston Section

IEEE Boston Section is the largest, most active, and technically diverse section in the U.S. Comprised of Engineers, scientists and professionals in the electrical and computer sciences and engineering industry

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Computer Society - 6:30PM, Thursday, May 18

Efficient Verification of Computation

Speaker: Yael Tauman Kalai, Microsoft Research New England, MIT



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

Please register in advance for this seminar even if you plan to attend in person at https://acm-org.zoom.us/webinar/register/1716817587025/WN_cpY46yuPSq-L-FUC5rLMZtg

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

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

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

Efficient verification of computation is fundamental to computer science and is at the heart of the P vs. NP question. Recently it has had growing practical significance, especially with the increasing popularity of blockchain technologies and cloud computing. In this talk, I will present schemes for verifying the correctness of a computation. I will discuss both their practical aspects and their impact on quantum complexity, hardness of approximation, and the complexity of Nash equilibrium.

Yael Tauman Kalai is Senior Principal Researcher at Microsoft Research New England, adjunct professor in the EECS Dept at MIT, and a member of the Computer Science and Artificial Intelligence Lab (CSAIL). Yael works on improving the efficiency and privacy of communications through cryptography and has developed methods for verifying the correctness of computation. She developed “doubly efficient” interactive proofs that minimize the computational overhead of using strong devices, machines capable of carrying out more complex cryptographic functions. Succinct proofs offload computations from a weak device to a stronger one, paving the way for faster, more reliable transactions. Ethereum and other blockchain companies have since implemented these proofs to verify the validity of transactions. Yael’s work on delegating computation also has applications to cloud computing.

Her master’s thesis introduced the concept of ring signatures, a variation of group signatures that preserves the anonymity of individual signers, a concept she co-developed with Ron Rivest and Adi Shamir. This later became incorporated into cryptocurrency systems such as Cryptonote and Monero. Her work on the Fiat-Shamir heuristic established a better understanding of that paradigm’s security issues.

Yael graduated from the Hebrew University of Jerusalem in 1997, worked with Adi Shamir at the Weizmann Institute of Science, earning a master’s degree in 2001, and then moved to the Massachusetts Institute of Technology, where she completed her PhD in 2006 with Shafi Goldwasser as her doctoral advisor. She did postdoctoral study at Microsoft Research and the Weizmann Institute before becoming a faculty member at the Georgia Institute of Technology. She has been at Microsoft Research since 2008.

Kalai was an invited speaker on mathematical aspects of computer science at the 2018 International Congress of Mathematicians. Her master’s thesis introducing ring signatures won an outstanding master’s thesis award and her MIT PhD dissertation was awarded the George M. Sprowls Award for Outstanding PhD Thesis in Computer Science. She was co-chair of the Theory of Cryptography Conference in 2017 and chair of the Innovations in Theoretical Computer Science (ITCS) Conference in 2023. She is a fellow of the International Association of Cryptographic Research (IACR), and was recently awarded the 2022 ACM Prize in Computing “for breakthroughs in verifiable delegation of computation and fundamental contributions to cryptography”.

This joint meeting of the Boston Chapter of the IEEE Computer Society and GBC/ACM will be hybrid (in person and online), our first attempt to get back to normal after the COVID-19 lockdown.

Up-to-date information about this and other talks is available online at <https://ewh.ieee.org/r1/boston/computer/>. You can sign up to receive updated status information about this talk and informational emails about future talks at <https://mailman.mit.edu/mailman/listinfo/ieee-cs>, our self-administered mailing list.

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.

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 21, 2023

Speaker: CL Kim

Course Format: Live Webinar, 3 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 hand-written 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 13, 2023

Payment	on/by March 6	After March 6
IEEE Members	\$95	\$110
Non-members	\$115	\$130

https://ieeeboston.org/event/neuralnetworks/?instance_id=3453



2024 IEEE INTERNATIONAL SYMPOSIUM ON PHASED ARRAY SYSTEMS AND TECHNOLOGY

Returning to Boston in the Fall of 2024

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 present a unique opportunity for members of the international community to interact with colleagues in the field of Phased Array Systems and Technology.



Important Dates and Call for Papers will be posted to the Symposium Web Site after May 1, 2023!

IEEE-ARRAY.org

DSP for Wireless Communications

Dates & Times: Live Workshops: 6:00 - 7:30PM ET, Thursdays, July 27, August 3, 10, 17, 24
 First Video Release, July 20, 2023, (Orientation) 6:00 - 6:30PM
 Additional videos released weekly in advance of that week's live session

Speaker: Dan Boschen

Location: Zoom Webinar

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 October 24, 2023.

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.

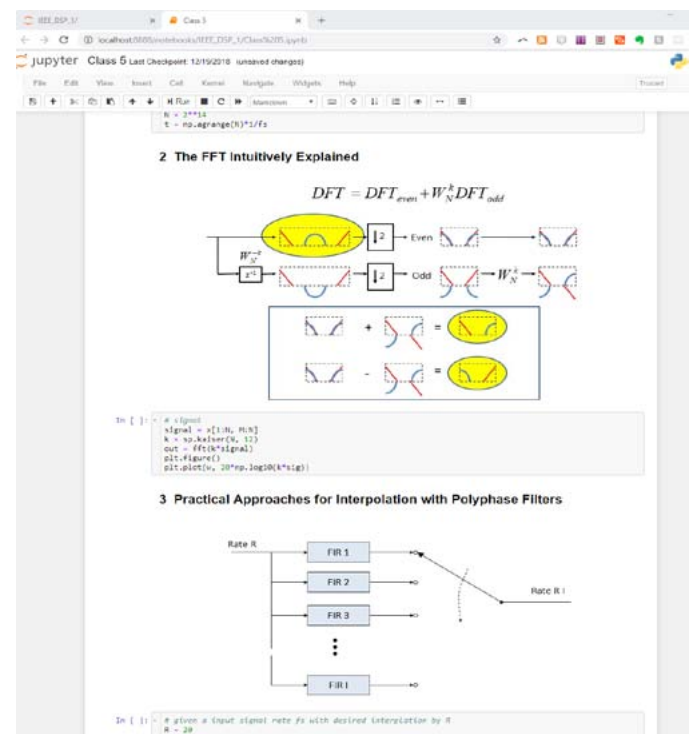
Now with Jupyter Notebooks!

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 demonstration. A more detailed course on Python itself

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

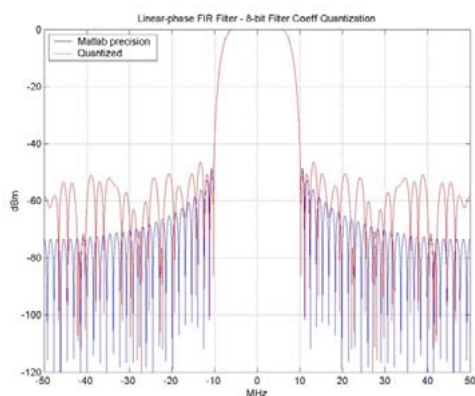
Class 5: Fast Fourier Transform, Multi-rate Signal Processing, Multi-rate Filters

Speaker's Bio:

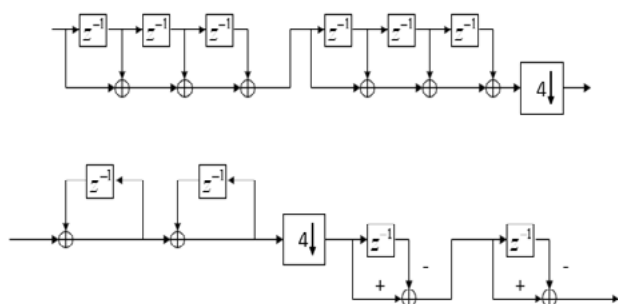
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing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

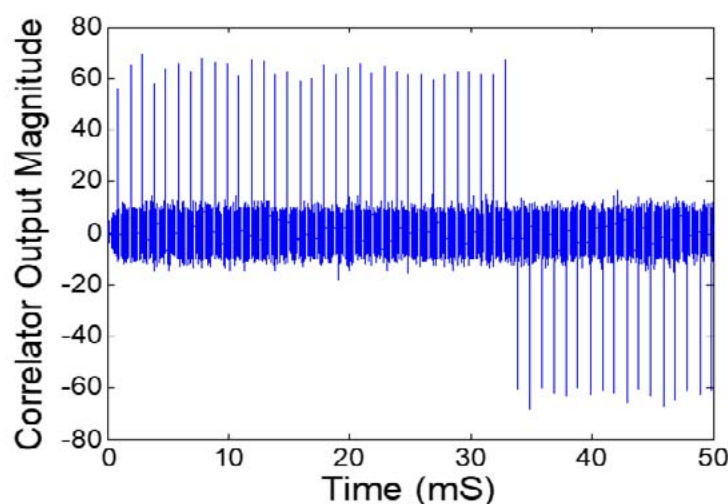
Linear Phase FIR Filter
(8-bit quantized filter coefficients)



Multi-stage CIC



Sliding Correlation



**Decision (Run/Cancel) Date for this Course is
Monday, July 17, 2023**

IEEE Members	\$190
Non-members	\$210

https://ieeeboston.org/event/digital-signal-processing-webinar/?instance_id=3435

Digital Signal Processing (DSP) for Software Radio

Dates & Times: Live Workshops: 6 - 7:30PM EST; Thursdays, October 19, 26, November 2, 9, 16
First Video Release and orientation, 6 - 6:30PM October 12, 2023
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 January 16, 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

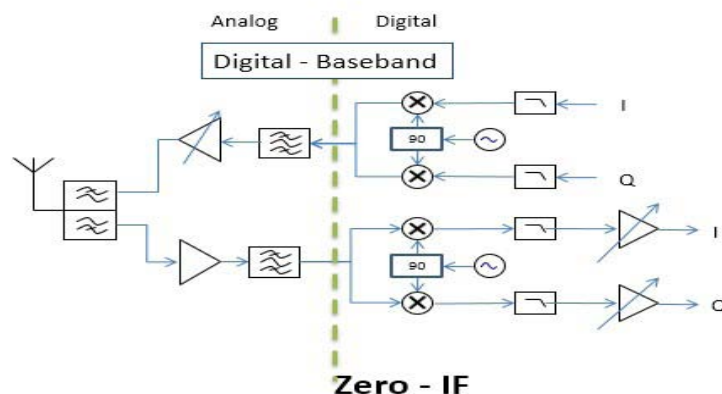
Class 5: RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers

Speaker's Bio:

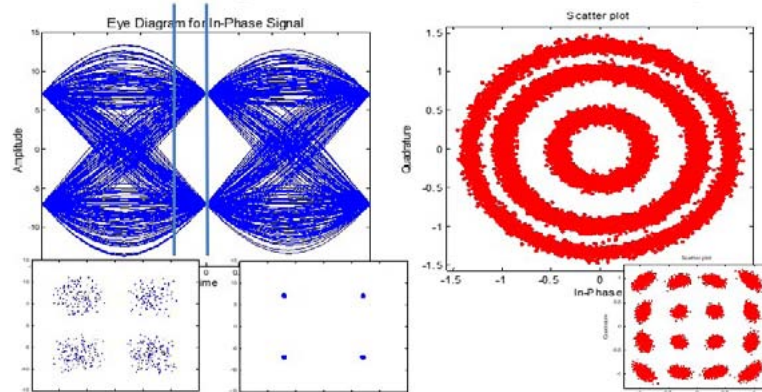
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing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

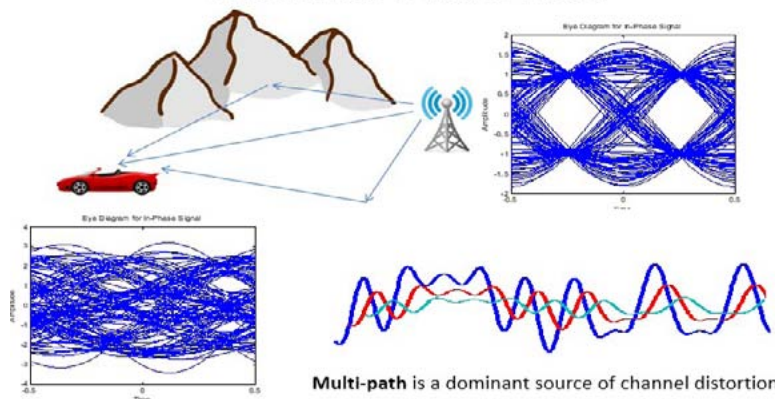
Radio Architectures



Timing and Carrier Recovery



Channel Distortion



**Decision (Run/Cancel) Date for this Course is
Monday, October 9, 2023**

IEEE Members	\$190
Non-members	\$210

https://ieeeboston.org/event/dpswradio/?instance_id=3429

Mark Your Calendar!



Every Wednesday in October 2023

4 Focused Tracks With Free Seminars

Oct. 4
Signal
Integrity/Power
Integrity

Oct. 11
5G/Wi-Fi/
IoT

Oct. 18
PCB/
Interconnect/
EMC-EMI

Oct. 25
Radar/
Automotive/
SATCOM

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