



Boston Section

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

THE *Reflector*

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EDITORIAL

A YEAR OF INNOVATION

EDITORIAL BY
RIDDHI SHAH
2025 ICAD CONFERENCE
TECHNICAL PROGRAM CHAIR

P. 3

OPINION

IEEE - YOURS, MINE, THEIRS

OPINION BY
MANFRED (FRED) SCHINDLER
BOSTON SECTION MEMBER AND
2024 IEEE VP TECH. ACTIVITIES

P. 6

NEW CONFERENCE!

IEEE 2025 INTERNATIONAL
CONFERENCE ON
ARTIFICIAL INTELLIGENCE &
DATA ANALYTICS

CALL FOR PAPERS

P. 4

2025 BOSTON SECTION AWARDS

MARCH 16TH, 2-5PM
JOYCE CUMMINGS CENTER
TUFTS UNIVERSITY

P. 5

CHAPTER & SOCIETY AND PROFESSIONAL MEETINGS AND EVENTS

LOTS HAPPENING IN
FEBRUARY!

P. 8

PROFESSIONAL DEVELOPMENT COURSES

P. 12

ONLINE COURSES
IEEE BOSTON SECTION
ONLINE AND ON-DEMAND --
COURSES ONGOING

P. 22



Boston Section

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for Humanity

TABLE OF CONTENTS

Editorial - <i>A Year of Innovation</i> by Riddhi Shah, 2025 IEEE International Conference on Artificial Intelligence and Data Analytics (ICAD) Technical Program Chair	Page 3
2025 IEEE International Conference on Artificial Intelligence and Data Analytics (ICAD) - <i>CALL FOR PAPERS</i>	Page 4
2025 IEEE Boston Section Awards Celebration - March 16th at Tufts University.....	Page 5
Opinion - <i>IEEE - Yours, Mine, Theirs</i> By Manfred (Fred) Schindler, Boston Section Member and 2024 IEEE VP Technical Activities	Page 6
Tufts University - <i>Best Practices for Managing Teams, Projects and Labs</i>	Page 8
IEEE Photonics Society - <i>Integrated Photonics in Thin-Film Lithium Niobate (TFLN)</i>	Page 9
IEEE Boston Consultants Network (CNET) - <i>Generative AI and Codeless Test Automation</i>	Page 10
Tufts University Graduate School of Engineering - <i>Panel Workshop: Preparing for an Engineering Career in Industry -- Part Tufts e-Week</i>	Page 11
IEEE Boston Consultants Network (CNET) - <i>Hiring a Consultant, Being a Consultant and Applications of Using a Consultant</i>	Page 11
Course: <i>Digital Signal Processing (DSP) for Software Radio</i> - Starting Soon!	Page 12
Course: <i>Introduction to Neural Networks & Deep Learning (Part 1)</i> - Starting Soon!	Page 14
Course: <i>Python Applications for Digital Design & Signal Processing</i>	Page 16
Course: <i>Digital Signal Processing (DSP) for Wireless Communication</i>	Page 18
IEEE Boston Section Online, self-paced, on-demand courses	Page 22
IEEE Boston Section Volunteers Wanted!	Page 23

ANNOUNCING

*IEEE International Conference on
Artificial Intelligence and Data Analytics*

2025 ICAD

CALL FOR PAPERS - PAGE 4



Riddhi Shah

A Year of Innovation

By Riddhi Shah, 2025 IEEE International Conference on AI and Data Analytics (ICAD) Technical Program Chair

The IEEE Boston Section is thrilled to announce one of its most exciting initiatives: the IEEE International Conference on AI and Data Analytics (ICAD), scheduled to debut on June 24, 2025. This groundbreaking conference aims to serve as a premier platform for showcasing cutting-edge research and innovations in artificial intelligence and data analytics.

ICAD's focus spans a wide array of industries, including healthcare, finance, manufacturing, and smart cities, emphasizing how these technologies are driving change and creating opportunities worldwide. The Technical Program Committee has been hard at work crafting an agenda designed to inspire and engage attendees. From thought-provoking keynote addresses by industry leaders to interactive workshops and panel discussions, ICAD will provide an enriching experience for everyone—from seasoned professionals to aspiring students. Our mission is not only to highlight advancements but also to foster collaborations that will drive future innovation.

This year, we've seen an incredible response to our call for volunteers. The enthusiasm and creativity of our members have been instrumental in shaping the vision for ICAD. It's heartening to see professionals and students alike coming together to contribute their ideas and energy. Their dedication ensures that this conference will not just be another event but a landmark occasion in the IEEE calendar.

As we gear up for ICAD, one of our key priorities is creating an inclusive and dynamic environment. We are working to ensure that the conference offers opportunities for networking, skill-building, and idea-sharing across diverse sectors. Special attention is being paid to making the event accessible to early-career professionals and students, fostering a space where they can learn from experts and contribute their perspectives.

Beyond ICAD, our commitment to advancing education continues to shine. We've seen strong interest in educational programs and professional development sessions across diverse topics. These initiatives underscore the importance of equipping our community with the knowledge and skills needed to thrive in this rapidly evolving field. Looking forward, we aim to expand these offerings to make a broader impact in 2025. As we step into the new year, I encourage everyone to get involved. Whether it's through submitting papers, volunteering, or simply attending, your participation is what makes events like ICAD possible. Together, we can make 2025 a year of innovation, collaboration, and growth—not just for IEEE Boston but for the global AI and data analytics community.

Let's embrace this exciting opportunity to shape the future, one breakthrough at a time.





2025 IEEE International Conference on Artificial Intelligence & Data Analytics

June 24, 2025
Greater Boston, MA, USA

CALL FOR PAPERS

Submission Deadline: February 6, 2025

Notification of Acceptance: March 6, 2025

Publication-Ready Submission: March 20, 2025

More information and submissions:
IEEE-ICAD.org

ICAD 2025 invites submissions of original research papers and will include oral and poster sessions, a student paper contest, tutorials given by experts in AI topics and special sessions. This new conference will emphasize the applications of AI and key AI verticals that impact technology applications and innovations. The conference aims to provide an experience that prepares you to learn about new research and breakthroughs in AI, gain valuable insights, grow your network and get inspired by the brightest minds working in the multi-faceted field.

We invite authors to submit original papers on topics including, but not limited to:

Track 1: Foundations of AI & Data Analytics	Track 2: AI in Industry & Enterprise Applications	Track 3: Advanced AI Techniques & Emerging Trends	Track 4: Responsible AI & Ethics
- Machine Learning Fundamentals - Deep Learning Techniques - Natural Language Processing - Computer Vision - Reinforcement Learning - Unsupervised Learning - Time Series Analysis - Predictive Modeling	- AI for Business Intelligence and Analytics - AI in Finance and FinTech - AI for Supply Chain and Logistics - AI in Customer Service and Experience - AI in Manufacturing and Industry 4.0 - AI for Climate Change and Environmental Sciences - AI in Materials - Science and Engineering	- Explainable AI (XAI) and Interpretable Machine Learning - Generative AI and Creative Applications - Quantum AI and Quantum Machine Learning - Neuromorphic Computing and Brain-inspired AI - Edge AI and Federated Learning - AI Security and Privacy - Adversarial Machine Learning - LLM and AI Agents	- AI Governance and Regulation - Ethical AI and Fairness in Machine Learning - Privacy-Preserving AI - AI for Cybersecurity - Human-Robot Interaction and Collaboration - AI in Healthcare - Robotics and Assistive Technologies - AI Bias and Mitigation Strategies

Submission Guidelines

All paper submissions must be in IEEE dual-column format and must be 6 pages (minimum) to 8 pages (maximum) in length including figures, tables & references and must be submitted in PDF format via the Conference Management Tool. The paper must comply with the specifications at ieee-icad.org.

Technical Program Chair: Rhiddiben Shah, shahriddhi717@gmail.com

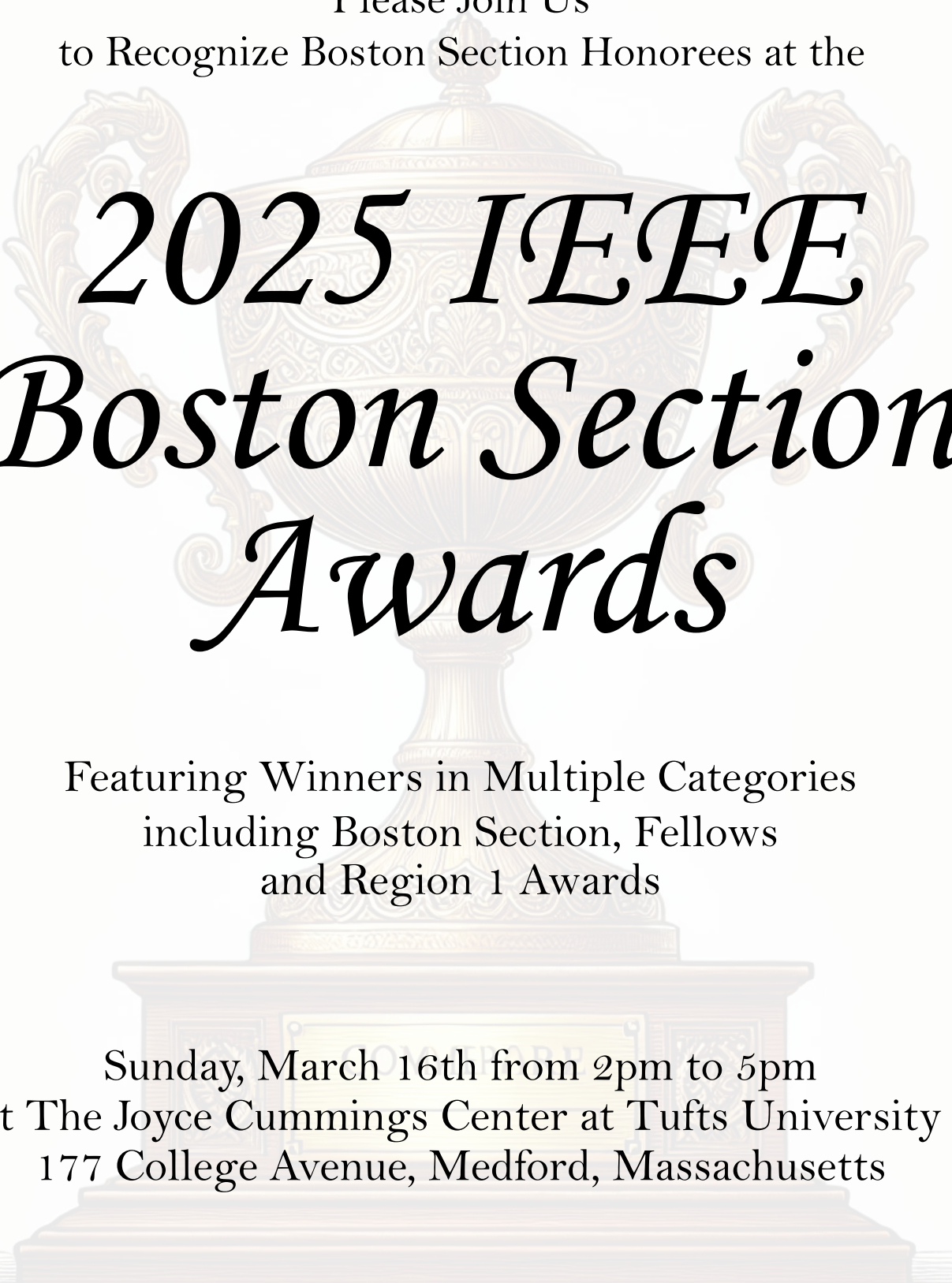
Conference Chair: Shankar Krishnan, shanky.krish06@gmail.com



2025 ICAD



Please Join Us
to Recognize Boston Section Honorees at the



2025 IEEE Boston Section Awards

Featuring Winners in Multiple Categories
including Boston Section, Fellows
and Region 1 Awards

Sunday, March 16th from 2pm to 5pm
at The Joyce Cummings Center at Tufts University
177 College Avenue, Medford, Massachusetts

RSVP by Feb. 21, 2025 at
<https://events.vtools.ieee.org/m/464633>



Manfred (Fred)
Schindler

IEEE - Mine, Yours, Theirs

By Manfred (Fred) Schindler, Boston Section Member and 2024 IEEE VP
Technical Activities

I've been an IEEE member since I was an undergrad. I started volunteering early in my career. IEEE is an important part of my professional life. Being involved in IEEE has helped me have a great career. We, IEEE, have lots of great products

and services. More importantly, we have lots of great communities – sections, chapters, societies, technical councils, technical committees, initiatives, working groups, local groups, to name just some. Many of these communities are doing important things. I suspect most of us realize that. But what about the rest of the world – the general public, our employers, even some of our members?

For much of the world we are invisible. The best we can hope for is that they associate us with WiFi, or some of our other standards. Those activities are important but are only a part of what we do. Were we always invisible? When our predecessor organizations were created, AIEE in 1884 and IRE in 1912 our technologies were new and emerging. Maybe the public took more notice. I'm not sure, I wasn't around.

I can't say what our public image was like after 1963 when IEEE was formed by the merger of IEEE and IRE. My dad was an engineer and a member, so even as a child I was more aware than most. He was Chair of the North Jersey Section in 1975-76, during a period that was notable for the layoffs that came with the end of the Vietnam War and the winding down of the Apollo program. I entered engineering school nonetheless, aware of the IEEE, though not of its breadth.

AIEE and IRE were founded by leaders in industry, but industry's engagement with IEEE has been in decline for decades, as has been the percentage of our members working in industry. We have data showing the portion of our membership working in industry has declined roughly monotonically from 60% 1999 to 32%

today.

Something interesting thing happened around 1999. Up until 1998 IEEE had Professional Activities organization. We no longer have comprehensive programs and services for industry professionals. That's not to say there are none. The Boston Section does quite well, much better than I've seen elsewhere. IEEE USA has maintained a set of professional activities. But USA is struggling with ever diminished funding and is in no position support our members globally.

Our engagement with academia is strong, largely because we have compelling products and services for them. We help many academics advance in their careers. We need to do the same for the people in industry working in technology-related fields. Let's become indispensable in advancing their careers. Our mission is to advance technology for humanity - that's not a purely academic pursuit.

What about the companies our members (and non-members) work for? My own career experience demonstrates how industry's connection to IEEE has changed. My first involvement with IEEE, as for many, was with conferences. That was in the 1980's. I started as a reviewer before moving onto other roles. I was then working at Raytheon. They encouraged and supported my involvement. We felt that it was important for the company to be represented in IEEE activities. As I progressed through my career and in my volunteer roles, the level of support from my employers declined. By 2000 it had degraded to what could best be called tacit acceptance.

By the late 2010's my involvement in IEEE was at best tolerated. Today, many of our volunteers, especially younger ones, find that employers no longer support their involvement in IEEE, or even their attendance at our events. People use their vacation time to participate in IEEE events. They pay their own way to attend conferences. If they make a technical contribution, it often doesn't relate to the work their employers pay them to do.

The world's largest companies have been built around IEEE's technologies. Economies depend on our technologies. Directly or indirectly, industry still depends on our publications. Our standards activities are essential to the efficient implementation of technological advancements. We've been developing more training and education services and products. We provide opportunities for technology professionals to grow, to network, and to contribute to society in meaningful ways.

There is no one way to reengage with industry and with the professionals who work there. It's not just one problem. We need our industries to recognize the value IEEE has. Plus, people working in industry need to better understand how IEEE can enhance our careers. My career would not have been as successful if not for IEEE. I know I'm not alone in this.

Not everyone working in technology has the same needs as me or will benefit from IEEE the same way I did. The next generation has needs and expectations that I can't anticipate. But together, I bet we can. We need to crowd source this. In some ways, we already are – look at our activities all around the world and across all our technical areas. We have lots of great things going on, but they're isolated. Let's share, learn, collaborate and revitalize IEEE's professional activities. Let's invest some of our \$1 billion in reserves in supporting our professions.

Getting companies to reengage with IEEE is a different problem. They might be encouraged to engage more if all their employees were involved in IEEE, but that's not likely enough. We need a more direct approach. Do industry leaders still know who we are and what we do? Does the public know who we are? We're too modest about what we do and who we are. Let's promote the great things we do. Then, let's collaborate to do even greater things, and promote those too.

I've mentioned collaborations a few times. I'm not saying we don't, but we have opportunities to do more. Our technical societies vigilantly guard the boundaries around their fields of interest, yet intersocietal collaborations are increasing. The technical world is ever more interdisciplinary, and our traditional technical boundaries no longer make sense. As an example,

consider an RF power amplifier. It used to be a stand-alone block. Today it's hard to be successful developing a PA without understanding and accounting for the signal processing that it interacts with. The progression of technology almost demands collaboration. Still, when we decide to launch a new technical journal, we often waste a year negotiating who the stakeholders are and what their share is.

For geo-units, geographic isolation is a factor. Regions 1 and 2 are merging. That's a sign of, and an opportunity for, collaboration. But collaboration between sections on opposite sides of the globe remains a challenge. Collaborations of technical societies with geo units are also quite limited. Here too, the Boston Section does about as well as any. But think of the opportunities if we work together. If we want to support the careers of our members, we must meet them where they are – geographically and technically.

We have vehicles for collaboration. Chapters are a great example – after all that's where the technical and geographical meet. But we don't have coordinated support for chapters. Sections manage them and societies interact with them. It's well understood that this isn't coordinated, and MGA and TA have both created committees to address this. And sensibly, we are working on making it one committee, a joint MGA/TA subcommittee on chapter support.

The Educational Activities Board (EAB) and Humanitarian Technologies Board are a couple of great vehicles for collaboration. They are both hampered by a lack of funding, but collaboration can bring funding. What if a couple sections, several student branches and a few societies want to work together on a project with EAB? They could each bring some funding to that project. But that level of collaboration should get a boost – enhance their plans with some of our \$1 billion.

We shouldn't build a new bureaucracy to support this level of collaboration. If we have that many units agreeing that a project is worthwhile, no additional approval should be needed. It's had enough scrutiny already! When it comes to bureaucracy IEEE punches well over its weight. When I became MTT president in 2003, I also became a member of TAB. The level of bureaucra-

cy and intensity of the politics reminded me of a recent employer (not Raytheon!), and I gladly left TAB behind. It took 20 years for me to appreciate what I had missed, and the greater contributions I could make. Last year I was the TA VP.

We're proud to be volunteer led, and sadly it's us, the volunteers that created and encouraged that bureaucracy. If it's us that built it, it can be us that reduces it. We can deploy systems and tools to simplify how we operate.

We seem to have a knack for introducing new tools that don't quite do what we need and don't have particularly friendly interfaces. Most commercial tools strive to make themselves intuitive. We often fall into a trap and de-prioritize the interface to meet arbitrary deadlines. Not all our tools are user hostile, and many have been gradually improving. We need to do more of that. Let's not burden our best volunteers with needless frustrations. Let's invest some time and money in improving our tools. Let's prioritize usability when we decide what to buy. After we've succeed-

ed in getting industry professionals to re-engage with IEEE, let's not alienate them with bad interfaces and confusing websites.

Technology is everywhere. The technologies we work on and with are ubiquitous. Society depends on our tech. Our tech has transformed how we live. When the public thinks about technology - the trends in technology, the professionals working on and with technology, the impact of technology, they should think of IEEE. Let's be at the forefront of inspiring the next generation to work with and on tech. Let's make sure they understand who we are. When leaders wonder about technology, they should think of IEEE. They should come to IEEE for expertise and guidance. We already have most of what we need to fulfill that mission. Let's fill in the gaps. Let's put ourselves out there. Let's become more visible.

Manfred (Fred) Schindler is Petitioning for 2025 IEEE President-elect and was the 2024 IEEE VP Technical Activities.

Tufts University – 12:00 PM, Monday, February 3

Best Practices for Managing Teams, Projects and Labs

Time: 12:00 PM

Location: Tufts University, Medford, MA

Register here: <https://bit.ly/managing-teams-projects-labs>

Presenter: Ron Lasser, Professor of the Practice

Join Professor Ron Lasser, Ph.D. in an interactive seminar on managing teams and projects. Explore strategies for handling difficult team dynamics, achieving goals, and aligning objectives.

Don't miss this opportunity to learn proven methods for success from a seasoned, award-winning expert educator.



IEEE Boston Photonics Society – 6:00 PM, Thursday February 13

Integrated Photonics in Thin-Film Lithium Niobate (TFLN)

This is the Photonics Society monthly in-person seminar series. Light meals will be served (free of charge, registration required).

Meeting Location: MIT Lincoln Laboratory, Cafeteria, 3 Forbes Road, Lexington, MA.

Schedule:

6:00 pm Networking starts
6:15 pm Light meals served.
7:00 pm Seminar starts

Speaker: Christian Reimer, PhD (HyperLight Corporation)

Register at: <https://events.vtools.ieee.org/m/464035>

This presentation will provide an introduction into integrated photonics in thin-film lithium niobate (TFLN) photonics and its applications, including technical status and ongoing development. Over the past years, TFLN has transitioned from a research-centered new material platform to becoming the leading platform to provide practical solutions for next generation applications. In particular datacom, telecom and high-performance applications such as radio-over-fiber and measurement and test can benefit from TFLN attributes such as ultra-high electro-optic bandwidths, low driving voltages, compact size and cost-effective volume production.



Dr. Christian Reimer (pictured) is a physicist and entrepreneur working in the fields of nonlinear optics, integrated photonics and quantum optics. He received graduate degrees from the Karlsruhe Institute of Technology in Germany, Heriot-Watt University in Scotland, and the National Institute of Scientific Research in Canada. He then worked as a postdoctoral fellow at Harvard University, before becoming Co-Founder and Chief Architect of HyperLight Corporation. HyperLight, a Venture-Capital funded scale-up, is specialized on scalable integrated lithium niobate technologies for ultra-high performance photonic solutions.

Enroll NOW!

2025 Courses

<https://ieeeboston.org/courses/>



IEEE Boston Consultants Network (CNET) – 6:30 PM to 8:30 PM, Wednesday Feb. 12

Generative AI and Codeless Test Automation

Location - Online Only. Your registration confirmation email contains the zoom link.

Speaker: Paul Grossman, is an experienced software test automation engineer with vast experience in Test Automation and AI.

Event Registration Link: <https://www.bostonconsultants.org/event-details/february-meeting-generative-ai-and-codeless-test-automation>. The event is free and open to the public.

Generative AI is transforming the landscape of test automation and solving many challenges in the industry. As the number of tests in a suite increases, maintenance of the code in these tests consumes more time. This also applies to the hundreds more page object locators. This in turn results in greater maintenance demands; this cycle ultimately detracts from the time available for creating new test cases and analyzing results effectively.

One of the standout innovations in this domain is the ability to write test steps in a human-readable format, freeing users from the constraints of code as well as traditional Gherkin “Given-When-Then” structures. This approach significantly reduces the complexity associated with test automation development, allowing non-technical users to interact with elements by simply stating actions (e.g., click “Add To Cart”) rather than needing to master intricate CSS or XPath locators. Furthermore, when a descriptive string lacks specificity, relative element positioning can be employed to clarify interactions, enhancing both accuracy and ease of use in test case development.

This presentation will showcase specific examples of how generative AI can increase efficiency by creating entire test suites from a single AI prompt, highlighting the importance of crafting effective prompts to elicit desired outcomes. Additionally, the use of AI to repair test cases and generate modular equivalents to subroutines also reduces this time. The capability of AI to autonomously generate a test case based on its title as well as its ability to self-heal existing test case statements, underscores its potential to streamline the

testing process and increase efficiency.

To further mitigate maintenance challenges, a simplified version control system and an innovative approach to regular expressions—referred to as templates—have been introduced for simple data generation. This approach lowers the technical expertise barrier, enabling a workforce composed of 90% manual testers and 10% developers to engage effectively in test automation as well as free up developers to add more application functionality. Additionally, executing tests in parallel accelerates result time, maximizing productivity and responsiveness in software development cycles.



Paul Grossman (pictured above) is known as the Dark Arts Wizard of Test Automation. He is the co-author of “Enhanced Test Automation with WebdriverIO” which includes tips common to all tools he has encountered over 25 years. During his career he has automated the testing of medical equipment, insurance policies and entertainment kiosks. Most recently he has ventured into low-code automation platforms assisted with generative AI. Since 2004 he has been a speaker at multiple conferences, always with a live demo, a little humor and a bit magic. Paul pushes the limits testing which he uses to create demo videos on his YouTube channel regarding a wide variety of test automation tools.

Tufts University Graduate School of Engineering – 6:30 PM to 8:30 PM, Tuesday Feb. 25

Panel Workshop: Preparing for an Engineering Career in Industry -- Part Tufts e-Week

Location: In-person and via Zoom details shared after you submit this [registration form](#).

6:00 PM (ET) buffet dinner, followed by
6:30–8:30 PM panel discussion

More details about Tufts e-Week can be found at:
<https://engineering.tufts.edu/eweek>

This is a panel of consultants from Boston Consultants Panel Presentation:

- How to leverage your academic work into an industry career
- Best practices for interviewing
- Tips for best salary negotiation

The workshop will have a panel of Tufts alumni speakers from industry:

Chiamaka Chima, E14, EG16,
 Denise Griffin, E91,
 Tyler Morris, EG21

And from Tufts University Career Services:

Matt Casey, Associate Director of Career Services
 Amory Wakefield, Assistant Director of Career Services.

Moderated by: Kevin Oye, Director of Tufts Gordon Institute.

Hosted by Dr. Karen A. Panetta, Dean of Graduate

IEEE Boston Consultants Network (CNET) – 6:30 PM to 8:30 PM, Wednesday Feb. 26

Hiring a Consultant, Being a Consultant and Applications of Using a Consultant

This is a virtual event on Zoom and open to the public. After registering, you will receive a confirmation email containing information about joining the webinar

Location: online

Presenter: Panel of 3 CNET Consultants

More details and free registration can be found at:
<https://www.bostonconsultants.org/event-details/consultants-panel-meeting>

This is a panel of consultants from Boston Consultants Network doing a multi-part presentation about consulting from 3 distinct points of view: the consultant, the client, and applications of where consultants add value.

Topics Covered for Discussion will Include:

- Introduction to consulting and what consultants do
- Getting started in consulting
- How working as a consultant is a viable business opportunity
- How a company benefits from hiring a consultant
- Consulting value-add
- Benefit of a consultant to project resources
- Types of consultants and business applications using consultants
- Examples include medical device consulting, examples of how generative AI can increase efficiency by creating entire test suites from a single AI prompt, highlighting the importance of crafting effective prompts to elicit desired outcomes.

Digital Signal Processing (DSP) for Software Radio

Dates & Times: Course Kick-off/Orientation, 6 - 6:30PM ET, Thursday, February 20
 Live Workshops: 6:00 - 7:30PM ET; Thursdays, Feb. 27, March 6, 13, 20 & 27
 First Video Release, Thursday, February 20, 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 May 27) 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

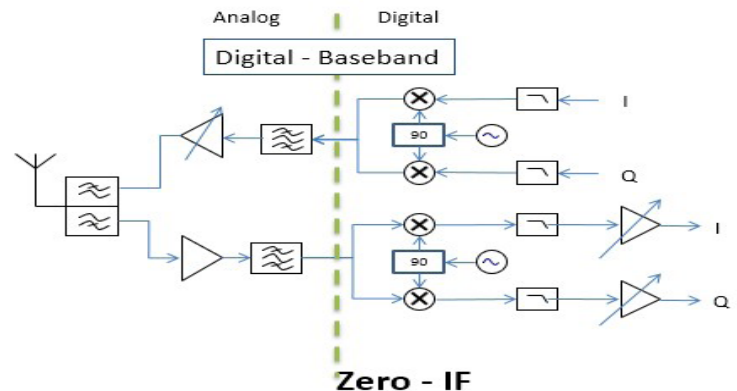
Class 5: RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers

Speaker's Bio:

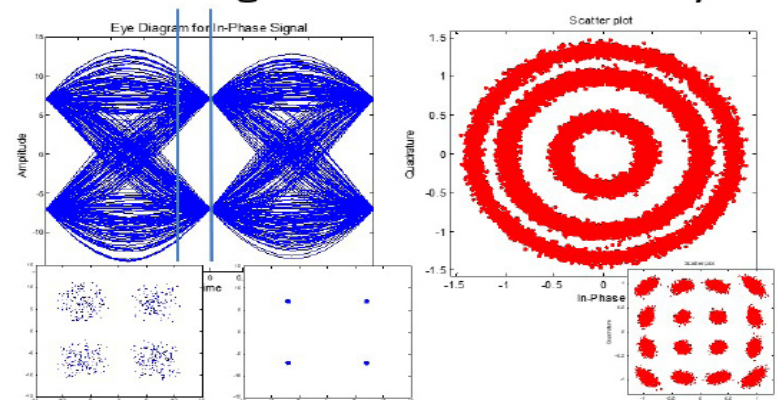
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing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

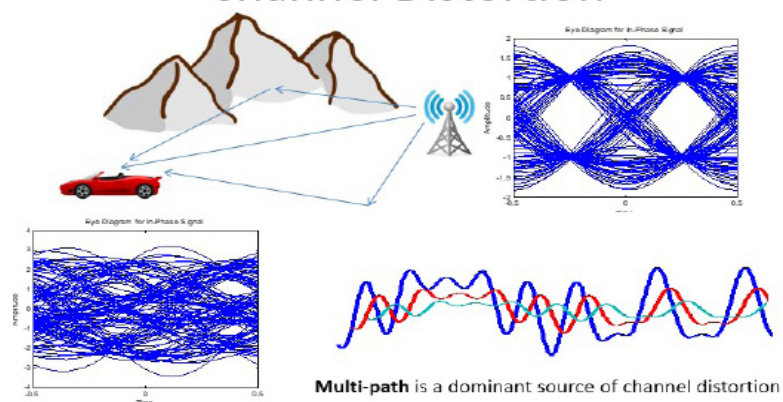
Radio Architectures



Timing and Carrier Recovery



Channel Distortion



**Decision (Run/Cancel) Date for this Course is
Thursday, February 13, 2025**

	By Feb. 6th	After Feb. 6th
IEEE Members	\$190	\$285
Non-members	\$210	\$315

<https://ieeeboston.org/ieee-boston-section-course-offerings>

Introduction to Neural Networks and Deep Learning (Part I)

Web-based Course with live Instructor!

Times & Dates: 8:30AM - 12:30PM ET, Saturday, March 22, 2025

Speaker: CL Kim

Course Format: Live Webinar, 4.0 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.

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, March 14, 2025**

Payment	on/by March 7	After March 7
IEEE Members	\$115	\$130
Non-members	\$135	\$150

<https://ieeeboston.org/ieee-boston-section-course-offerings>

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.

Python Applications for Digital Design and Signal Processing

Dates & Times: Course Kick-off/Orientation, 6 - 6:30PM ET, Thursday, May 1
 Live Workshops: 6:00 - 7:30PM ET; Thursdays, May 8, 15, 22 and 29
 First Video Release, Thursday, May 1, 2025, additional videos released weekly in advance of that week's live session!

Speaker: Dan Boschen
Location: Zoom

This is a hands-on course combining pre-recorded lectures with live Q&A and workshop sessions in the popular and powerful open-source Python programming language.

Course Information will be distributed on Thursday, May 1 in advance of and in preparation for the first live workshop session. A live orientation session will be held on February 29. Attendees will have access to the recorded session and exercises for two months (until May 20, 2025) after the last live session ends!

Pre-Recorded Videos: The course format includes pre-recorded video lectures that students can watch on their own schedule, and an unlimited number of times, prior to live Q&A workshop sessions on Zoom with the instructor. The videos will also be available to the students for viewing for up to two months after the conclusion of the course.

Overview: Dan provides simple, straight-forward navigation through the multiple configurations and options, providing a best-practices approach for quickly getting up to speed using Python for modelling and analysis for applications in signal processing and digital design verification. Students will be using the Anaconda distribution, which combines Python with the most popular data science applications, and Jupyter Notebooks for a rich, interactive experience.

The course begins with basic Python data structures and constructs, including key "Pythonic" concepts, followed by an overview and use of popular packages for scientific computing enabling rapid prototyping for system design.

During the course students will create example designs including a sigma delta converter and direct digital synthesizer both in floating point and fixed point. This will include considerations for cycle and bit accurate models useful for digital design verification (FPGA/ASIC), while bringing forward the signal processing tools for frequency and time domain analysis.

Jupyter Notebooks: This course makes extensive use of Jupyter Notebooks which combines running Python code with interactive plots and graphics for a rich user experience. Jupyter Notebooks is an open-source web-based application (that can be run locally) that allows users to create and share visually appealing documents containing code, graphics, visualizations and interactive plots. Students will be able to interact with the notebook contents and use "take-it-with-you" results for future applications in signal processing.

Target Audience: This course is targeted toward users with little to no prior experience in Python, however familiarity with other modern programming languages and an exposure to object-oriented constructs is very helpful. Students should be comfortable with basic signal processing concepts in the frequency and time domain. Familiarity with Matlab or Octave is not required, but the equivalent operations in Python using the NumPy package will be provided for those students that do currently use Matlab and/or Octave for signal processing applications.

Benefits of Attending / Goals of Course: Attendees will gain an overall appreciation of using Python and quickly get up to speed in best practice use of Python.

Topics / Schedule:

Pre-recorded lectures (3 hours each) will be distributed Friday prior to each week's workshop dates. Workshop/ Q&A Sessions are 6 - 7:30PM on the dates listed below:

Kick-off / Orientation: May 1

Class 1 May 8

Topic 1: Intro to Jupyter Notebooks, the Spyder IDE and the course design examples. Core Python constructs.

Class 2 May 15

Topic 2: Core Python constructs; iterators, functions, reading writing data files.

Class 3 May 22

Topic 3: Signal processing simulation with popular packages including NumPy, SciPy, and Matplotlib.

Class 4 May 29

Topic 4: Bit/cycle accurate modelling and analysis using the design examples and simulation packages

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.

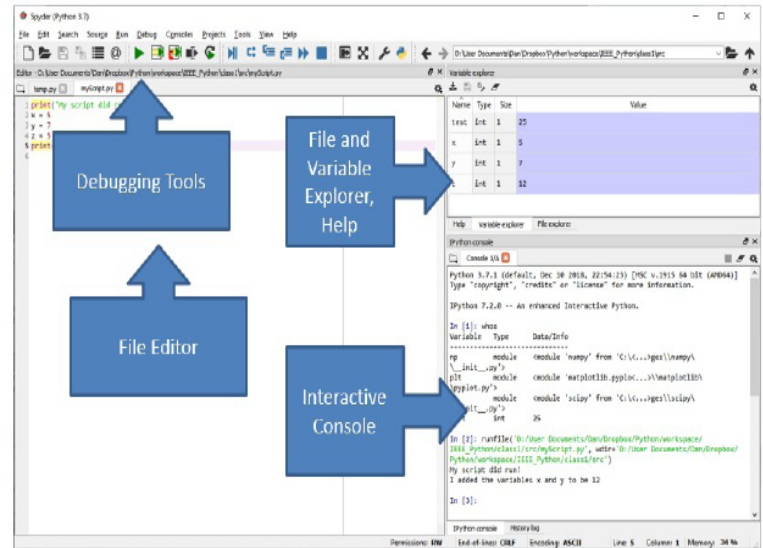
For more background information, please view Dan's Linked-In page (<https://www.linkedin.com/in/danboschen/>)

Registration is open through the last live workshop date. Live workshops are recorded for later use.

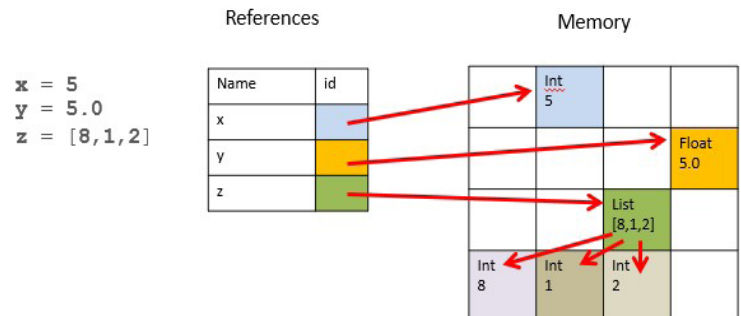
Decision (Run/Cancel) Date for this Course is Thursday, April 24, 2025

Payment	On/by April 18	After April 18
IEEE Members	\$190	\$285
Non-members	\$210	\$315

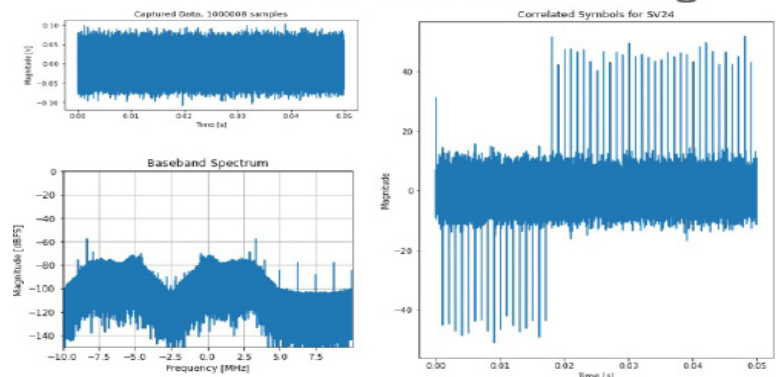
Spyder IDE



Mutable / Immutable



GPS Waveform Processing



DSP for Wireless Communications

Dates & Times: Course Kick-off/Orientation, 6 - 6:30PM ET, Thursday, July 3
Live Workshops: 6:00 - 7:30PM ET; Thursdays, July 10, 17, 24, 31 & Aug. 7
First Video Release, Thursday, July 3, 2025 additional videos released weekly in advance of that week's live session!

Speaker: Dan Boschen
Location: Zoom

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.

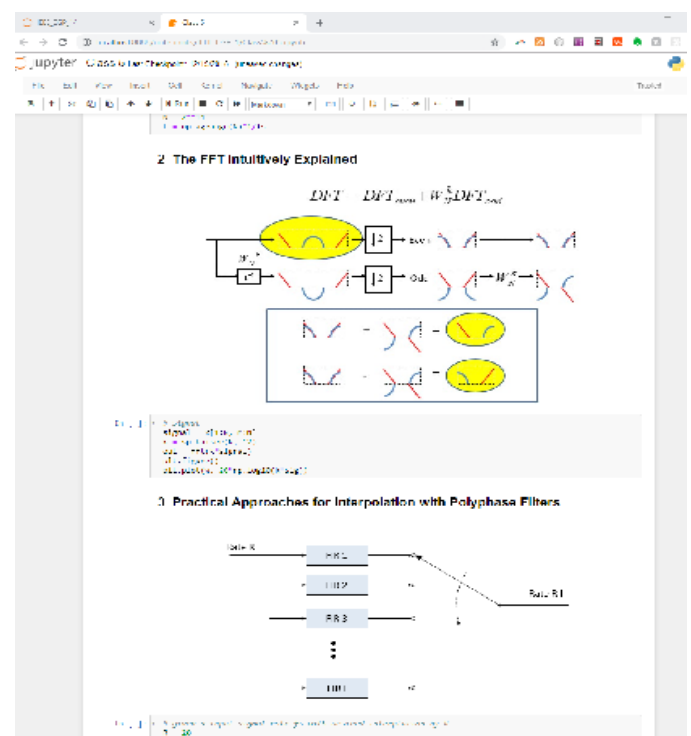
Now with Jupyter Notebooks!

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

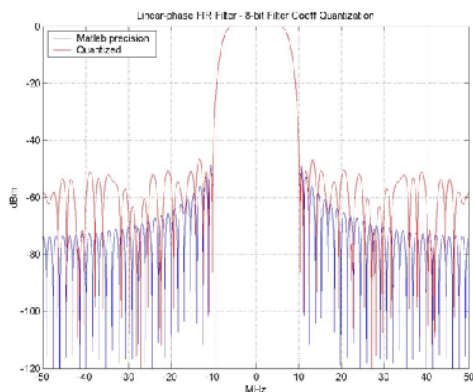
Class 5: Fast Fourier Transform, Multi-rate Signal Processing, Multi-rate Filters

Speaker's Bio:

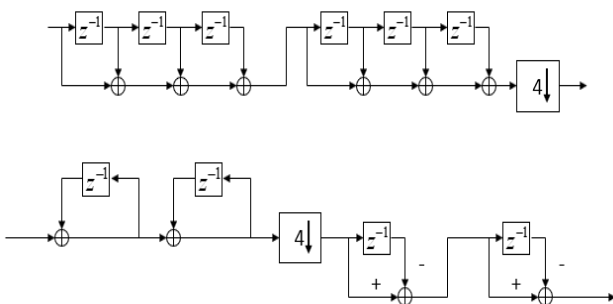
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing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

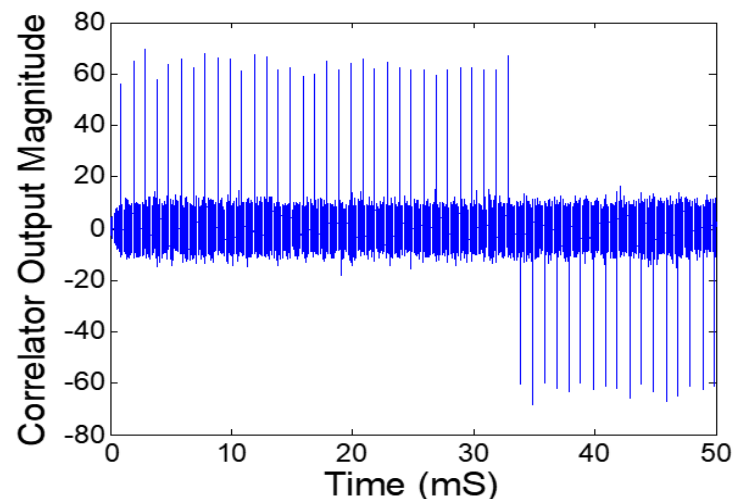
Linear Phase FIR Filter
(8-bit quantized filter coefficients)



Multi-stage CIC



Sliding Correlation



**Decision (Run/Cancel) Date for this Course is
Friday, June 27, 2025**

Payment	By June 19	After June 19
IEEE Members	\$190	\$285
Non-members	\$210	\$315

<https://ieeeboston.org/ieee-boston-section-course-offerings>

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

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 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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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/>

Reliability Tutorial Series: Electronic Failure Mechanisms

https://ieeeboston.org/event/ieee-ansys-reliability-tutorial-series-electronic-reliability/?instance_id=3635

Reliability Tutorial Series – Accelerated Life Testing for Electronics Reliability

https://ieeeboston.org/event/ieee-ansys-reliability-tutorial-series/?instance_id=3634

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/>

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