Boston Section

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

THE Reflector

ISSUE #1
JANUARY 2025

IEEE Boston Section

ieeeboston.org

IEEE Advancing Technology for Humanity

TABLE OF CONTENTS

ANNOUNCING

IEEE International Conference on Artificial Intelligence and Data Analytics

2025 ICAD

CALL FOR PAPERS - PAGE 6

Karen Panetta

Lessons Learned from Our Friend Dr. Arthur Winston

By Dr. Karen Panetta, IEEE Fellow and IEEE Boston Section Chair

Dr. Arthur Winson was a long time Boston Section volunteer and in 2004, he became the IEEE President. While I can tell you many stories of the years I spent working with Arthur, I thought it would be better to share the lessons I learned from him and perhaps only one story to put it all into context.

Arthur taught me that there are only two things people don't like. They don't like the way things are and change. It is very easy to complain about the way things are and expect others to step forward to fix it, but it takes tremendous courage, enormous energy and infinite resilience to make the change happen. Arthur was an architect for change. He not only established the blueprint to take on grand challenges, but he led the charge to execute those plans. We don't do this expecting to get promoted, or to make money, because change is often met with a tsunami of resistance that gives us a reputation of a rebel warrior rather than celebrating and supporting us as pioneers. We take on these challenges because it is the right thing to do.

There are two examples that immediately come to mind that demonstrate Arthur's profound impact. The first is his contributions to IEEE Women in Engineering (WIE).

Arthur was a proponent of diversity and inclusion, long before this topic was on most organizations' radars. He also knew that simply giving a group of underrepresented individuals a space and budget to go off an "solve the problem" on their own was not a viable or sustainable approach to address social challenges. Arthur knew that it took a community, both men and women who wanted to support the advancement and inclusion of everyone to bring about positive change.

Let me share a story of how my involvement with Arthur and the evolution of IEEE WIE came about. Arthur and I worked together at Tufts University. He was the Executive Director of the Tufts Gordon Institute for Engineering Management, and I was an assistant professor in the department of Electrical, Computer Engineering and Computer Science Department. Arthur was also a member of our department.

There was a bus leaving for a department outing. Arthur prided himself on being very punctual, but I was always running late. Thus, I was the last one to get on the bus. There was only one seat left and fortunately for me, it was next to Arthur.

That bus ride changed my life. Arthur and I discussed

Dr. Arthur Winston with Dr. Karen Panetta, March 2024

what it would take to get young women interested in pursuing engineering and by the time we got off the bus, Arthur had asked me to provide him with a position statement about all the topics I discussed and proposed to him.

Two months later, I was informed that I was selected to be the new IEEE Women in Engineering Committee Chair, a position reporting to the IEEE Board of Directors and a role with high expectations that I would lead this global organization into a thriving community.
I secured my first passport and found myself on a plane to Paris, France to meet the IEEE WIE Committee members.

In all honesty, the committee members were totally perplexed of how a woman from Boston, who had no prior experience on the WIE committee and had never traveled beyond the U.S. could possibly lead and help the organization flourish. I had already developed a thriving Nerd Girls STEM outreach program that was becoming internationally acclaimed, so while I had the knowledge and leadership skillset, to the IEEE WIE committee, I was a complete outsider.

I appreciated their honesty, but I also endured some brutal commentary from a vocal individual of how I arrived to become the leader of IEEE WIE and had my abilities questioned. Behind the scenes, Arthur must have strongly advocated for me because he knew IEEE WIE needed a disruptive innovator who could bring synergy and global cooperation to the organization. He trusted and believed in me and there was no way I would let him down. I committed to myself that failure was not an option, and a mediocre performance was not acceptable. I tuned out the “noise” and set out to work.

During that time, Arthur entrusted me to my IEEE WIE Committee Chair predecessor, MaryEllen Randall, now the IEEE-President Elect for support. She was one of my strongest advocates helping to quell the anguish of some of my skeptics. MaryEllen has continued to be among the most collegial individuals I have ever worked with. I am so grateful that Arthur connected us.

The synergistic transition of power and cooperation between MaryEllen and myself should be a model for nations’ leaders to follow! Furthermore, my most vocal skeptics turned into allies and were instrumental in helping me implement new strategies that changed the organization’s trajectory.

As IEEE WIE grew, it became evident that we needed more staff support. I was told that I needed to put in a request and a proposal to hire new staff.

Together, MaryEllen and I put forward a proposal that came back with a definitive response, which was “No”.
I was confident we put forward a compelling proposal and thought I now had to live with the decision.

I received a call from Arthur who said, “I heard you are not going to attend the IEEE Board meeting and present your proposal to the IEEE Finance Committee. Why not?” I replied, “Because they already denied the proposal and said, no.” Arthur laughed and responded, “Karen, in IEEE, no doesn’t mean no.”

I got on a plane and headed across the country to present to the IEEE Finance Committee, a committee that had a reputation for eating their own young. I was terrified.

Dr. Arthur Winston

I presented the proposal and recall Past IEEE Treasurer, Joseph Lillie, who was chairing the committee, working out the numbers so that our request could be granted.

That support enabled IEEE WIE to expand and flourish. Incidentally, it took me 20 more years to get over my fear of the IEEE Finance committee. I decided to take the bull by the horns and joined the committee in 2024. They are not as scary as I envisioned and are extremely brilliant and data driven individuals.

Arthur was so proud of me for conquering my fear and I remained appreciative that he entrusted my stewardship to Joe Lillie as I ventured into what I thought back then, was the lion's den.

Dr. Arthur Winston, photo credit Benchmark Senior Living

IEEE WIE has become the largest international affinity group supporting women in technology. It has more male members than any other technical women's professional organization. Because IEEE WIE has grown to become a thriving international community, it is often referred to as "WE", reflecting on the true collaborative spirit of its membership. Arthur was one the first male member and he was also the recipient of the first IEEE WIE mentorship recognition awards. He was also the first male to receive an award from IEEE WIE.

The second example of Arthur's impact is when the US Department of State had restrictions on the dissemination of technical and scientific research. Arthur knew that a global economy couldn't be achieved if people globally were not allowed to participate and be educated in the latest technological advancements. He knew international collaboration and the inclusion of diverse perspectives inspired the most impactful innovations.

Arthur did not stand on the sidelines expecting others to address and solve this issue. Rather, he stepped into action and led the charge to have the restrictions lifted.

Imagine what our world would have been like if such restrictions were not removed? Healthcare technologies that have saved billions of lives would not have been created or disseminated, and the millions of new business ventures that have lifted underserved populations from poverty would have surely been further excluded from participating.

When Arthur's son called me to inform me of Arthur's passing, I was distraught and rather than me consoling his son, as I should have, his son was consoling me. When I ended the call, my husband reminded me that while I was sad and would always miss Arthur, I should recognize that all the time and efforts I spend educating underrepresented groups of individuals, promoting outreach and education as a viable path to make dreams come true and my own reputation for being a disruptive innovator, were exactly the traits that Arthur exhibited throughout his lifetime. Furthermore, the wonderful individuals I have met in IEEE through Arthur have remained my steadfast collaborators.

Arthur was my role model and mentor and I am honored that I have become exactly what he architected in his blueprints for me and the countless others he has mentored.

What I realized most, was that Arthur's life mission and efforts were never solely about engineering technologies. It was about mutual respect for all people and the inclusion of all individuals through collaboration. This is Dr. Arthur Winston's legacy and I hope to continue to be a vehicle to continue his legacy.

Arthur loved IEEE, and his family has requested that any remembrances for Arthur be donated to the IEEE Foundation.

You can read Dr. Arthur Winston's obituary here.

IEEE Advancing Technology for Humanity

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

IEEE Advancing Technology for Humanity

2025 ICAD

IEEE Boston Section

Boston ENET – 7:00 PM, Tuesday, January 7

The Long History of AI and its Business Applications Today

Time: 7:00 - 8:30 PM
Location: Lasell University, Newton, MA

Register here: https://bostonenet.org/events/the-long-history-of-ai-and-its-business-applications-today/#registration-form

ChatGPT launched generative artificial intelligence two years ago comparable to what browsers did for the internet in the 1990s. But, the roots of AI date back to the 1940s. Compute power enabled the AI take off.

AI is the very shiny, new object attracting hype-level attention: a growing number of platforms to develop applications, hundreds of billions of dollars of investment in AI companies and businesses using AI, and claims of significant workplace results.

In this program you will learn:

--The eight-decade development of AI and why it's taken off in the last few years.

--How it will impact many industries and professions.

--What initial applications may be best for your business.

--What a pioneer in generative AI has learned that you should know if you're developing products or services.

More information at:
https://bostonenet.org/events/the-long-history-of-ai-and-its-business-applications-today/

IEEE Computer Society and GBC/ACM – 7:00PM, Thursday, January 9

Artificial Intelligence and Trust

This is an in-person and virtual event on Zoom. After registering, you will receive a confirmation email containing information about joining the webinar

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

Presenter: Bruce Schneier

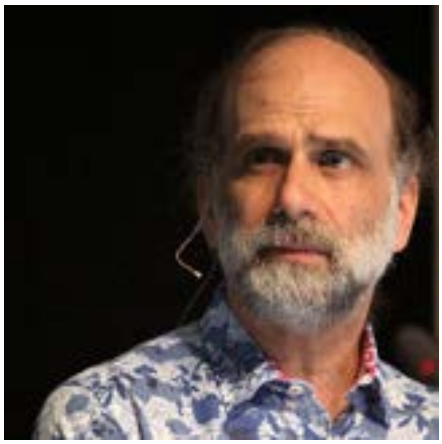
More details and free registration can be found at https://acm-org.zoom.us/webinar/register/1917341053333/WN_CYgexNC-Ssmbzi-0gRF234Q

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 plan to serve light refreshments (probably pizza) before the talk starting at around 6:30 pm. Letting us know you will come in person will help us determine how much pizza to order.

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

AI and Trust: Trusting a friend and trusting a service are fundamentally different. The former is personal and intimate, while the latter is impersonal and can scale to all of human society. The companies behind the current generative AI systems are poised to exploit that difference. Their intimate conversational nature will cause us to think of them as friends when they are actually services, and trusted confidents when they will actually be working against us. Like much of the internet, these systems will collect our personal data behind our backs and try to manipulate our behavior. Enabling trust in AI systems will require two things. The first are foundation models that are not controlled by corporations and the profit motive. The second is government regulation of the industry. Democratic governance is how we create social trust in our society.

Bruce Schneier is an internationally renowned security technologist, called a "security guru" by the Economist. He is the New York Times best-selling author of 14 books -- including A Hacker's Mind -- as well as hundreds of articles, essays, and academic papers. His influential newsletter Crypto-Gram and blog Schneier on Security are read by over 250,000 people.



Bruce Schneier

Schneier is a Lecturer in Public Policy at the Harvard Kennedy School, a faculty affiliate at the Ash Center for Democratic Governance and Innovation at HKS, a fellow at the Berkman-Klein Center for Internet and Society at Harvard University, a board member of the Electronic Frontier Foundation and AccessNow, and an advisory board member of EPIC and VerifiedVoting.org. He is the Chief of Security Architecture at Inrupt, Inc.

IEEE COMPUTER SOCIETY

Fostering a Robust Ecosystem to Help Young Professionals Excel at the YP Networking Dinner

On November 22nd, we held a young professionals' dinner attended by 17 individuals. The event aimed to provide a platform for professional growth and enhance attendees' sense of belonging within the IEEE community. Focusing on networking and collaboration, it underscored our commitment to fostering a robust ecosystem where young professionals can excel in their careers. Engagement from industry representatives and local institutions ensured that participants gained valuable insights into current industry trends and potential career opportunities.

Overall, this event significantly contributed to the development of the local Young Professional community and fostered lasting connections among its members.

During the event, Dr. Babak Enayati, vice president at Nexamp delivered a presentation on career growth, addressing key strategies for early-career professionals to achieve their goals. The event offered various benefits:

--Facilitated networking opportunities for both IEEE and non-IEEE members.
--Enhanced professional development through interactive discussions.
--Strengthened ties with local YP Affinity Groups and Sections.
--Encouraged collaboration with industry representatives and local institutions.

IEEE youngprofessionals™

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

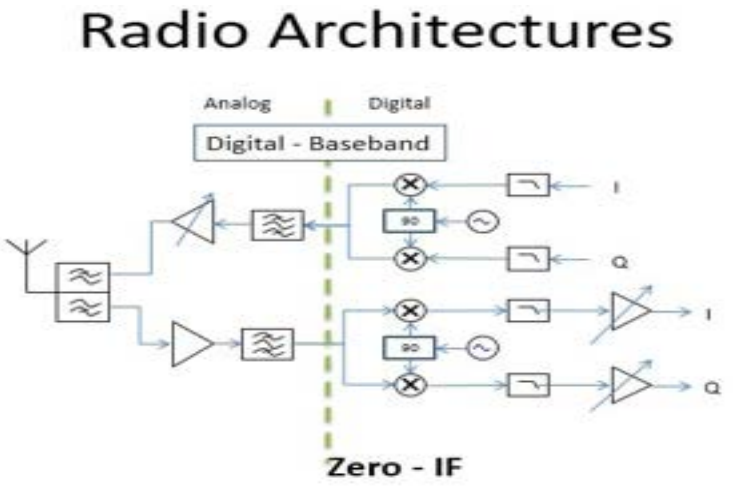
Class 5: RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers

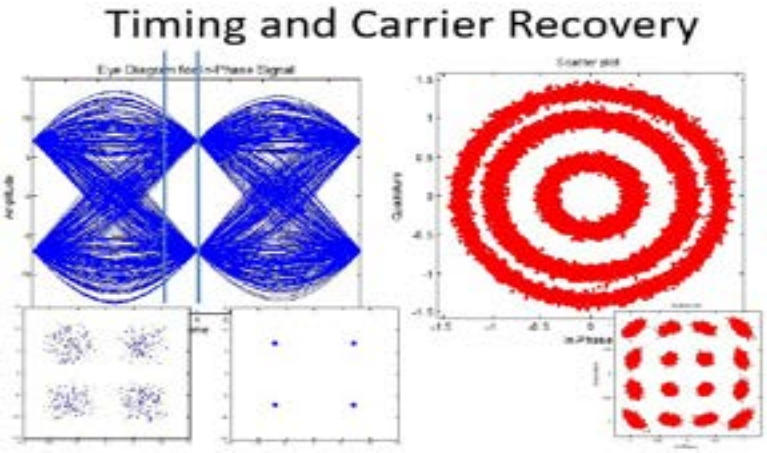
Speaker's Bio:
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing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

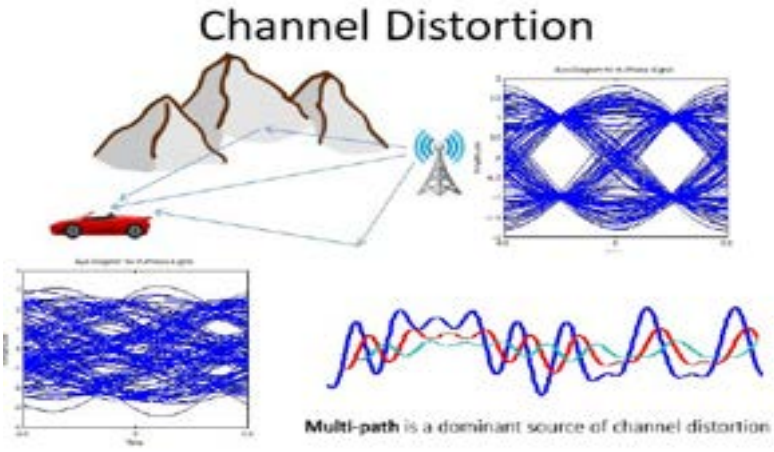
Decision (Run/Cancel) Date for this Course is Thursday, February 13, 2025

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

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







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: 9AM - 12:30PM ET, Saturday, March 22, 2025

Speaker: CL Kim

Course Format: Live Webinar, 3.5 hours of instruction!

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

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

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

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

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

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

Benefits of attending the series:

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

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

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

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

Outline:

Feedforward Neural Networks.

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

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

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

Decision (Run/Cancel) Date for this Course is Friday, March 14, 2024

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

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

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

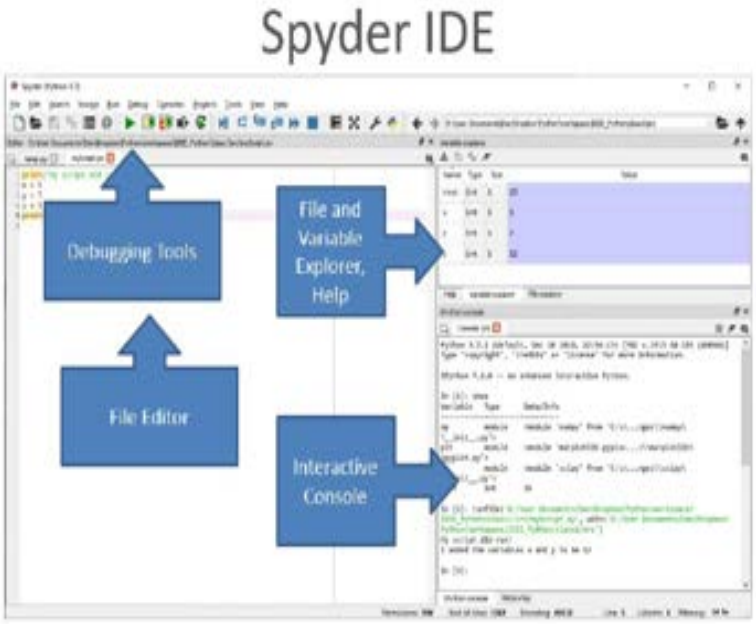
Speaker's Bio: Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing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

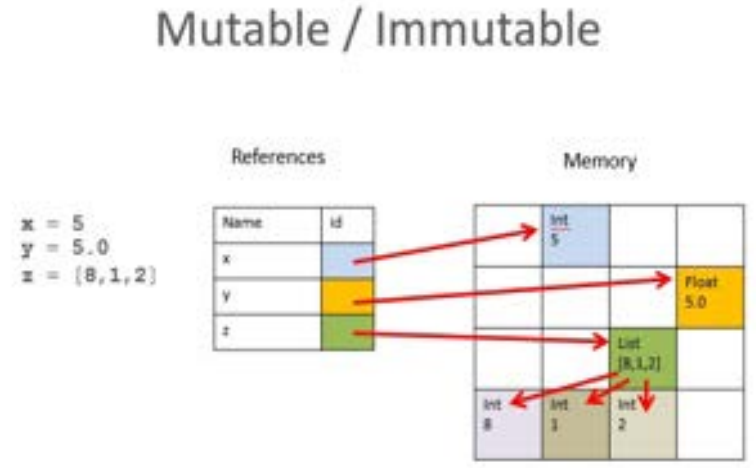
For more background information, please view Dan's Linked-In page (https://www.linkedin.com/in/danboschen/)

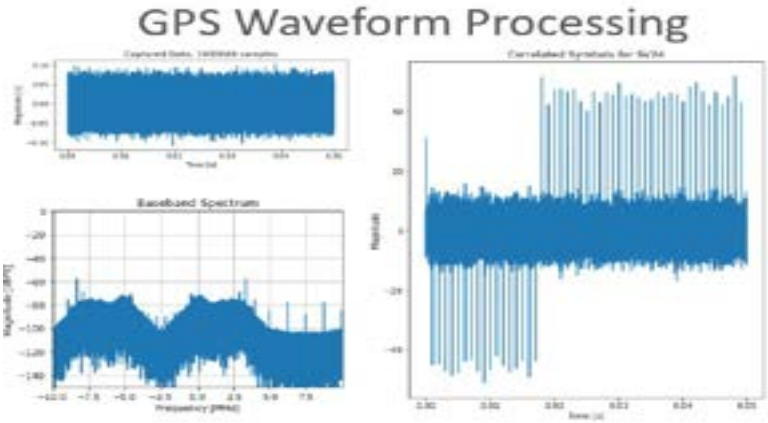
Registration is open through the last live workshop date. Live workshops are recorded for later use.

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







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

DSP for Wireless Communications

Dates & Times: **Course Kick-off/Orientation, 6 - 6:30PM ET, Thursday, September 4**
Live Workshops: 6:00 - 7:30PM ET; Thursdays, Sept. 11, 18, 25 & Oct. 9
First Video Release, Thursday, Sept. 4, 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

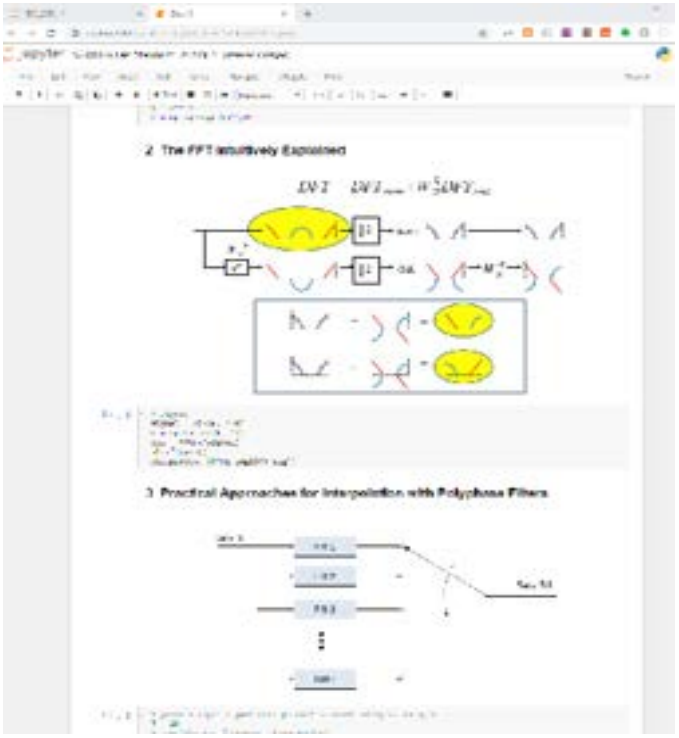
This course is a fresh view of the fundamental and practical concepts of digital signal processing applicable to the design of mixed signal design with A/D conversion, digital filters, operations with the FFT, and multi-rate signal processing. This course will build an intuitive understanding of the 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

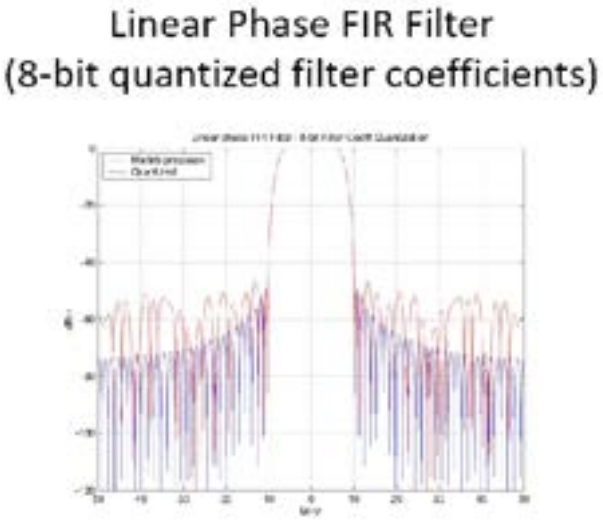
Class 4: Windowing, Digital Filter Design, Fixed Point vs Floating Point

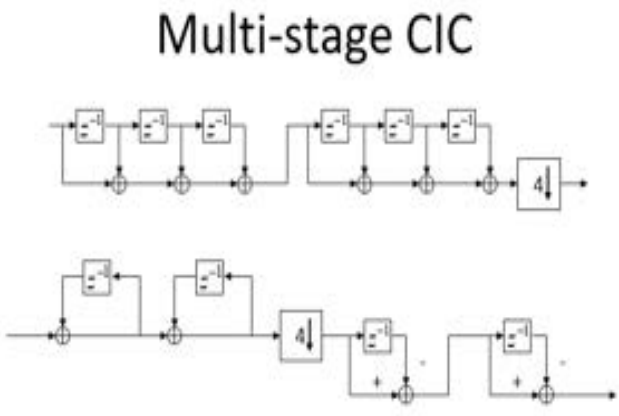
Class 5: Fast Fourier Transform, Multi-rate Signal Processing, Multi-rate Filters

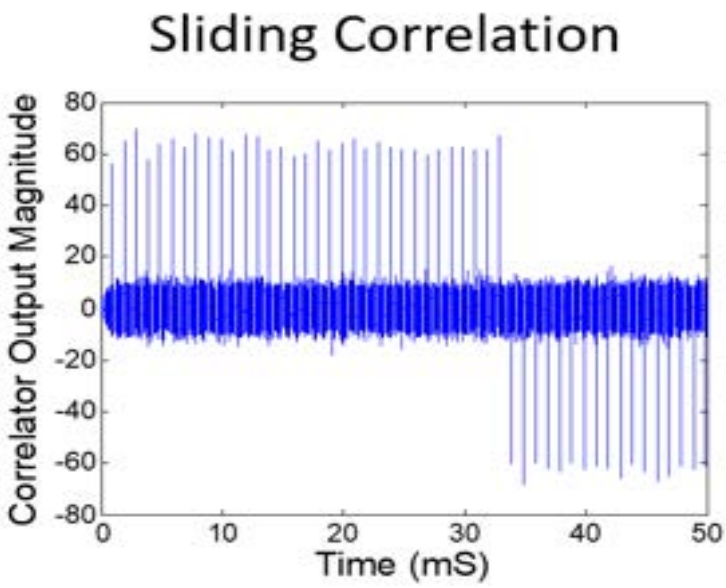
Speaker's Bio:

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







Decision (Run/Cancel) Date for this Course is Friday, April 29, 2025

Payment	By August 21	After August 21
IEEE Members	$190	$285
Non-members	$210	$315

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

CNET Corner -- Getting Started in Consulting

IEEE Boston Consultants Network (CNET) is a network of consultants that offer a wide variety of consulting services. Check us out at: https://boston-consultants.org/

Come to an event and see what Boston CNET can do to help you: https://bostonconsultants.org/events

Recently, two long time consultants, Sorin Marcovici, Boston CNET Chairman, sat down with Mark Fitzgerald, Boston CNET Treasurer and Webmaster, to discuss the key skills and requirements needed to develop a successful consulting business.

Sorin: Mark, drawing on your experience of over 15 years in the consulting field, what would you say are the key skills and knowledge everyone should master prior to entering the consulting field?

Mark: Before embarking on a career as a consultant, you need to be quite confident that you have near-expert marketable knowledge and experience. The key word here is marketable. To obtain said marketable expertise, you should have a track record which includes successful completion of a variety of complex and diverse projects. This project experience enables you to develop a broad technical base of skills and knowledge. Consultants need to hone their ability to learn quickly and on the job while using their technical and project skills. As a successful consultant, you need to be passionate, self-directed, results oriented and be willing to take risks. Additionally, you should be qualified to proficiently understand and effectively negotiate legal contracts.

Mark Fitzgerald

Sorin: What advice can you give regarding cultivating your first clients?

Mark: Initially, your personal network needs to be extensive enough that you can find your first clients within that network or by social media. To keep growing your business once it is established, you will need to expand your network via such avenues as professional organizations, conferences, social media, public speaking and experience working for varied companies. Hanging out your shingle is not an easy path as a consultant; however, for the right type of person, consulting can provide rewarding professional opportunities and freedom.

Sorin: What other professional avenues and approaches should an aspiring consultant pursue to grow their business?

Mark: Social media is currently the predominant marketing tool. LinkedIn is the predominant leader in business marketing. Increase your presence in these areas. You should have a personal profile and a company profile on LinkedIn. Each profile should be linked together, professional, and clearly state that you are a consultant with specific knowledge in some marketable discipline. Key words must be used in all your professional social media. Your ability to ensure a search engine finds your key words is your goal. Networking is king. Most of your work will come from networking. Meet and talk to everyone you can. Your resume must be direct, concise and easily grab the attention of potential clients within 30 seconds. Give out business cards.

Sorin: What is an easier path to becoming a consultant?

Mark: An alternate approach to marketing yourself and finding clients is to contract with a professional staffing agency that specializes in your field of expertise. The staffing agency will act as your marketing department and find you work. This is often an easier way to break into consulting, *(article continues)*

Sorin Marcovici

however, be aware that when working with headhunters you must be able and willing to actively manage your ongoing relationship with them. Never let your resume be distributed without your consent. You may get double submitted by multiple headhunters; then you will never get that contract. You may have to reduce your rate if you want to work through a headhunter. Always get a JD (job description) and a rate prior to starting any technical conversation.

Sorin: What does C2C mean when negotiating rates with headhunters and clients?

Mark: This is an important point. C2C is corp-to-corp (business to business). It means you are incorporated as a business and you wish to be treated like a business, not as an individual. C2C is the opposite of a W2 contract. W2 means you are working for the headhunter like an employee. It's always best if you still act like an independent consultant with professional experience and a professional outlook, no matter what the circumstance are.

Sorin: What are the advantages and disadvantages to working with a professional staffing agency?

Mark: The advantage is that the headhunter should have a broad range of customers that want your services, and that can keep you working. You can typically find work more quickly because the headhunter has that extensive list of customers. The headhunter will always want a cut of the contract, and that may take away some margin. But if the rate is acceptable, then working more often by using a headhunter is preferred to not working, or due to the rate.

Sorin: When consulting for a client, what are some winning consulting strategies?

Mark: Often, the clients treat you like, and may even call you a contractor. You want to differentiate yourself by acting as a professional consultant. You aren't a contractor! Not everyone can do this work well, and do it quickly. Consultants must be dependable, prepared in advance to do the job, thoroughly research ideas prior to offering expert advice, and let the client make the critical decisions. However, consultants should advise clients on achieving better project performance and bringing more business value. You are not an employee, so don't act like one. You should do the work the client wants done, and make forward progress each day. Your goal is to satisfy the client, not yourself.

Sorin: What other considerations should be addressed and factored into someone's decision-making process prior to their accepting a consulting contract?

Mark: From the very beginning of your consultant career, you need to decide if you are going to work independently or as part of a consulting firm. If you choose to go the independent contractor route, you may be personally liable for the work you perform, and may be putting your own assets at risk. Again, this is why an independent consultant should ensure they have comprehensive general liability and/or professional liability insurance. Depending on the state laws, and your company location, you will need to decide the most appropriate type of incorporation for your practice (S-Corp, C-Corp, or LLC). Professional liability insurance is different than general liability. Professional liability insurance is typically required when you are selling a product, rather than a service.

Sorin: Do I need a company website?

Mark: No, but it is preferable. Most consultants say the same thing: they don't get business from their website. Your website is like a calling card, a reference, a way to say to your clients you are a real business. But don't count on that website bringing in clients. LinkedIn could serve as your website. Business cards are also useful.

Sorin: Any final words of wisdom?

Mark: As a consultant you have two primary jobs: working your own practice and also servicing your clients. Unlike a typical job with set hours, pursuing a career in consulting requires a more expansive time commitment. The payoff is that for the right individual, being a consultant often leads to enjoyable, high-level work solving complex issues and advancing your company. Your pay is better, but you have to try and keep working consistently, and that is challenging. Remember that it is important to enjoy your work as a consultant since much of your life revolves around tending to your business.

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, ieee-bostonsection@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, ieee-bostonsection@gmail.com.

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

IEEE Boston Section Online Courses:

(Students have 180 day access to all online, self-paced courses)

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

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

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

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

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

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

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

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

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

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 Video Series

A collaborative discussion panel featuring esteemed members from the Institute of Electrical and Electronics Engineers was 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 Trina Lorigan at the Boston Section at ieeebostonsection@gmail.com.

Call for Articles

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

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

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

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

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

We are excited about this new feature and hope you are eager to participate!

Submissions should be sent to;
ieeebostonsection@gmail.com

IEEE Boston Section Volunteers Wanted!

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

About IEEE Boston Section:

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

Volunteer Opportunities:

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

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

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

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

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

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

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

Benefits of Volunteering:

Volunteering with IEEE Boston Section offers numerous benefits, including:

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

How to Get Involved:

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

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

Volunteer Here!

https://ieeeboston.org/volunteer/