

BOSTON



DIGITAL SIGNAL PROCESSING
(DSP) FOR SOFTWARE RADIO

P.26

PROF. DEV. TRAINING:
INTRODUCTION TO PRACTICAL
NEURAL NETWORKS AND DEEP
LEARNING

P.21

2022 IEEE INTERNATIONAL
SYMPOSIUM ON PHASED
ARRAY SYSTEMS AND
TECHNOLOGY

P.19

PROF. DEV. TRAINING:
PYTHON APPLICATIONS FOR
DIGITAL DESIGN AND
SIGNAL PROCESSING

P.23

PRACTICAL RF PCB DESIGN,
WIRELESS NETWORKS AND
TELECOMMUNICATIONS

P.30

PROF. DEV. TRAINING:
DIGITAL SIGNAL PROCESSING
(DSP) FOR WIRELESS
COMMUNICATIONS

P.28

THE REFLECTOR

ISSUE #9

SEPTEMBER 2022

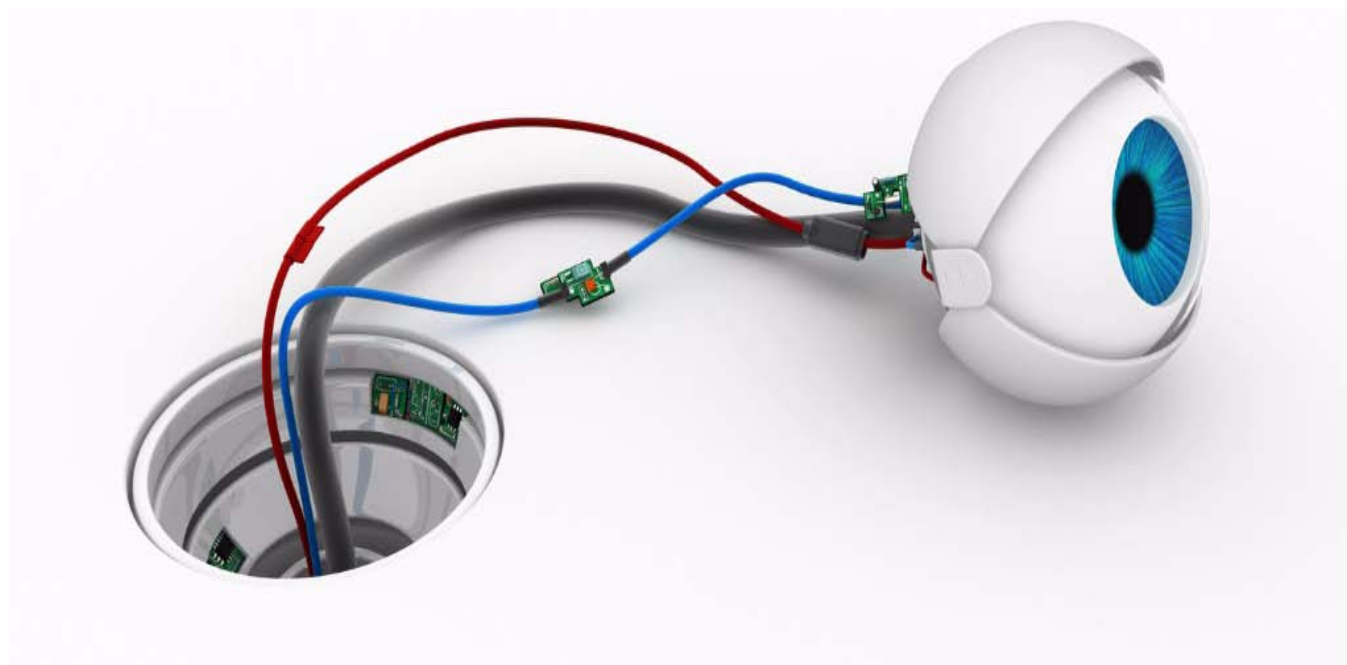


TABLE OF CONTENTS

Editorial - “Students need IEEE!” by Soon Wan, IEEE Boston Student Activities Chair	Page 3
IEEE Boston Section Online, self-paced, on-demand courses	Page 5
2022 IEEE/MIT Undergraduate Research Technology Conference (URTC) - Call for Papers!	Page 6
Call for Volunteers (Consumer Technology, and Engineering in Medicine & Biology Chapters)	Page 7
IEEE Video Series (Five videos on issues and technologies that impact planet Earth) and Call for Course Speakers/Organizers	Page 8
Entrepreneurs’ Network	Page 9
Robotics and Automation Society	Page 12
Computer Society and GBC/ACM	Page 13
Entrepreneurs’ Network	Page 15
Microwave Theory and Technology Society	Page 17
Aerospace and Electronic Systems Society	Page 18
2022 IEEE International Symposium on Phased Array Systems and Technology (Technical program is online).....	Page 19
Introduction to Practical Neural Networks and Deep Learning (Part I)	Page 21
Python Applications for Digital Design and Signal Processing	Page 23
2022 IEEE International Symposium on Technologies for Homeland Security	Page 25
Digital Signal Processing (DSP) for Software Radio	Page 26
DSP for Wireless Communications	Page 28
Practical RF PCB Design, Wireless Networks, Products and Telecommunications	Page 30
2022 IEEE High Performance Extreme Computing Conference (Technical program is online)	Page 32



Students Need IEEE

By Soon Wan, IEEE Boston Section Student Activities Chair

I joined IEEE when I was an undergraduate student. At that time, I was not aware of all the great benefits that I could enjoy from my IEEE Student Membership. All I knew was that IEEE was a professional technical society. As a freshmen student, I wanted to be part of it, and I thought it would be cool to be belonged to a professional society that would help my life as a student.

Now, IEEE is the world largest technical professional organization dedicated to advancing technology for the benefit of humanity. I am proud and still feel honor to be an IEEE Member. Yes, I am no longer a Student Member as I had graduated. However, I continued my IEEE Membership, got my first job, and now, I am an IEEE Senior Member. Since then, I have been enjoying the benefits of my IEEE Membership.

IEEE and its members inspire a global community through its highly cited publications, conferences, technology standards, and professional and educational activities. IEEE has over 409,000 members in more than 160 countries, and there are more than 125,000 student members in the world.

Why you need to join IEEE when you are a student of an undergraduate or graduate program? During my college freshmen orientation, an Electrical Engineering Professor introduced the IEEE and told us why we should join. I was excited that the school had an IEEE Student Branch. The Student Branch gave students the opportunity to meet and learn from fellow students, as well as faculty members and professionals in your field

of interest. The Student Branch hosted numerous educational, technical, and professional advantages of IEEE membership through special projects, activities, meetings, tours and field trips.

In addition, IEEE offers a variety of scholarships for Student Members. The local IEEE Section has the funding and resources to help the Student Branch to organize events, and help student members to access to scholarships and awards. The IEEE Foundation has supported many Education events through funding, including Student Travel Grants to conferences and competitions. Overall, as a Student Member, you can connect and network with many fellow members whom share the same interests as you do, and help you build your career as a student and later on, as a young professional.

So, if you are a student, please consider becoming part of the world's largest technical organization, and join IEEE. If you a Professor, Engineer, or Scientist, who is mentoring students, please share your experience of being an IEEE member. As I know many of you are IEEE members, and your membership has helped your research and development to develop many technologies that have improved our life and the society.

To conclude, IEEE has transformed me from an ordinary student to an engineer, and to a successful professional leader. IEEE has broadened my career network and connected me to the worldwide engineering community – IEEE has shaped my life!



What + If = IEEE

420,000+ members in 160 countries.
Embrace the largest, global, technical community.

People Driving Technological Innovation.

iee.org/membership

#IEEEmember



KNOWLEDGE

COMMUNITY

PROFESSIONAL DEVELOPMENT

CAREER ADVANCEMENT

IEEE Boston Section Online Courses:

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

Electronic Reliability Tutorial Series

Full course description and registration at ,
<http://ieeeboston.org/electronic-reliability/>

High Performance Project Management

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

Introduction to Embedded Linux Part I

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

Embedded Linux Optimization - Tools and Techniques

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

Embedded Linux Board Support Packages and Device Drivers

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

Software Development for Medical Device Manufacturers

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

Fundamental Mathematics Concepts Relating to Electromagnetics

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

Reliability Engineering for the Business World

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

Design Thinking for Today's Technical Work

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

Fundamentals of Real-Time Operating Systems

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



Call for Submissions

To submit: <https://cmt3.research.microsoft.com/URTC2022>

Envisioning a technical conference targeted towards undergraduate students all over the globe, the MIT IEEE Student Branch in 2015 inaugurated the IEEE MIT Undergraduate Research Technology Conference. This year we are organizing it again with the goal to make the conference a venue where undergraduate students can meet to present, discuss, and develop solutions advancing technology for humanity. Participants can attend a rich program with renowned speakers, technical sessions, a student design competition, exhibits, networking, and social activities, presenting a great opportunity for students to interact with leading industry experts.

The conference theme is “Meet Innovative Technology”, and the eight fields of focus are:

1. Biological and Biomedical Engineering (BioEECS)
2. Circuits, Materials, and Nanotechnologies
3. Computer Systems, Theoretical Computer Science and Mathematics
4. Machine Learning / Artificial Intelligence (AI)
5. Robotics and Controls
6. Security and Communications
7. Space Application and Technologies
8. Innovation Research

Early Paper Submission Deadline	July 10, 2022
Regular Paper Submission Deadline	July 31, 2022
Regular Notification of Acceptance	August 28, 2022
Poster and Lightning Talk Submission Deadline	August 31, 2022
Poster and Lightning Talk Acceptance Notification	September 7, 2022

Authors may submit content in the form of a technical paper, poster, or lightning talk.

All submissions must be written in English. Paper submissions must be no longer than 5 pages, single-spaced, with a minimum font of 10 point, and submissions may include figures, illustrations, and graphs. Abstract submissions for the poster and lightning talk are limited to 500 words.

All submissions will be peer-reviewed. Submissions are online

Please join the mailing list (MIT-Conference@ieee.org) for more information and updates on submission, the technical program, registration, and accommodation.

A conference proceeding of all the accepted papers that have been presented at the conference may be published and included in the IEEE Xplore journal. Electronic and online media containing all accepted submissions will be distributed to all registered attendees.

Meet Innovative Technology

Sponsored by MIT IEEE Student Branch and IEEE Boston Section



Massachusetts
Institute of
Technology

<https://urtc.mit.edu/>



Consumer Technology Society Call for Volunteers!

We are currently looking for volunteers who would be interested in pushing forward the mission of the Consumer Technology (CT-S), Boston Chapter. The chapter is looking for volunteers to help organize chapter meetings and help meet the needs of the local CT-S member needs.

The Boston Section is organizing chapters into groups of similar technical interest areas to pool their resources for easier and better chapter collaboration in planning the chapter events.

If you have interest in volunteering for a chapter leadership position or are interested in learning more about what these volunteer positions may entail, please send an email to Karen Safina in the IEEE Boston Section office at, ieeebostonsection@gmail.com

Aakash Deliwala, Chair, IEEE Boston Consumer Technology Chapter

Engineering in Medicine & Biology Society Call for Volunteers!

We are currently looking for volunteers who would be interested in pushing forward the mission of the Engineering in Medicine & Biology Society (EMBS), Boston Chapter. The EMBS - Boston Chapter was recently approved in July 2021, and we're looking to make a significant impact in the area of Biomedicine, Bioengineering, and Biotechnology in the region. The chapter is looking for volunteers to help organize chapter meetings and help meet the needs of the local EMBS members.

The Boston Section is organizing chapters into groups of similar technical interest areas to pool their resources for easier and better chapter collaboration in planning the chapter events.

If you have interest in volunteering for a chapter leadership position or are interested in learning more about what these volunteer positions may entail, please send an email to Karen Safina in the IEEE Boston Section office at, ieeebostonsection@gmail.com.

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

IEEE Video Series

A collaborative discussion panel featuring esteemed members from the Institute of Electrical and Electronics Engineers has convened in 2021 to produce educational video presentations that embrace IEEE's mission of advancing technology for humanity.

Among the programs they've produced include "Electric Vehicles: Fun Saving Our Planet", "Greener Power For More Electric Vehicles", "Overcoming Nuclear Fears To Achieve Net Zero CO2 By 2050" and "Achieving a Net Zero Carbon Future", "Green Energy's Economic Progress", and "Net-Zero CO2 with Nuclear, Hydrogen and Geothermal". Projects currently in production include the expansive topic of futurology, with a focus on increasing the efficiency and transformation of aging electrical power generating stations and infrastructure to accommodate nuclear power; reviewing the viability of alternative energy (such as geothermal, wind and solar); and focusing on 'cleaner' fossil fuels that are more environmentally-friendly to slow the rate of climate change.

These shows are produced and directed by Lennart E. Long, IEEE Senior Life Member from the Executive Committee and Past Chair of the Boston Section; Dr. Paul H Carr, BS, MS, MIT; PhD Brandeis U, IEEE Life Fellow; Dr. Ted Kochanski, SB (MIT), Ph.D (U.Texas, Austin), IEEE Global Education for Microelectronic Systems and former Boston Section Chair; and Dr. Ken Laker, B.E. (Manhattan College), M.S. and Ph.D. (New York University), IEEE Life Fellow and past President of IEEE.

The panel is moderated by five-time Boston/New England Emmy Award-winner and television personality and star of "The Folklorist," John Horrigan. These video programs with presentations and discussions can be accessed at the IEEE Boston Section video portal at <https://vimeo.com/user18608275>.

We are looking for any IEEE members that would like to appear on the program in the role of presenter or discussion expert. Simply reach out to Robert Alongi at the Boston Section at, ieeebostonsection@gmail.com.

Call for 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.

Entrepreneurs' Network – 6:00PM, Tuesday, September 6

Startup Success Stories, Lessons, Pivots and Failures

Microsoft Technology Center, 5 Wayside Rd, Burlington, MA

Registration: <https://bostonenet.org/events/startup-success-stories-lessons-pivots-and-failures/>

ENET is pleased to announce the first event of our 32nd program year. This event will be held as a hybrid event! Attendees will have the option to join us in-person at the Microsoft Technology Center in Burlington, MA or online via Zoom.

Launching a successful startup can be an extraordinarily rewarding experience. Whether the goal is to create a great medical device, drug, software or some other innovative product/service, the journey to success most often is memorable, a testament to hard work, ingenuity, and leadership, and may even come with big financial rewards.

That successful entrepreneurship is a journey is an important point to reinforce. Even overnight successes rarely happen...well, overnight. Entrepreneurs usually start out with an innovative idea that leads to the startup. Once an appropriate corporate entity has been formed (C-Corp, LLC, LLP...?), the founders of the fledgling startup need to gain an understanding of the intended market and then, assuming a successful product launch, how to access that market. Along the way, there are important milestones to accomplish, including: protect intellectual property, develop a viable product, meet regulatory requirements, develop sales strategies, and build a team to do the work. The founders also need to seek funding for the startup, whether from private investors, early sales, government grants, collaborations, or other sources.

What happens when things don't go to plan? There should indeed be a plan, guided by founder experience and research, along with advice from advisers, mentors and other entrepreneurs. Advice from others can be seen as learning from other peoples' mistakes – this releases the entrepreneur to make new, original mistakes, which will become invaluable tools for the path

to success, or pivots, if needed. The persistent, successful entrepreneur knows that even failure will offer up learnings to fold into the next venture. Tonight's panelists will share stories about their entrepreneurial adventures and the lessons learned along the way.

More information:

This is a hybrid event. You may choose to participate in-person or online.

In-person Participation (check-in begins at 6:00 PM):

LOCATION: Microsoft Technology Center, 5 Wayside Road, Burlington, MA 01803.

PARKING: Free parking is available.

REFRESHMENTS: Cheese, crackers, chips, cookies, soft drinks & juice will be served.

COVID POLICY: You are required to provide proof of vaccination or self-attest to having received a negative COVID-19 test within the previous week via HealthCheck. Attendees who do not upload proof of vaccination must wear a face covering onsite.

Online Participation:

Zoom links will be sent to all registrants after registration.

COST AND RESERVATIONS: This event is free for ENET members and \$10 for non-members. Click [here](#) to learn how to become a member. To expedite sign-in for the event, we ask that everyone — members as well as non-members — pre-register. Pre-registration is available until midnight the day before the meeting. If you cannot pre-register, you are welcome to register in person at the door while seats are available.

Event Schedule

6:00 pm Networking

7:00 pm Introduction, ENET Chairperson's announcements

7:10 pm eMinute Pitch, up to 3 startup pitches

7:25 pm Expert Panel, 4 expert speakers on the night's topic

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

8:30 pm Networking, panelists will be available af-

terward for responses to individual questions.

Panel:



Richard Fauconier, PhD, Co-founder Precisix, LLC

Dr. Richard Fauconier is a co-founder of Precisix, LLC, where he is in charge of its consulting and product development arm. Precisix's other arm is a logistics operation. Dr. Fauconier is also a co-inventor of a multi-laser device for the stand-off chemical recognition of substances on surfaces. He holds 2 patents in this field, and currently leads a Precisix team working on contractual modifications to the laser device, under the auspices of the Department of Homeland Security. In addition, he is the author or co-author of several technical papers, mostly in the disciplines of radar and substance-on-surface chemical recognition. Dr. Fauconier follows a duality principle in his work, in which entrepreneurship and engineering go hand in hand, neither sufficient by itself, and both equally necessary.

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

Bonnie Fendrock, MS, MBA, Co-Founder and CEO
Cyta Therapeutics



Bonnie Fendrock is a biotech executive and entrepreneur. She is currently the founding CEO of Cyta Therapeutics, an early-stage spin-out from UMass, Amherst focused on developing new drugs for obesity, cardiometabolic disorders and liver diseases. Prior to founding Cyta, Bonnie was CEO, Co-founder and Board Member of Hepregen Corporation, a venture backed, commercial stage, MIT spin-out which developed products and services used by biotech and pharmaceutical companies in the drug development process. She continues to be an advisor at Red Sky Partners, a boutique consulting firm providing corporate development, product strategy and leadership support to life sciences companies. With thirty years of experience in biotech, Bonnie has a general management background and has held roles in corporate and business development, marketing and program management from foundational and high growth biotechnology companies including Genzyme, Somatix, and Genetics Institute.

Bonnie is a current member of the Commercialization

Advisory Committee of Gloucester Marine Genomics Institute (GMGI) and just joined the Board of Directors for Wellspring House in Gloucester. Bonnie is passionate about supporting individuals on their path to financial independence and career success. As such, she has volunteered her time and skills as a mentor and advisor throughout her career. Bonnie served as a Director on the Boston Chapter Board of the Healthcare Businesswomen's Association (HBA) for five years and volunteers as a mentor to entrepreneurs through The Deshpande Center at MIT and other organizations. In 2012, Bonnie was honored along with other innovation leaders as one of the Mass High Tech 'Women to Watch'. Prior to business school, she worked in research and product development at Integrated Genetics and Centocor. Bonnie received a BA, Molecular Biology from Wellesley College, a MS, Interdisciplinary Science from MIT and a MBA from The Wharton School, University of Pennsylvania as a Management of Technology Fellow. <https://www.linkedin.com/in/bonniefendrock-ms-mba/>



Enrique Shadah, MBA, Founding Director and President, Expert Collective Cooperative
An expert in all aspects of the process of venture creation, Enrique has founded and led startups, advised sellers and buyers in M&A transactions, and spearheaded industrial collaborations and spin-offs in academia. Enrique

currently serves as the founding Director of the Expert Collective Cooperative, an organization focused on advising business and technology leaders translate knowledge into digital and physical products and services that have positive socio-economic and environmental impact. He also holds an appointment at the MIT LinQ program for biomedical innovation, housed within MIT's Institute for Medical Engineering and Sciences, in which he focuses on managing venture and industrial relations.

At MIT, Enrique developed expertise in leading a community of academics, practitioners and professionals to create win-win collaborations. For example, Enrique was the conceptual creator of MIT's Startup Exchange, an online platform that enables interactions between MIT's Industrial Liaison Program's corporate members and MIT-connected startups (<http://startupexchange.mit.edu>) and remains an active mentor in the MIT startup community.

For most of his tenure at the Institute, Enrique has held industry-facing positions including Head of the Workplace Learning Collaborative at MIT's Abdul Latif Jameel World Education Lab (J-WEL; <http://jwel.mit.edu>) and Senior Industrial Liaison Officer at the Office of Corporate Relations.

Enrique earned a Master in Business Administration from Babson College in Wellesley, Massachusetts (Magna Cum Laude) and a Bachelor of Science Degree in Mechanical Engineering from Universidad Simón Bolívar in Caracas, Venezuela. Enrique is fluent in English and Spanish and has basic knowledge of Portuguese.

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



Isaac Stoner, PhD, MBA, Co-Founder and CEO Octagon Therapeutics

Isaac Stoner is the co-founder and CEO of Octagon Therapeutics, a drug discovery company focused on targeted first-in-class medicines for severe autoimmune disease.

He has been in technical leadership roles at a variety of early stage life sciences startups including Firefly BioWorks (acquired in 2014) and Ion Torrent (acquired in 2010), and gained venture capital experience

at GlaxoSmithKline, PureTech Health, and KdT Ventures. Isaac earned an MBA at MIT and a degree in biomedical engineering at Brown University.

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



Roger Frechette, PhD, Principal and Founder, NEPAssociates, LLC

Roger is a life sciences consultant/advisor, helping early-stage life science companies to succeed and to grow. His work with clients leverages an extensive global network and multi-disciplinary insights derived from >20 years of experience in the business of life sciences, calibrated with an extensive science background. His career has encompassed success as a business executive, project/alliance manager and entrepreneur, and as a scientist, including leadership of discovery/preclinical development teams resulting in two FDA approved therapeutics. Roger has been a volunteer with Boston ENET since 2014, in addition to supporting start-ups as a mentor with MassBio, and other Greater Boston Area entrepreneur support groups. He also a mentor with 12Ronnies, a global early-stage startup mentorship organization.

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

Advertise with us!!!

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

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

IEEE Boston Section Rate Card <http://ieeeboston.org/advertise-ieee-boston-section/>

IEEE Boston Media Kit <http://ieeeboston.org/advertise-ieee-boston-section/>

Contact IEEE Boston Section at ieeebostonsection@gmail.com for more information on rates for Online Advertising

Robotics and Automation Society – 5:30PM, Tuesday, September 13

Multi-Agent Coordination from High-Level Specifications

Dr. Kevin Leahy, MIT Lincoln Laboratory



Many existing approaches for coordinating heterogeneous teams of robots either consider small numbers of agents, are application-specific, or do not adequately address common real-world requirements, e.g., strict deadlines or intertask dependencies. We introduce scalable and robust algorithms for task-based coordination

from high-level specifications (ScRATChES) to coordinate such teams. We define a specification language, capability temporal logic, to describe rich, temporal properties involving tasks requiring the participation of multiple agents with multiple capabilities, e.g., sensors or end effectors. Arbitrary missions and team dynamics are jointly encoded as constraints in a mixed integer linear program, and solved efficiently using commercial off-the-shelf solvers. ScRATChES optionally allows optimization for maximal robustness to agent attrition at the penalty of increased computation time. We include an online replanning algorithm that adjusts the plan after an agent has dropped out. The flexible specification language, fast solution time, and optional robustness of ScRATChES provide a first step toward a multipurpose on-the-fly planning tool for tasking large teams of agents with multiple capabilities enacting missions

with multiple tasks. We present randomized computational experiments to characterize scalability and hardware demonstrations to illustrate the applicability of our methods.

Dr. Kevin Leahy is a technical staff member in the Artificial Intelligence (AI) Technology Group at MIT Lincoln Laboratory. His current work involves AI for autonomous systems, with an emphasis on formal methods and multi-agent systems. His previous work at MIT Lincoln Laboratory focused on a variety of domains, including learning decentralized control strategies for multi-agent systems, researching collision avoidance in aviation, and planning for heterogeneous teams from high-level specifications. Dr. Leahy received his BA degree in economics and MS and PhD degrees in mechanical engineering from Boston University. He currently serves as Junior Co-chair on the IEEE Technical Committee for Verification of Autonomous Systems.

Location: MassRobotics, 12 Channel Street, Boston, MA 02210

Registration: <https://www.eventbrite.com/e/multi-agent-coordination-from-high-level-specifications-tickets-402377159917?aff=ebdssbdestsearch>

IEEE Boston Section Social Media Links:

Twitter: <https://twitter.com/ieeeboston>

Facebook: <https://www.facebook.com/IEEEBoston>

YouTube: <https://www.youtube.com/user/IEEEBostonSection>

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

Computer Society and GBC/ACM – 7:00PM, Thursday, September 15

Programming is (should be) fun!

Gerald Jay Sussman, MIT

Register in advance for this webinar at https://acm-org.zoom.us/webinar/register/6416598165396/WN_rytdvV-vQ2u8l9olCZzXBg. After registering, you will receive a confirmation email containing information about joining the webinar.

Programming is not coding! Programming is a medium for creative expression. Composing a good program can be an esthetic experience similar to writing a story, a piece of music, or poetry.

A good programming experience is an exploration of abstract design. A successful design requires careful choice of the levels of detail for each layer of a programming project. Some of these choices involve classical issues of philosophy, such as the status of referents of expressions, the meaning of quotation, the problems with negation, the power of self-reference, and the use (and danger) of abstraction. Well-composed programs can be effective at expressing emotional content as well. There are the beauties of symmetrical design, and the horrors of ugly kludges.

All programs have bugs, even ones that meet given specs (because the specs are always incomplete or inconsistent). Bugs are inevitable because the creation of buggy approximations is a crucial part of the design process. Thus, it is more effective to make systems that are debuggable than to try to make systems that are correct by construction.

In any case, we must keep the fun in programming and not allow it to become a tedious job.

Gerald Jay Sussman is the Panasonic (formerly Matsushita) Professor of Electrical Engineering at the Massachusetts Institute of Technology. He received the S.B. and the Ph.D. degrees in mathematics from the Massachusetts Institute of Technology in 1968 and 1973, respectively. He has been involved in artificial intelligence research at M.I.T. since 1964. His research has centered on understanding the problem-solving strategies

used by scientists and engineers, with the goals of automating parts of the process and formalizing it to provide more effective methods of science and engineering education. Sussman has also worked in computer languages, in computer architecture and in VLSI design.



Sussman is a coauthor (with Hal Abelson and Julie Sussman) of the introductory computer science textbook used at M.I.T. for 23 years. The textbook, "Structure and Interpretation of Computer Programs," has been translated into French, German, Chinese, Polish, Japanese, and Korean. As a result of this and other contributions to computer-science education, Sussman received the ACM's Karl Karlstrom Outstanding Educator Award in 1990, and the Amar G. Bose award for teaching in 1992.

Sussman's contributions to Artificial Intelligence include problem solving by debugging almost-right plans, propagation of constraints applied to electrical circuit analysis and synthesis, dependency-based explanation and dependency-based backtracking, and various language structures for expressing problem-solving strategies. Sussman and his former student Guy L. Steele Jr. invented the Scheme programming language in 1975.

Sussman saw that Artificial Intelligence ideas can be applied to computer-aided design. Sussman developed, with his graduate students, sophisticated computer-aided design tools for VLSI. Steele made the first Scheme chips in 1978. These ideas and the AI-based CAD technology to support them were further developed in the Scheme chips of 1979 and 1981. The technique and experience developed was then used to design other special-purpose computers. Sussman was the principal designer of the Digital Orrery, a machine designed to do high-precision integrations for orbital-mechanics experiments. The Orrery was designed and built by a few people in a few months, using AI-based simulation and compilation tools.

Using the Digital Orrery, Sussman worked with Jack Wisdom to discover numerical evidence for chaotic motions in the outer planets. The Digital Orrery is now retired at the Smithsonian Institution in Washington DC. Sussman was also the lead designer of the Supercomputer Toolkit, another multiprocessor computer optimized for evolving systems of ordinary differential equations. The Supercomputer Toolkit was used by Sussman and Wisdom to confirm and extend the discoveries made with the Digital Orrery to include the entire planetary system. Sussman has pioneered the use of computational descriptions to communicate methodological ideas in teaching subjects in Electrical Circuits and in Signals and Systems. Over the past decades Sussman and Wisdom have developed a subject that uses computational techniques to communicate a deeper understanding of advanced Classical Mechanics. Computational algorithms are used to express the methods used in the analysis of dynamical phenomena. Expressing the methods in a computer language forces them to be unambiguous and computationally effective. Students are expected to read our programs and to extend them and to write new ones. The task of formulating a method as a computer-executable program and debugging that program is a powerful exercise in the learning process. Also, once formalized procedurally, a mathe-

matical idea becomes a tool that can be used directly to compute results. Sussman and Wisdom have produced a textbook, "Structure and Interpretation of Classical Mechanics," and a monograph, "Functional Differential Geometry," to capture these ideas. The textbook is now in a second edition.

Sussman is a life fellow of the Institute of Electrical and Electronics Engineers (IEEE). He is a member of the National Academy of Engineering (NAE), a fellow of the American Association for Artificial Intelligence (AAAI), a fellow of the Association for Computing Machinery (ACM), a fellow of the American Academy of Arts and Sciences, and a fellow of the American Association for the Advancement of Science (AAAS).

This joint meeting of the Boston Chapter of the IEEE Computer Society and GBC/ACM will be online only due to the COVID-19 lockdown

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

Call for Articles

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

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

Professional development or general interest articles should have broad applicability to the engineering community and should not explicitly promote services for which a fee or pay-

ment is required. A maximum length of two to three pages would be best.

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

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

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

Submissions should be sent to;
ieeebostonsection@gmail.com

Entrepreneurs' Network – 6:00PM, Tuesday, September 20

Essential Tips for Startup Networking and Communications

Location: Microsoft Technology Center, 5 Wayside Rd, Burlington, MA

Registration: <https://bostonenet.org/events/essential-tips-for-startup-networking-and-communications/>

Attendees will have the option to join us in-person at the Microsoft Technology Center in Burlington, MA or online via Zoom.

While the notion of the “SELF MADE ENTREPRENEUR” is often used to describe successful startup founders, this is not really an accurate description of a typical company Founder (or Co-Founder). The reality: entrepreneurship is a team sport. Every new entrepreneur needs help – help from advisors, mentors, co-founders, early team member hires (and later hires), investors, business partners, lawyers, contractors, etc. Even seasoned, serial entrepreneurs need help.

How does our intrepid entrepreneur find the right people to help with different insights and activities at each stage of a startup's development? The simple answer: founders have to share their startup story – in person, by email and phone, by social media messaging and outreach, by press releases to local, national and global outlets, etc. Whether a profound introvert or a gregarious extrovert, or anything in between, telling a compelling story is an essential tool for collecting all of the people and companies that will be needed to succeed as a “self-made entrepreneur”. Join our panel of expert communicators to learn how the Pro's do it.

More information:

This is a hybrid event. You may choose to participate in-person or online.

In-person Participation (check-in begins at 6:00 PM):

LOCATION: Microsoft Technology Center, 5 Wayside Road, Burlington, MA 01803.

PARKING: Free parking is available.

REFRESHMENTS: Pizza will be served

COVID POLICY: You are required to provide proof of vaccination or self-attest to having received a negative COVID-19 test within the previous week via HealthCh-

eck. Attendees who do not upload proof of vaccination must wear a face covering onsite.

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

COST AND RESERVATIONS: This event is free for ENET members and \$10 for non-members. Click here to learn how to become a member. To expedite sign-in for the event, we ask that everyone — members as well as non-members — pre-register. Pre-registration is available until midnight the day before the meeting. If you cannot pre-register, you are welcome to register in person at the door while seats are available.

Event Schedule

September 20, 2022

6:00 pm Networking

7:00 pm Introduction, ENET Chairperson's announcements

7:10 pm eMinute Pitch, up to 3 startup pitches

7:25 pm Expert Panel, 4 expert speakers on the night's topic

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

8:30 pm Networking, panelists will be available afterward for responses to individual questions.



Lauren Perna, CEO, Head Writer, Lauren Perna Communications

Lauren Perna is the CEO and Lead Writer of Lauren Perna Communications, a Boston-based writing company that focuses on content creation and copywriting for clients in the life sciences, healthcare, and mental health

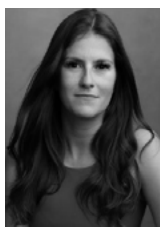
industries. They also specialize in LinkedIn content creation and training.

Lauren started her company in 2020 after several years of freelancing. Before that, she spent nine years at MassBio, where she led initiatives to help life sciences companies raise their visibility. She is deeply engaged with her community as an elected Town Meeting Member, a Chapter Leader for the Women's Business

League Neponset Valley Chapter, and a Board Member for the Dedham Square Circle. Lauren is also a published mental health writer and fierce advocate for mental health awareness and care.

Lauren received her Bachelor of Arts from Fordham University. She also holds a certificate in Digital Marketing and completed the Emerging Leaders Program from UMass Boston. Lauren lives in Dedham, MA, with her partner, his son, and their dog. She enjoys spending time at their vacation house in the Lakes Region of NH.

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



Danielle Silva, Assistant VP. Capital Advisors Group

Danielle Silva is Assistant Vice President at Capital Advisors Group (CAG). CAG is an institutional investment advisor that helps companies manage their corporate cash. Additionally, the firm assists companies in securing debt funding. Danielle focuses on business development in the Northeast and Mid Atlantic regions for life science and tech companies. Prior to CAG, Danielle led life science business development for SVB Analytics, which was the buy-side advisory and valuations group at Silicon Valley Bank. Danielle was also one of the founders of Life Science Nation, a company that helps early-stage life science companies raise equity funding. Danielle began her career at Brighton House Associates where she raised capital for alternative investment vehicles such as venture capital, private equity, and hedge funds.

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



Diane Darling, Principal Consultant, Coach, Author & Professional Speaker

To overcome her fear of public speaking, Diane Darling took acting and stand-up comedy classes. That out-of-the-box and strategic mindset have been a contributing factor to her success. She was even the commencement speaker at MIT Charm School (yes, there is such a thing).

McGraw-Hill commissioned her to write the definitive book on networking called *The Networking Survival Guide*, which was published in April 2003 and went into a 2nd printing just 90 days after the book hit the shelves. Her books are collectively in 9 languages.

Her travels include all seven continents and approximately 60 countries. She has lived in the Philippines, Thailand, Colorado, Indiana, Washington DC, Alabama and now in Boston, MA. She is a member of the Chief Executive's Club of Boston, is the past president for the Association for Talent Development in Boston, and a founding member of 20/20 Women on Board.

Her hobbies include traveling, watching football, reading, knitting, learning new technologies, attempting to play tennis, and camping in Maine.

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



Magdalena Leszczyniecka, PhD, MBA, President and CEO, STC Biologics

Magdalena founded STC Biologics Inc. in 2009 with a goal to bring biosimilar products to patients who cannot afford branded equivalents. Since 2009, STC has worked on four biosimilar antibody products, some being developed in-house and others for STC's partners. Magdalena has a broad drug development experience in small molecules and various biologics; she gained start up experience prior to STC working for venture capital firms: Flagship Ventures and Atlas Ventures. She has led the development of MM-121 and anti-HER3 antibody programs at Merrimack Pharmaceuticals. In 2002, she started her scientific career at Novartis Pharmaceuticals as a project leader for two oncology development products. She received her Ph.D. from a joined program between Columbia University and NYU, an MBA from Babson College, and a B.S in Biochemistry from Rutgers University.

<https://www.linkedin.com/in/magdalena-leszczyniecka-phd-mba-8b64b83/>



Roger Frechette, PhD, Principal and Founder, NEPAssociates, LLC

Roger is a life sciences consultant/advisor, helping early-stage life science companies to succeed and to grow. His work with clients leverages an extensive global network and multi-disciplinary insights derived from >20 years of experience in the business of life sciences, calibrated with an extensive science background. His career has encompassed success as a business executive, project/alliance manager and entrepreneur, and as a scientist, including leadership of

discovery/preclinical development teams resulting in two FDA approved therapeutics. Roger has been a volunteer with Boston ENET since 2014, in addition to supporting start-ups as a mentor with MassBio, and other

Greater Boston Area entrepreneur support groups. He also a mentor with 12Ronnies, a global early-stage startup mentorship organization.

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

IEEE Boston Section Social Media Links:

Twitter: <https://twitter.com/ieeeboston>

Facebook: <https://www.facebook.com/IEEEBoston>

YouTube: <https://www.youtube.com/user/IEEEBostonSection>

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

Microwave Theory & Technology Society and Young Professionals – 6:00PM, Tuesday, September 20

Dual-Band and Broadband RF Power Amplifiers for Concurrent Signal Transmission

Philip Zurek of MIT Lincoln Laboratory

Location: Hybrid - Virtual: Zoom link TBA

On-Site: The Hubble Auditorium, Analog Device located at 1 Analog Wy, Wilmington, MA 01887

Broadband power amplifiers (PAs) are becoming increasingly important for communications and radar; however, the performance of a broadband PA is degraded when it amplifies concurrent signals. In this work, two different PA design approaches are studied with concurrent signals: (1) a single-ended dual-band design; and (2) a broadband diplexed PA architecture. Implementations in both cover 2-18 GHz in aggregate as hybrid and MMIC demonstrations with GaAs and GaN technologies. Results indicate that both PAs can achieve similar power and efficiency as compared to

standard broadband PAs, whereas linearity can be improved and/or simplified using these approaches.

Philip Zurek received the B.S. degree in electrical engineering from the New Jersey Institute of Technology, Newark, NJ, USA, in 2016, the M.S. degree, and the Ph.D. degree in electrical engineering from the University of Colorado, Boulder, CO, USA, in 2018 and 2021, respectively. He is currently a member of the technical staff at the MIT Lincoln Laboratory, with research interests including high-efficiency and broadband power amplifier design and architectures.

Registration: <https://events.vtools.ieee.org/m/321382>

Aerospace and Electronic Systems Society – 6:00PM, Wednesday, September 28

The Future of Remote Work: AI-enabled Employee Engagement Optimization

Speaker: Dr. Furkan Eris, Spiky.ai



During the COVID-19 pandemic many companies had to adapt to a new remote-work setting. This forced employers and employees to quickly implement a distributed workforce model. Because some companies directly saw the unexpected benefits of this new working arrangement in the form of higher productivity and lower costs, they decided to permanently shift to part-time remote operations. On the other hand, churns numbers increased to all-time highs with employees gaining the capability of switching their jobs to a remote arrangement without having to relocate. Companies are now at a crossroad and must make hard and quick decisions on the path forward to improve remote productivity, increase employee satisfaction, limit churns, and reduce costs. In this presentation we introduce a new platform adopting AI-enabled algorithms that improve remote meetings effectiveness and remote teams' productivity. These algorithms are being successfully integrated into established and widely used platforms such as Zoom and Webex.

Bio: Dr. Furkan Eris (<https://www.linkedin.com/in/furkan-eris/>) graduated from Bogazici University in Istanbul, Turkey, in 2016 with a dual degree in Electrical & Electronics Engineering and Physics. He moved to Boston and earned a Ph.D. in applied Machine Learning from Boston University, building algorithms to design and adapt computing systems, namely CPUs. Throughout his Ph.D., he has worked along with AMD and AMD Research which led to several patents (4) and publications (11).

Dr. Eris founded Spiky.ai in 2022. Spiky.ai is a quickly growing Techstars-backed startup focused on applying runtime machine learning to generate conversational and emotional metrics to generate EQ metrics for companies. Spiky.ai is VC-backed, working with companies such as Zoom, Cisco Webex, Microsoft teams, Udemy, and Disney. The company has grown to 25+ people in 1 year.

Registration: https://ieeeboston.org/event/the-future-of-remote-work-ai-enabled-employee-engagement-optimization/?instance_id=3323

IEEE Boston Section Social Media Links:

Twitter: <https://twitter.com/ieeeboston>

Facebook: <https://www.facebook.com/IEEEBoston>

YouTube: <https://www.youtube.com/user/IEEEBostonSection>

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

2022 IEEE International Symposium on Phased Array Systems and Technology

Revolutionary Developments in Phased Arrays



11–14 October 2022
The Westin Waltham Boston
Waltham, Massachusetts, USA



Sponsors

Platinum

MITRE



BAE SYSTEMS



Technical



Media



Conference Registration

Register by September 1st for Discounted Fees

see www.array2022.org for details

About the Symposium

Phased array systems continue to be a rapidly evolving technology with steady advances motivated by the challenges presented to modern military and commercial applications. This symposium will present the most recent advances in phased array technology and present a unique opportunity for members of the international community to interact with colleagues in the field of Phased Array Systems and Technology.

Note: there will be a virtual component of the conference to accommodate potential travel restriction or concerns due to COVID19

Plenary Speakers

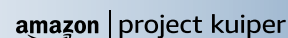
- Alfonso Farino – Consultant to Leonardo S.p.A.
- Tom Dalrymple – Air Force Research Laboratory Sensors Directorate
- Gabriel Rebeiz – University of California San Diego
- Robert Palmer – Oklahoma University Advanced Radar Research Center
- Israel Lupa – Elta
- Ellen Ferraro – Raytheon

Special Sessions

- European Phased-Arrays Systems and Technology
- Low Frequency Arrays
- Intelligent Arrays
- SATCOM Arrays
- Weather Arrays
- Wideband 3D-Integrated mmWave Array Tiles

Sponsors

Gold



Silver



Bronze



Advertise with us!!!

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

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

IEEE Boston Section Rate Card <http://ieeeboston.org/advertise-ieee-boston-section/>

IEEE Boston Media Kit <http://ieeeboston.org/advertise-ieee-boston-section/>

Contact IEEE Boston Section at ieeebostonsection@gmail.com for more information on rates for Online Advertising

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.

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

Web-based Course with live Instructor!

Times & Dates: 9AM - 12:30PM ET, Saturday, October 15

Speaker: CL Kim

Course Format: Live Webinar, 3 hours of instruction!

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

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: Reference book: “Neural Networks and Deep Learning” by Michael Nielsen, <http://neuralnetworksanddeeplearning.com/> 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
Monday, October 10, 2022**

IEEE Members	\$110
Non-members	\$130

https://ieeeboston.org/event/neuralnetworks/?instance_id=3285

Call for Articles

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

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

Professional development or general interest articles should have broad applicability to the engineering community and should not explicitly promote services for which a fee or payment is required. A

maximum length of two to three pages would be best.

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

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

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

Submissions should be sent to;
ieeebostonsection@gmail.com

Python Applications for Digital Design and Signal Processing

Dates & Times: Live Workshops: 6:00 - 7:30PM ET; Tuesdays, Sept. 13, 20, 27, Oct. 4
First Video Release, September 7, 2022, 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 Wednesday, September 7, 2022 in advance of and in preparation for the first live workshop session.

Attendees will have access to the recorded session and exercises for two months (until December 4, 2022) after the last live session ends!

New Format with Pre-Recorded Videos: The course format has been updated to release 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 - 7pm on the dates listed below:

Class 1

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

Class 2

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

Class 3

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

Class 4

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

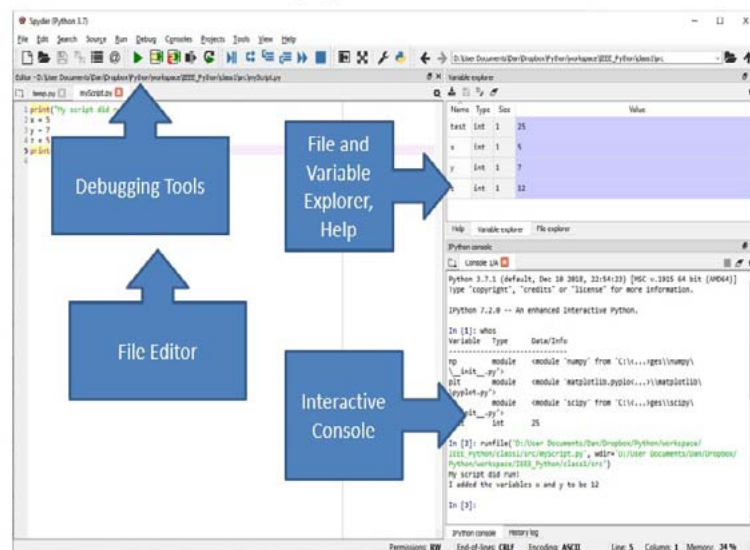
Speaker's Bio: Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing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

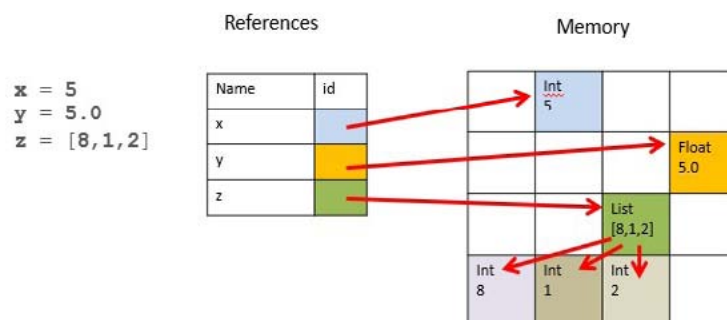
Decision (Run/Cancel) Date for this Course is Friday, September 2, 2022

IEEE Members \$190
Non-members \$210

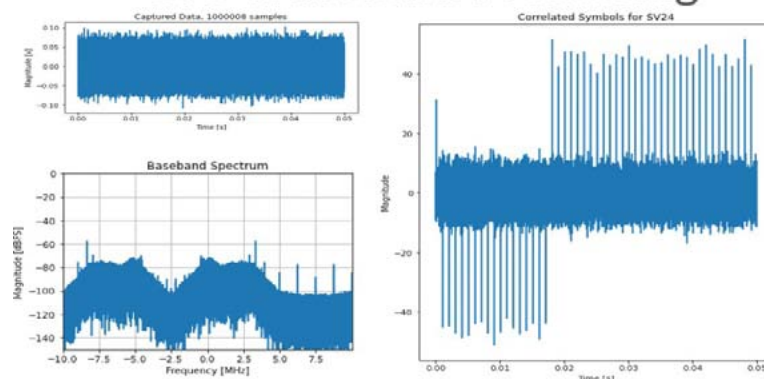
Spyder IDE



Mutable / Immutable



GPS Waveform Processing



Call for Papers (Deadline extended to July 15, 2022)



Co-Sponsor:



2022 IEEE Virtual International Symposium on Technologies for Homeland Security

November 14–15, 2022 • information@ieee-hst.org

Call for Papers

We are pleased to announce that the 21st Annual IEEE Symposium on Technologies for Homeland Security (HST '22), will be held November 14–15, 2022 as a virtual event. This symposium will bring together innovators from leading academia, industry, businesses, Homeland Security Centers of Excellence, and government agencies to provide a forum to discuss ideas, concepts, and experimental results.

HST is produced by IEEE with technical and organizational support from IEEE, IEEE Boston Section, IEEE-USA, MIT Lincoln Laboratory, and Raytheon Technologies. This year's event will once again showcase selected technical papers highlighting emerging technologies in the following areas:

Border Security, Critical Infrastructure
Protection, and Law Enforcement

Climate Change and
Homeland Resilience

Cyber Security

Frontier and
Emerging Technologies

We are currently seeking technical paper submissions in the above areas. This year, the Homeland Security Technology community has come together to respond and develop technology to address the challenges of COVID-19 and we anticipate HST'22 to reflect that focus. Accordingly, all areas are inclusive of technologies related to the global COVID-19 pandemic. Papers examining the feasibility of transition to practice will also be considered. All areas will cover the following common topics:

- Strategy, threat characterization, operational concepts, and risk analysis;
- Modeling, simulation, experimentation, exercises & training; and
- Testbeds, standards, performance, and evaluations.

Contact Information

For more detailed information on the Call for Papers, as well as Sponsorship and Exhibit Opportunities, visit the website: <http://ieee-hst.org/> or email: info@ieee-hst.org. Submissions should be sent to the following website: <https://cmt3.research.microsoft.com/HST2022/>

Important Dates (All deadlines are by midnight Eastern Standard Time)

Paper Extended Abstract Deadline: **July 15, 2022 (extension)**
 Paper Acceptance Notification: August 15, 2022
 Final Paper Submission Deadline: October 15, 2022

Organizing Committee

General Chair: James Flavin, MIT Lincoln Laboratory
 Technical Chairs: Gerald Larocque, MIT Lincoln Laboratory
 Anthony Serino, Raytheon
 Local Arrangement Chair: Bob Alongi, IEEE Boston
 Sponsorship/Exhibits Chair: Bob Alongi, IEEE Boston
 Special Advisor to the Chair: Lennart Long, EMC Consultant
 Registration Chair: Karen Safina, IEEE Boston

Technical Program Committee

*Climate Change and
Homeland Resilience*
 John Aldridge, MIT Lincoln Laboratory
 Deborah Campbell, MIT Lincoln Laboratory
 Lance Fiondella, UMass Dartmouth

*Border Security, Critical
Infrastructure Protection,
and Law Enforcement*
 Bengt Borgstrom, MIT Lincoln Laboratory
 Rich Moro, Raytheon
 Arash Samani, Systems & Technology Research

Cyber Security
 Hong Liu, UMass Dartmouth
 Firas Glaiel, Raytheon
 Thomas Edgar, Pacific Northwest National Laboratory

Digital Signal Processing (DSP) for Software Radio

Dates & Times: Live Workshops: 1:00 - 2:30PM EST; Saturdays, Jan. 28, Feb. 4, 11, 18, 25
First Video Release, January 21, 2023, additional videos released weekly in advance of that week's live session!

Speaker: Dan Boschen

Location: Zoom

Course Information will be distributed on Wednesday, January 21, 2023 in advance of and in preparation for the first live workshop session.

Attendees will have access to the recorded session and exercises for two months (until April 25) 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

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:

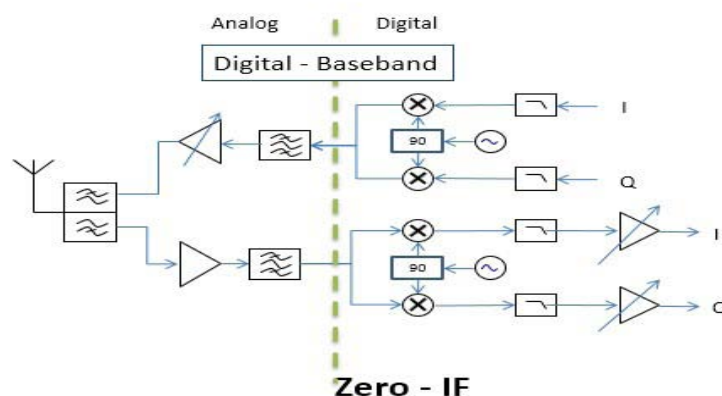
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing 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
Monday, January 16, 2023**

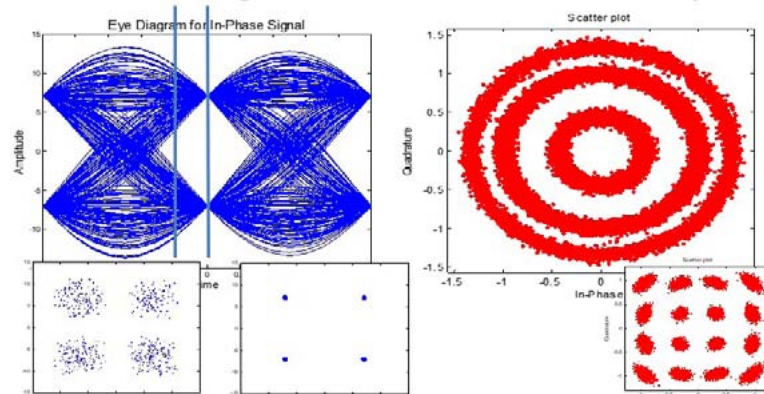
IEEE Members	\$190
Non-members	\$210

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

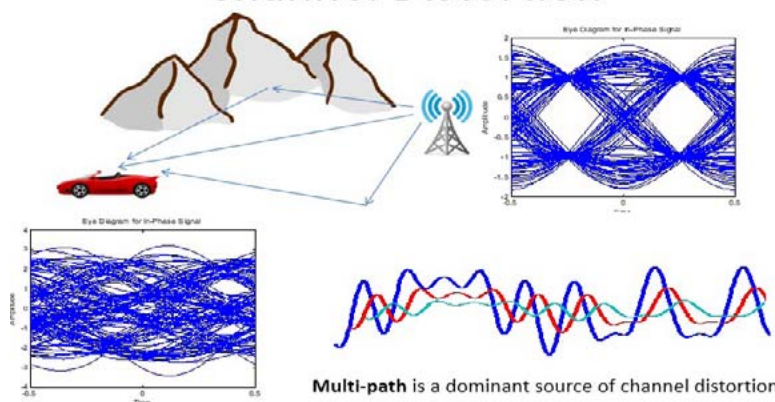
Radio Architectures



Timing and Carrier Recovery



Channel Distortion



DSP for Wireless Communications

Dates & Times: Live Workshops: 1:00 - 2:30PM ET, Saturdays, Oct. 22, 29, Nov. 5, 12, 19
First Video Release, October 15, 2022, additional videos released weekly in advance of that week's live session!

Speaker: Dan Boschen

Location: Zoom Webinar

New Format Combining Live Workshops with Pre-recorded Video - This is a hands-on course providing pre-recorded lectures that students can watch **on their own schedule** and an **unlimited number of times** prior to live Q&A/Workshop sessions with the instructor. Ten 1.5 hour videos released 2 per week while the course is in session will be available for up to two months after the conclusion of the course...until January 19, 2023.

Course Summary

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

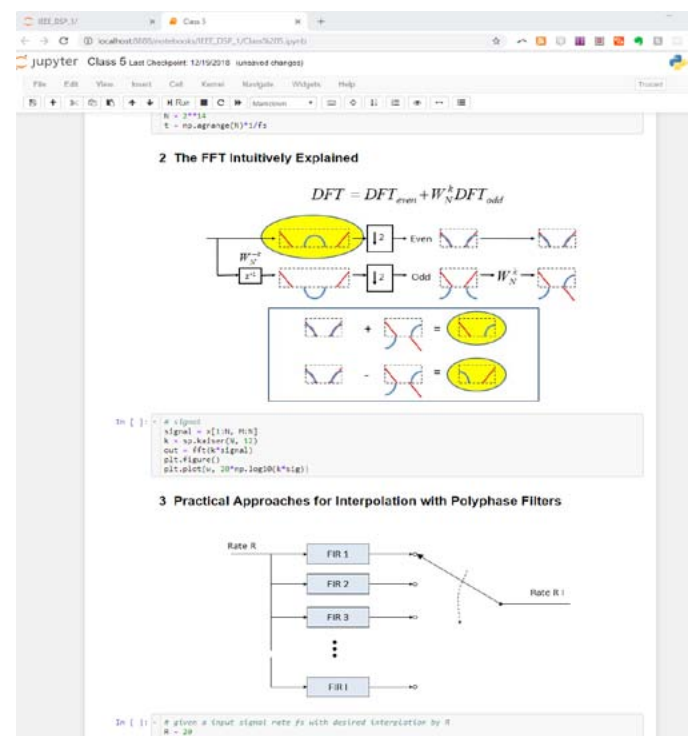
Now with Jupyter Notebooks!

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

This course will not be teaching Python, but using it for demonstration. A more detailed course on Python itself

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

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



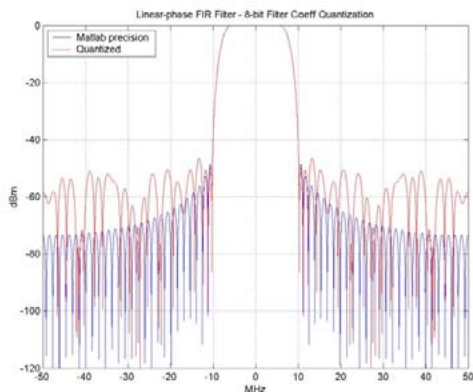
Target Audience:

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

Benefits of Attending/ Goals of Course:

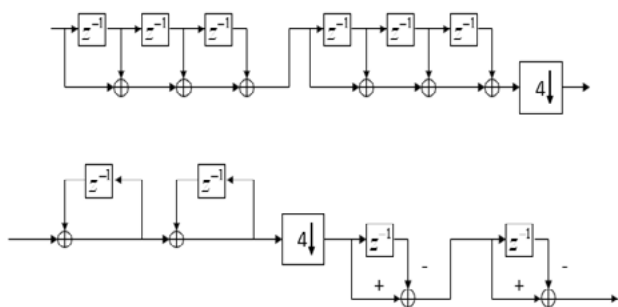
Attendees will build a stronger intuitive understanding of the fundamental signal processing concepts involved

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



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.

Multi-stage CIC

**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

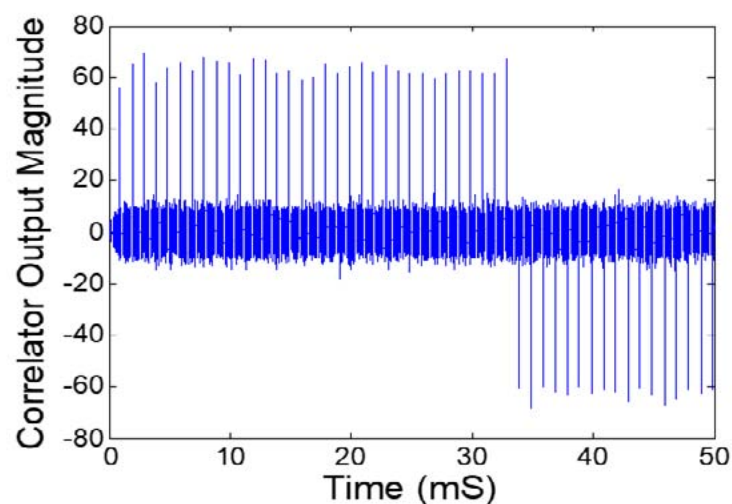
Class 5: Fast Fourier Transform, Multi-rate Signal Processing, Multi-rate Filters

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>

Sliding Correlation



**Decision (Run/Cancel) Date for this Course is
monday, october 10, 2022**

IEEE Members	\$190
Non-members	\$210

Practical RF PCB Design, Wireless Networks, Products and Telecommunications

Time & Date: 9:00AM - 4:30PM, Wednesday & Thursday, January 4 & 5, 2023
(13 hours of instruction!)

Speaker: Henry Lau, Lexiwave Technology

Location: Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA

Overview: One of the most demanding consumer products in the market is the wireless telecommunication product. A well-designed Radio Frequency Printed Circuit Board (RF PCB) contributes significantly to the success of any wireless product as the layout of the PCB greatly affects the performance, stability and reliability of the product. In today's highly competitive wireless products market with increasingly compressed development time-frame, there is a strong demand for RF professionals who possess the knowledge and experience to design top-performing RF PCBs in less number of iterations. What matters is whether your level of competence is up to the required standard to meet such demand.

Audience: RF Designers, Wireless Product Designers, Field Application Engineers, Design Managers and related professionals.

Benefits: This course aims to provide participants with an insightful training on RF PCB design from a practical, industrial perspective. Participants will be led through a systematic, theoretical presentation with case studies on commercial products in the training. The course will be conducted by an RF expert with rich industrial experience. It is suitable for RF professionals who want to keep up-to-date their skills and knowledge in RF PCB design and stay competitive.

OUTLINE

1. Printed circuit board design for RF circuits

From product design, circuit design to PCB design
Layer stack-up assignment
Grounding methods and techniques
Interconnects and I/O
Bypassing and decoupling
Partitioning methods

2. Printed circuits board design for other circuits

Clock circuits
Base-band circuits
Audio circuits
Power supplies
Impedance-controlled circuits

3. PCB design for EMC/EMI compliance

EMC/EMI compliance
Grounding methods
Decoupling methods
Shielding methods

4. Additional Design Techniques

Production concerns
Systematic product design approach
RF Modules
Evaluation boards
Other RF concerns
Casing design

5. Case studies

Expertise:

Henry Lau received his M.Sc. and MBA degrees from UK and USA respectively. He has more than 25 years of experience in designing RF systems, products and RFICs in both Hong Kong and US. He worked for Motorola and Conexant in US as Principal Engineer on developing RFICs for cellular phone and silicon tuner applications. Mr Lau holds five patents all in RF designs. He is currently running Lexiwave Technology, a fables semiconductor company in Hong Kong and US designing and selling RFICs, RF modules and RF solutions. He has also been teaching numerous RF-related courses internationally.

*notes, lunch and coffee breaks
included with registration*

**Decision (Run/Cancel) Date for this Courses is
Friday, December 27, 2022**

Payment received by Dec. 23

IEEE Members \$415

Non-members \$445

Payment received after Dec. 23

IEEE Members \$445

Non-members \$465

https://ieeeboston.org/event/practical-rf-pcb-design/?instance_id=3308

Additional Courses Planned for later in 2023

Python for Signal Processing and Digital Design – April 1, 2023

DSP for Wireless Communications – July 22, 2023

DSP for Software Radio – October 14, 2023

Look in future Reflector issues and our website for more details

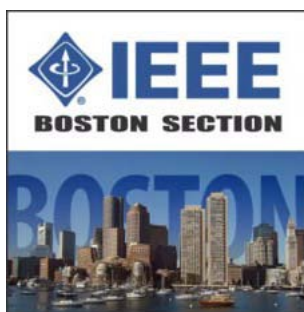
IEEE Boston Section Social Media Links:

Twitter: <https://twitter.com/ieeeboston>

Facebook: <https://www.facebook.com/IEEEBoston>

YouTube: <https://www.youtube.com/user/IEEEBostonSection>

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



26th Annual
2022 IEEE High Performance Extreme Computing
Virtual Conference



19—23 SEP 2022



Register Now! Complimentary Attendance Option Available!

Special Events!

- ⇒ MIT/Amazon/IEEE Graph Challenge
- ⇒ GraphBLAS Forum
- ⇒ Sky Computing
- ⇒ Tutorial: Exploring Graph Analysis for HPC with Near-Memory Accelerators
- ⇒ Tutorial: SPIRAL
- ⇒ Remote Sensing for Humanitarian Assistance & Disaster Relief
- ⇒ HPSEC: High Performance Secure Extreme Computing
- ⇒ BRAIDS
- ⇒ Bridging Quantum and High Performance Computing
- ⇒ Scaling HPC Education
- ⇒ AI Challenges
- ⇒ Open SuperComputing

Distinguished Speakers!



Keynote Speaker:
Prof. Barbara Liskov



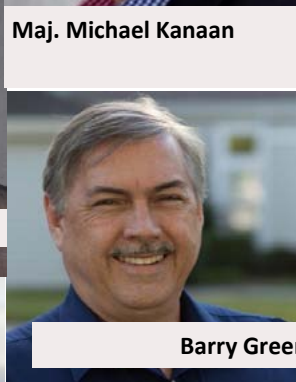
Dr. John Reynders



Prof. Taylor Perron



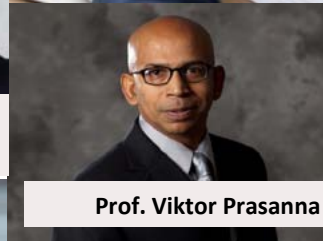
Maj. Michael Kanaan



Barry Greene



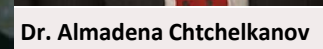
Dr. Rob Schreiber



Prof. Viktor Prasanna



Dr. Piyush Mehrotra



Dr. Almadena Chtchelkanov

IEEE-HPEC.org



Stay Connected & Subscribe Now!
@ mwjournal.com

**Join Us at the RF and
Microwave Community.**



Follow Us:
@MWJEditor

Subscribe now to access:

- In-Depth, Technical Articles
- Insights from Industry Leaders
- Focused Reports
- Product & Industry News
- eLearning Opportunities
- Video and Podcast Libraries
- Print Editions/Technical eBooks



Subscribe Now!

