

BOSTON



CALL FOR PAPERS - 2022 HIGH
PERFORMANCE EXTREME
COMPUTING CONFERENCE

P.4

DEADLINE, JULY 9, 2022

PRO DEV. TRAINING:

VHDL CIRCUIT DESIGN, SIMU-
LATION AND FPGA PROGRAM-
MING USING VIVADO

P.23

(LAST NOTICE, REGISTER NOW!)

CALL FOR PAPERS - 2022 IEEE
INTERNATIONAL SYMPOSIUM
ON PHASED ARRAY SYSTEMS
AND TECHNOLOGY

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DEADLINE, MARCH 12, 2022

PROF. DEV. TRAINING:

STATE MACHINES AND
TIMED STATE MACHINES
IN VHDL

P.24

(LAST NOTICE, REGISTER NOW!)

PROF. DEV. TRAINING:

INTRO TO QUANTUM
SOFTWARE DEVELOPMENT

(ORGANIZED BY MITRE)

P.21

(LAST NOTICE, REGISTER NOW!)

PROF. DEV. TRAINING:

INTRODUCTION TO PRACTICAL
NEURAL NETWORKS AND
DEEP LEARNING

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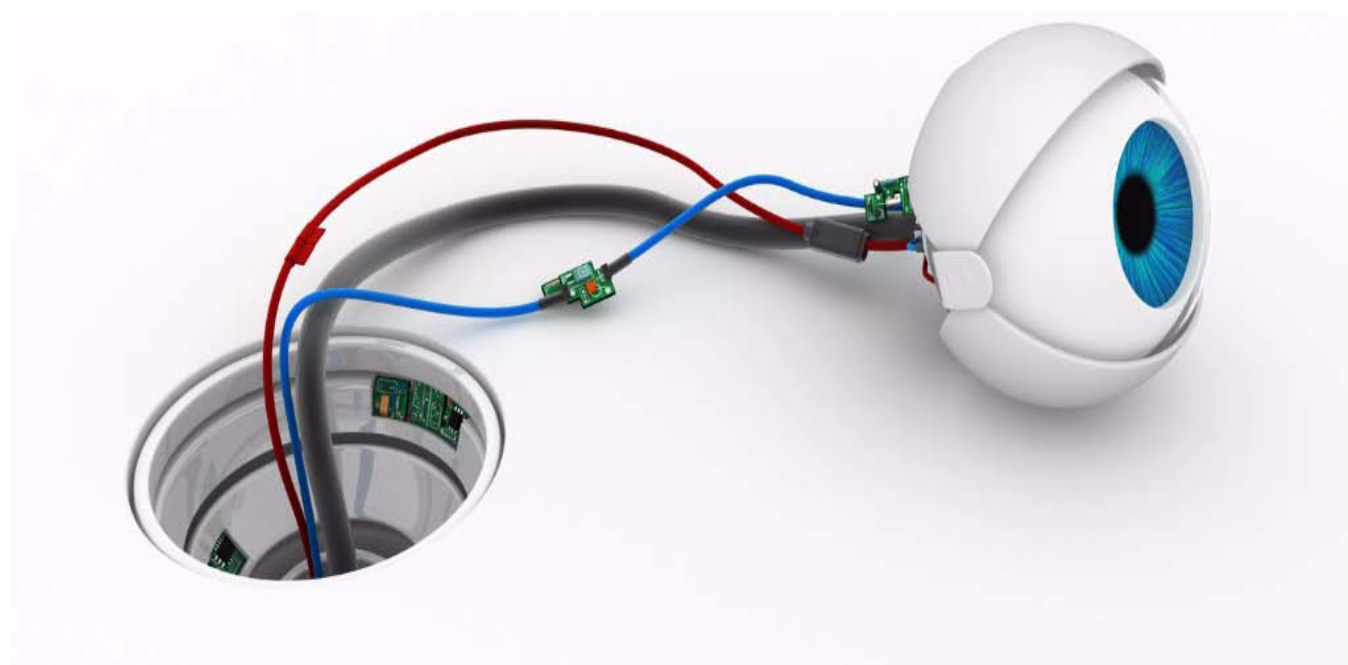


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Do You Want to Enhance Your Career?

Len Long, IEEE Boston Section Chapter Coordinator

IEEE-Boston provides career enhancement in many ways. First and foremost is the support given by the IEEE-Boston office. We are very lucky to have an office which is manned by IEEE employees. Their main duty is to help members enhance their career. They can point you to library resources, point the way to pertinent online and face-to-face courses, direct you to applicable IEEE Society Boston Chapter meetings and provide you with many tools (vTools). They can even refer you to IEEE international honor society called Eta Kappa Nu.

Library resources which are available chronicle state-of-the-art research, development and manufacturing papers and articles which can point the way to authors who are in your field and are doing published and refereed work.

In this Reflector you can see a list of all the IEEE-Boston courses which have been requested by engineering members in many fields of endeavor which are available to you to fortify your subject knowledge and provide names of authors that you might contact with questions during your course.

Also in this Reflector is a partial list of Societies which are active in the Boston area. Periodic meetings are

held by the Boston Chapter of those societies. Presentations are made by subject experts at these meetings and you get to meet people with like interests at the meetings.

The IEEE volunteer tools (vTools) site provides information on a wide range of tools developed by volunteers for IEEE members and IEEE volunteers. The toolbox simplifies organizational efforts and administration by offering web-based software in order to reduce time spent on managing local activities and to assist in member development.

The Eta Kappa Nu organization promotes excellence in the profession and in education through an emphasis on scholarship, character, and attitude. The chairperson of Eta Kappa Nu will receive your application and award you membership if you qualify for this very prestigious society.

The IEEE-Boston also can provide you with volunteer opportunities to belong to or lead society chapters or help with leadership on the Executive Committee. I hope you can take advantage of the career enhancements of IEEE-Boston.



26th Annual
2022 IEEE High Performance
Extreme Computing Virtual Conference
19 - 23 September 2022



www.ieee-hpec.org

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Northeastern University

Administrative Contact

Mr. Robert Alongi
IEEE Boston Section

A Note from the HPEC Committee:

IEEE HPEC 2022 will be presented as a virtual conference that will allow safe participation and full publication in IEEE Xplore.

The IEEE High Performance Extreme Computing Conference (HPEC '22) will be held in the Greater Boston Area, Massachusetts, USA on 19 – 23 September 2022. The HPEC charter is to be the premier conference in the world on the confluence of HPC and Embedded Computing.

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

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

HPEC accepts two types of submissions:

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

IMPORTANT DATES:

Submission Deadline: **JUL 09, 2022**
Notification of Acceptance: **AUG 15, 2022**
Camera Ready Deadline: **AUG 31, 2022**

Submissions to HPEC '22 should be <https://cmt3.research.microsoft.com/HPEC2022/>

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

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

IEEE 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 IEEE BOSTON SECTION AWARDS NOMINATIONS (2021)

DISTINGUISHED SERVICE AWARD

Description - The purpose of the Distinguished Service Award is to honor an IEEE Boston Section member who has made exceptional and distinguished contributions to the Boston IEEE Section. The Distinguished Service Award is to honor an IEEE Boston Section member who has made exceptional and distinguished contributions to the Boston IEEE Section. This award is a wood, engraved plaque with the recipient's citation.

Administration - The Distinguished Service Award will be administered by the Boston Section's Awards Committee. The Awards Committee will submit their recommendations to the Section's Executive Committee for approval.

Eligibility - Individuals nominated for this award must be members of the Boston Section and the IEEE. The award is based upon evidence of distinguished service to the Boston Section. Selection criteria include leadership roles and leadership quality, innovative and important services/contributions to the Boston Section

DISTINGUISHED MEMBER AWARD

Description - The purpose of this award is to recognize distinguished long-term service to the Boston Section of the IEEE and significant contributions in an IEEE field of interest. The Distinguished Member Award recognizes outstanding long-term service (10-years or more) to the Boston Section and significant contributions in an IEEE field of interest. This award is a wood, engraved plaque with the recipient's citation

Administration - The Distinguished Member Award will be administered by the Boston Section's Awards Committee. The Awards Committee will submit their recommendations to the Section's Executive Committee for approval.

Eligibility - Individuals nominated for this award must have been members of the Boston Section for at least the previous ten (10) years. Multiple awards may be given each year, if suitable candidates are nominated. Individuals nominated for this award must currently be members of the Boston Section and members of the IEEE. The award is based upon evidence of distinction in long-term service to the Boston Section and for contributions to the fields of interest to the IEEE. Selection criteria include leadership roles and leadership quality, innovative and important contributions to the Boston Section, service and dedication to the Boston Section, and technical achievements in the fields of interest to the IEEE.

STUDENT ACHIEVEMENT AWARD

Description - The purpose of the Student Achievement Award is to recognize a college student who demonstrates the potential to become distinguished leader and outstanding contributor in an IEEE field of interest. This award is a wood, engraved plaque with the recipient's citation. The Student Achievement Award is to recognize a college student who demonstrates the potential to become a distinguished leader and outstanding contributor in an IEEE field of interest.

Administration - The Student Achievement Award will be administered by the Boston Section's Awards Committee. The Awards Committee will submit their recommendations to the Section's Executive Committee for approval.

Eligibility - An individual nominated for this award must be a student (sophomore year or higher), in good standing, at an institution of higher education located in the Boston Section or be a legal resident within the Boston Section who is attending an institution of higher education outside the Section. The nomination must be submitted by, or endorsed by, the student's major professor, academic advisor or Dean of the department/college they are attending. All nominees' major field of study must be in an IEEE field of interest. The award is based upon evidence of distinguished leadership, accomplishment, and/or outstanding contributions that further the aims of the IEEE.

The deadline for submitting nominations for the 2021 Boston Section Awards is Monday, February 28, 2022.

**Nominations can be submitted to the Boston Section Awards Committee at
ieeebostonsection@gmail.com**

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 – 7:00PM, Tuesday, February 1

Negotiating Contracts: A Critical Entrepreneurial Skill

Location: Online Webinar

Registration closes at 3pm on February 1, 2022.

As an entrepreneur, founder or co-founder of a startup or early stage company, you have to wear many hats. You are the recruiter for co-founders employees and contractors, you are the fund-raiser fit seed investment, you are the salesperson to enlist suppliers, alliance partners and beta testers, you are the financial wizard who had to keep all of this afloat on a shoe string budget.

Yet, one thread that runs through so many of these critical responsibilities and challenges you face, is the ability to negotiate contracts. It's a key entrepreneurial skill, one that you want to master and it is the topic for ENET's Feb. 1 webinar.

For this topic, ENET will be offer three expert speakers, each covering a different aspect of contracts negotiations for the startup company and its founders. Our first speaker will discuss organizational contracting as you get the startup launched. Contracts among the founders and with seed investors. The second speaker discussed early stage contacting for life science companies including patent licensing, contracting with universities, sponsored research and getting your life science startup launched with its technology secured. The third speaker shares experience in startup and early stage contracting for tech companies including software development and contracting to get products or services to market for first revenues, including sales, marketing, VAR and distribution agreements.

Event Schedule

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

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

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

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

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

Registration:

<https://enet.wildapricot.org/event-4413259>

ENET Member: Free

General Public: \$10.00

Speakers:

Candice M. Hughes



PhD, MBA, CEO, Board Member, Speaker, Author, Biotech, Digital Health

A serial entrepreneur and innovation expert with biopharma compliance expertise, Dr. Hughes is known for turnarounds and startup launches. At Hughes BioPharma,

founded in 2005, Dr. Hughes restructures

R&D operations processes and compliance at global biopharmas, having worked with 50% of the largest 25 global pharmas and smaller biotechs. An early digital health startup founder, she also founded a gold standard healthcare division at a venture capital backed media firm. Living Loud Living Long for 50up women digital well-living community and media startup was founded by Dr. Hughes in 2021.

Dr. Hughes received her PhD in Neurobiology at Boston University School of Medicine and MBA with Beta Gamma Sigma honors at Kelley School of Business, Indiana University.

Bryan Natale



Corporate Partner at Burns & Levinson LLP

Bryan C. Natale is a partner in the firm's corporate group. Bryan represents clients in transactional matters with a focus on mergers and acquisitions, leveraged buyouts, growth equity investments, venture capital financings, distressed acquisitions, debt and equity financings, licensing and outsourcing, and securities and corporate governance. Bryan works extensively with private equity sponsors, venture capital funds, financial institutions, closely held and venture-backed emerging growth companies, privately held middle-market companies, and private equity-backed portfolio companies

across many industry sectors, including health care, technology and software, industrial and manufacturing, media and marketing, retail and consumer products, and financial services.

On behalf of his clients, Bryan drafts and negotiates primary and ancillary transaction documents, investment-related documents, commercial agreements, and corporate governance document.

Attorney Matthew A. Karlyn



Partner at Morrison & Foerster LLP
Matthew has a B.A from Union College, a J.D. from Temple University, and a M.B.A. from the University of Chicago and is authorized to practice law in Massachusetts, Illinois, and New York. He is a partner at the Boston, MA office of Morrison & Foerster LLP. He has 23 years of experience

in working with companies in the healthcare, pharmaceutical, medical device, and technology industries on a wide range of commercial life sciences, licensing, and technology transactions. His clients range from Fortune 100 companies to start-ups, and he regularly advises companies on matters involving IP commercialization, complex collaboration transactions, licensing initiatives, subscription-based economics, and business transactions related to the procurement, development, commercialization, and use of technology and life sciences products. He has also worked with a number of clients on corporate transactions including mergers and acquisitions, as well as private equity and venture capital financing.

Moderator & Organizers

William Byrnes, Esq.



Founder, Byrnes & Associates

Bill is an attorney and senior executive with 25+ years of experience building value by commercializing information and technology. Bill's focus involves a unique application of his legal and business management

experience on the day-to-day management of all elements of the product, sales, and contract life cycles as the core of the business. The effect of this focus can convert expense into value driven to the bottom line with increased shareholder value as the results.

Robert Adelson



Principal, Business and Tax attorney @ Adelson & Associates, LLC. Chair Emeritus @ Boston Entrepreneurs' Network (ENET)

Rob has been an attorney for over 30 years specialized in business, tax, stock and options, employment, contracts, financing, trademarks and intellectual property. Rob began as an associate at major New York City law firms before returning home to Boston in 1985 where he has since been a partner in small and medium sized firms before joining Engel & Schultz LLP where he was a partner from 2004 to 2019. When the senior partners retired, he moved his law practice to his own firm, Adelson & Associates, LLC, effective 1/1/2020. Rob represents entrepreneurs, start-ups and small companies, independent contractors and employees and executives. Rob is a frequent speaker on business law topics and author of numerous articles published in Boston Business Journal, Mass High Tech and other publications, plus more than thirty articles since 2016 on executive employment topics published by CEOWorld magazine. He has been named among the "Top 20 Boston Startup Lawyers" by ChubbyBrain.com, a website that provides tools for entrepreneurs. Rob has been on the ENET Board since 2002, was Vice Chair 2005-2009, and ENET Chairman 2009-2019. He was also a Co-Founder and Board member of the 128 Innovation Capital Group (2004 -2015). In 2016, he received the IEEE USA Professional Achievement award for "extreme dedication to the entrepreneurship community." He holds degrees from Boston University, B.A., summa cum laude, Northwestern University (Chicago), J.D., Law Review, and New York University, LL.M. in Taxation.

IEEE Boston/Providence/New Hampshire Reliability Society Chapter – 11:00AM, Wednesday, February 9

Designing for Reliability with ReliaSoft Software

FREE Webinar

Please visit our website at www.ieee.org/bostonrel



During this presentation, we will see how various stages of Design for Reliability (DfR) processes are implemented in ReliaSoft software. Additionally, we will discuss how the pieces of information collected during multiple reliability engineering activities can be combined and used to improve the decision-making process. We will demonstrate what the DfR framework looks like, and where the methods and tools fit in that standard work process. The following methods and tools will be reviewed during the case study: FMEA, Telcordia, Accelerated life testing, System reliability.

Design for Reliability is a discipline that refers to the process of designing reliability into products as part of the development process. If you are considering implementing a new DfR initiative or improving an existing program, join us to learn about what procedural steps and methods you may consider for your DfR process.

Date and Time

Date: Wednesday, 9 February 2022

Time: 11:00 AM to 12:00 PM

All times are US/Eastern

Location: This Webinar is to be delivered virtually.

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

Contact

Email event contact

Michael W. Bannan, Chair, IEEE Boston/Providence/
New Hampshire Reliability Chapter
<mailto:michael.bannan@ieee.org>

Speaker

Semyon Mikheevskiy of Hottinger, Bruel, & Kjaer
Semyon Mikheevskiy is an application engineer at Hottinger, Bruel, & Kjaer responsible for conducting training courses, providing consulting service and pre sales support. He is a customer facing technical expert on reliability engineering including life data analysis, ALT/ HALT, FMEA and MIL-HDBK-217.

He has 7 years of R&D and teaching experience as a research associate and 6 years of experience as a consultant and an application engineer. His focus is on reliability engineering and fatigue and fracture analysis. Semyon holds a PhD in Mechanical Engineering from the University of Waterloo, Canada. He is the author of seven papers published in various peer reviewed journals.

Agenda

11:00 AM Technical Presentation
11:45 AM Questions and Answers
12:00 PM Adjournment

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

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

Register:

<https://events.vtools.ieee.org/m/300700>

Entrepreneurs' Network – 7:00PM, Tuesday, February 15

Advanced Planning for Regulatory Compliance – Advice for Startups

Location: Online Webinar

Details and registration coming soon!
Event Schedule

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

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

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

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

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

Registration will available soon.

ENET Member: Free

General Public: Free

Signal Processing, Education Society, Young Professionals and Women in Engineering – 11:00AM, Friday, February 18

AI Talent Lab: No-code Machine Learning for All

Are you interested in learning the basics of machine learning or growing your existing skills alongside a revolutionary tiny machine learning (TinyML) company? During our one day Practical AI Masterclass, Neuton will guide us from the fundamentals of Artificial Intelligence through analyzing successful real-world use cases using their free-to-use innovative framework. Over the workshop, we will explore Neuton's self-growing and self-learning no-code artificial neural network architecture which builds on human ingenuity to develop state of the art neural networks that are 50+ times more compact than their conventional counterparts while removing the need to work on layers and neurons. No coding experience is required to participate in this workshop and topics can range from medical applications to manufacturing to finance! What are the perks for joining our course?

- Gain real skills to add to your resume
- Create your own ML model using Neuton's innovative platform to advance your portfolio while solving real-world use cases
- Gain a competitive edge when pursuing future employment

The virtual workshop will take place on February 18th from 11:00am - 3:00pm ET.

For a full breakdown of topics, please click the registration link below.

You can register for any part of the workshop here:
https://us06web.zoom.us/webinar/register/WN_vGQ86JYBRHm3zykwfCBR-w

- Adopt a data-driven mindset to kick start your machine learning career

Computer Society and GBC/ACM - 7:00PM, Thursday, February 24

Cell Development Kits (CDKs) - SDKs for Biology

Patrick Boyle, Ginkgo Bioworks

Register in advance for this webinar at

https://acm-org.zoom.us/webinar/register/3016427351531/WN_JeYRu9ZCSmiDPbyf4IVsEQ
After registering, you will receive a confirmation email containing information about joining the webinar.

Patrick Boyle is the Head of Codebase at Ginkgo Bioworks, a Boston-based synthetic biology company that makes and sells engineered organisms. Ginkgo is the leading horizontal platform for cell programming - we use automation and software to program DNA code. In this context, Ginkgo's "Codebase" is our portfolio of reusable biological assets. Ginkgo's Codebase includes thousands of novel strains, enzymes, genetic parts, and diverse genetic repositories, including millions of engineered DNA sequences. To help more developers leverage Ginkgo's Codebase, we recently launched "Cell Development Kits" (CDKs) - our version of SDKs.

CDKs provide streamlined access to the company's platform for aspiring cell developers to program cells to tackle the biggest challenges facing society. The first CDKs to launch are focused on protein expression programs. The service provides developers access to the toolkit needed to get started developing commercial proteins, including pre-engineered host cells optimized for protein production, specialized equipment, automation capabilities, genetic engineering expertise, insights garnered from Ginkgo's codebase and the applicable infrastructure to design, build and test a custom microbe.

Ginkgo's CDKs are designed to cut the cost of launching a cell program and speed up development timelines to build engineered microbes, for example, to determine whether a protein may be successfully and

commercially produced. The service is also designed to enable customers to prototype their idea in phases, with each phase providing data that can inform the customer's project and business strategy. By simplifying



the pathway for companies to get started on the Ginkgo platform with standard terms, a phased approach, low costs—starting at \$100,000 for protein expression projects—and clear deliverables, the CDK can help derisk projects prior to full scale technical development.

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.

DSP for Wireless Communications

Dates & Times: Live Workshops: 6:00 - 7:30PM EST; Thursdays, April 7, 14, 21, 28, May 5
First Video Release, April 1, 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 July 5, 2022.

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.

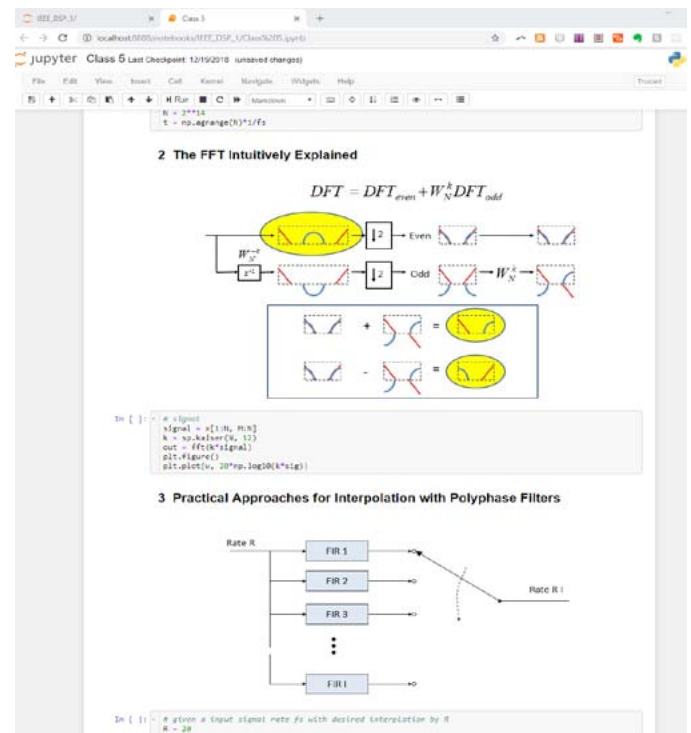
Now with Jupyter Notebooks!

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:

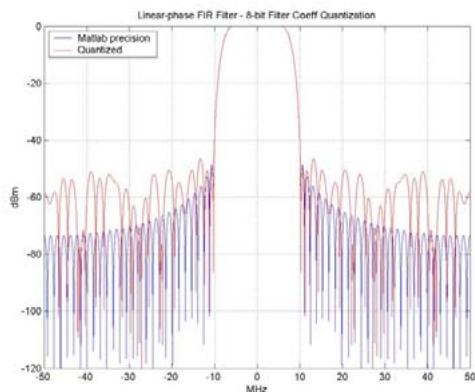
All engineers involved in or interested in signal processing applications. Engineers with significant experience with DSP will also appreciate this opportunity for an in-depth review of the fundamental DSP concepts from a different perspective than that given in a traditional introductory DSP course.

Benefits of Attending/ Goals of Course:

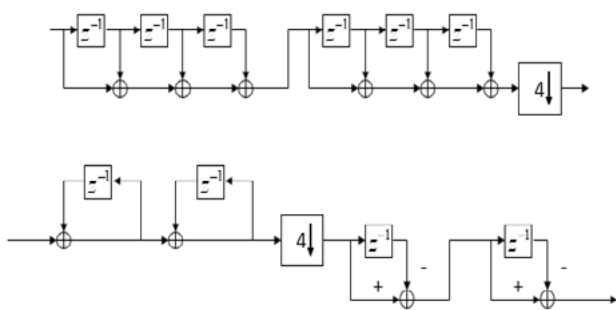
Attendees will build a stronger intuitive understanding of the fundamental signal processing concepts involved

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

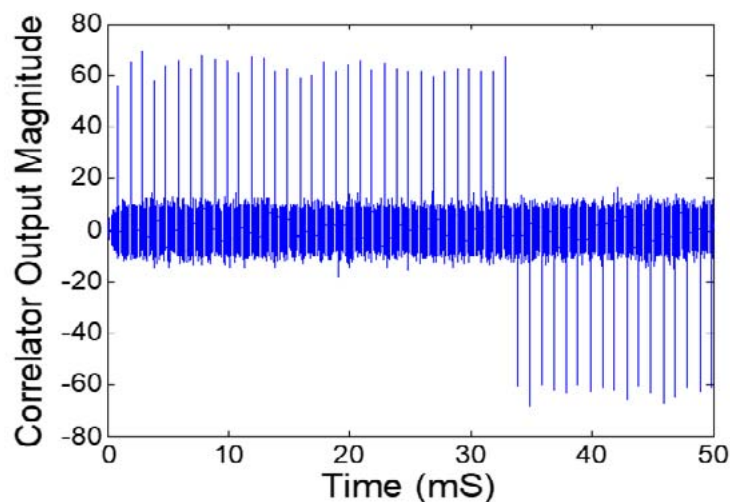
Class 4: Windowing, Digital Filter Design, Fixed Point vs Floating Point

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, April 4, 2022

IEEE Members	\$190
Non-members	\$210

Digital Signal Processing (DSP) for Software Radio

Dates & Times: Live Workshops: 6:00 - 7:30PM EST; Tuesdays, May 31, June 7, 14, 21, 28
First Video Release, May 25, 2022, additional videos released weekly in advance of that week's live session!

Speaker: Dan Boschen

Location: Zoom

Course Information will be distributed on Wednesday, May 25, 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 August 28) 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

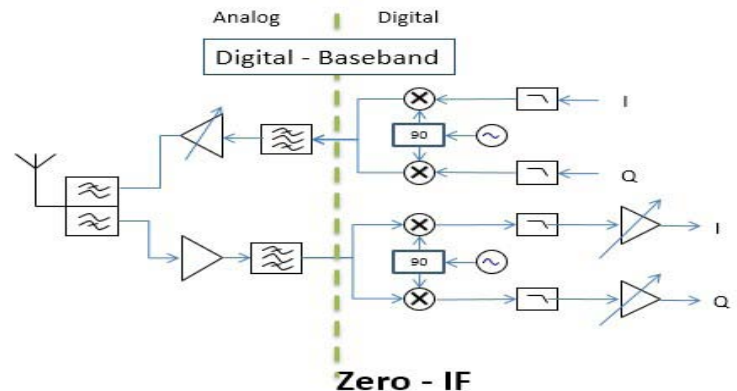
Class 5: RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers

Speaker's Bio:

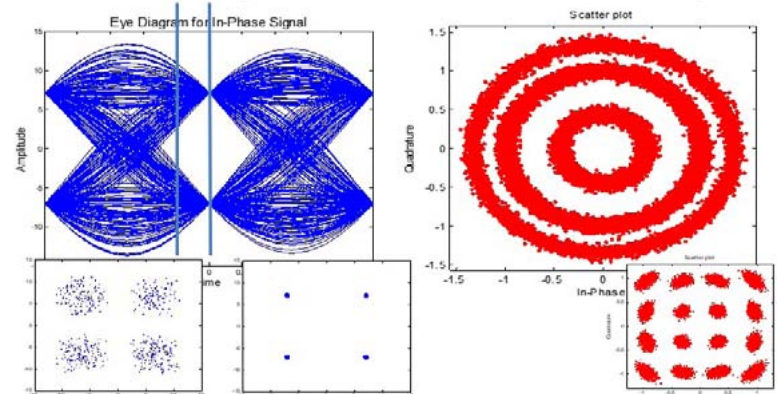
Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing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

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

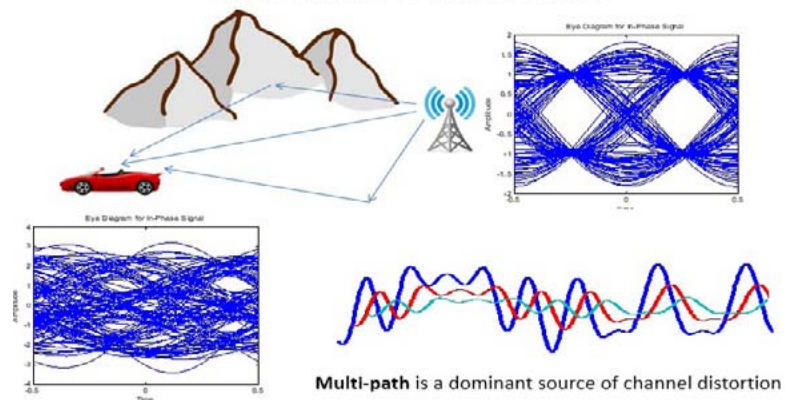
Radio Architectures



Timing and Carrier Recovery



Channel Distortion



**Decision (Run/Cancel) Date for this Course is
Friday, May 20, 2022**

IEEE Members	\$190
Non-members	\$210

https://ieeeboston.org/event/dpswradio/?instance_id=3219

Python Applications for Digital Design and Signal Processing

Dates & Times: Live Workshops: 6:00 - 7:30PM EDT; 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) 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

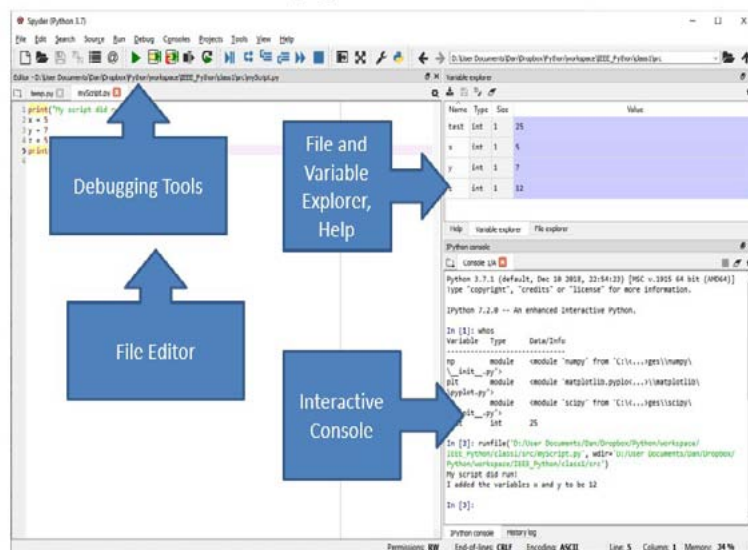
Speaker's Bio: Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing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

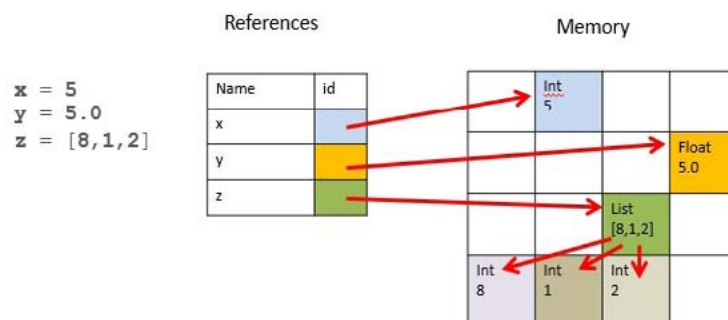
Decision (Run/Cancel) Date for this Course is Friday, September 2, 2022

IEEE Members \$190
Non-members \$210

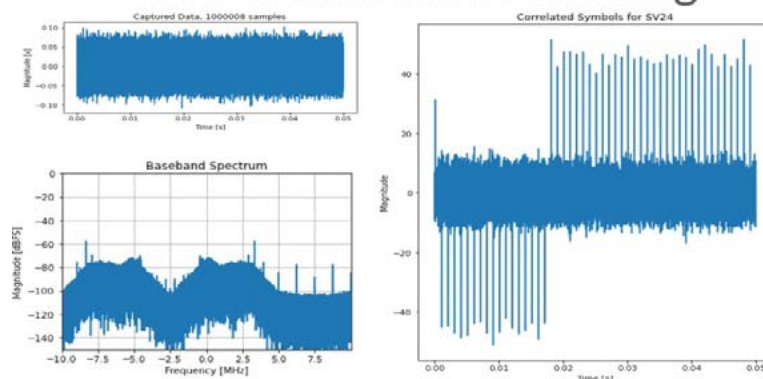
Spyder IDE



Mutable / Immutable



GPS Waveform Processing



CALL FOR PAPERS

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

www.array2022.org



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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

Suggested Topics

- 5G Arrays
- Array Design
- Array Measurements
- Array Signal Processing
- Automotive Arrays
- Beamforming & Calibration
- Dual Polarized Arrays
- MIMO Arrays
- Medical Applications
- Metamaterial Phased Arrays
- mmWave and Terahertz
- T/R Modules

Special Sessions

- European Phased-Arrays Systems and Technology *Michael Brandfass, Hensoldt Sensors GmbH, Alfonso Farina, Leonardo SpA*
- Low Frequency Arrays... *Vito Mecca, MIT Lincoln Laboratory*
- Intelligent Arrays *Kevin Rudd, Ben Epstein, DARPA*
- SATCOM Arrays *Ryan Stevenson, Kymeta*
- Weather Arrays *Kurt Hondl, NOAA*
- Wideband Arrays *Tim Hancock, DARPA*

Publication Information

All paper submissions must be in IEEE dual-column format and must be 2 pages (minimum) to 8 pages (maximum) in length including figures, and must be submitted in PDF format via the symposium website. All papers will be peer reviewed.

Authors of papers presented at the conference will be invited to submit an expanded version to the IEEE T-MTT Mini-Special Issue.

Important Dates

- Full paper submission 12 March 2022
- Author notification 30 April 2022
- Author registration deadline 01 Sept 2022

Introduction to Quantum Software Development

Web-based Course with live Instructor!

(LAST NOTICE, PLEASE
REGISTER NOW!)

Times & Dates: 6 - 8PM ET, February 8, 9, 10, 15, 16, 17, 22, 23, 24

Speakers: Joe Clapis, Richard Preston, MITRE Corporation

Course Format: Live lectures interspersed with lab exercises in Visual Studio



This course is organized by the MITRE Corporation and being offered as part of the IEEE Boston Section's professional development program.

Summary:

In recent years, there has been an enormous surge of interest in quantum computing. Government, academic, and commercial organizations have spent billions of dollars attempting to create reliable, general-purpose quantum computers. These systems leverage the unusual properties of quantum mechanics to perform computations that could never be performed on conventional computers in our lifetime. Such calculations have a wide range of applications, including:

- Breaking certain cryptographic algorithms
- Engineering new materials
- Simulating how systems behave in extreme environments
- Finding new medicines that target specific diseases
- Building secure transmission channels that cannot be eavesdropped

How do quantum computers accomplish these bold claims? How could we use this technology to tackle our most difficult challenges? And how do programmers like you access it? In this course, we will explore the answers to these questions and help you unlock the ability to write quantum software and simulate quantum algorithms. Students should bring some basic programming experience and an open mind as we delve into a new computing paradigm.

Format: Live virtual lectures with self-paced exercises.

Target Audience: Practicing software engineers.

Objective: Develop the practicable skills needed to implement and study quantum algorithms in software.

Prerequisites:

Students are assumed to have exposure to the following concepts:

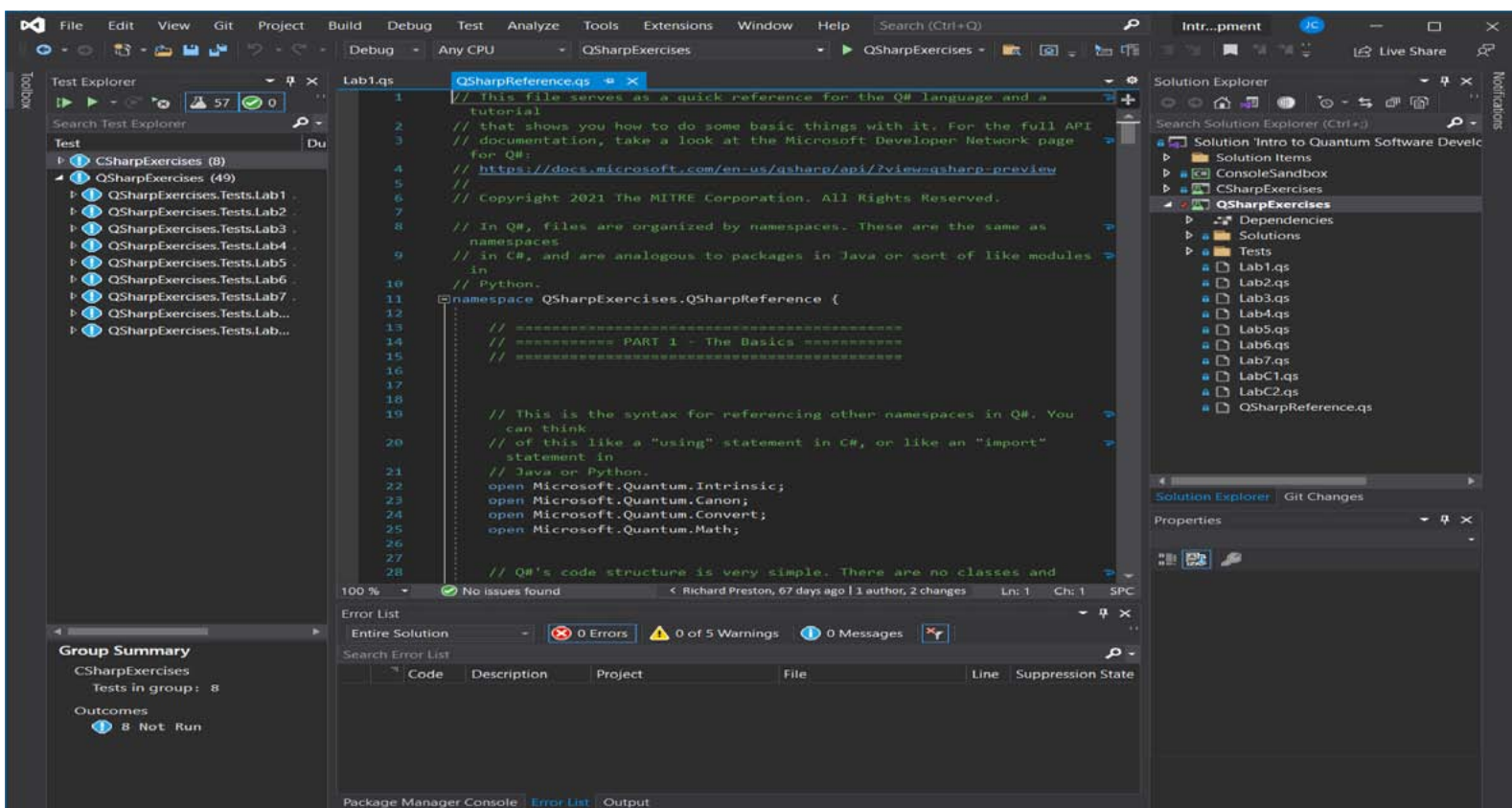
- Complex numbers
- Vectors & Matrices
- Bra-ket and tensor notation
- Digital information
- Endianness
- Digital logic
- Low- and high-level programming
- Visual Studio

Learning materials covering the course prerequisites will be provided in advance. This way, students can fill in any gaps in their knowledge and everyone starts on the same page on day 1.

Outline:

The course consists of live lectures interspersed with lab exercises in Visual Studio. All the materials are available in the form of an online course guide, so students can learn at their own pace both during and outside of class time. To mitigate technical difficulties, each student is provided remote access to a virtual machine with a preconfigured environment. The following topics are covered:

- Qubits and quantum gates
- Multi-qubit systems
- Quantum circuits
- Quantum protocols
- Quantum algorithms
- Q# programming



The Visual Studio exercises are Q# operations that must be implemented correctly for a unit test to pass. This approach allows students to get immediate feedback on how well they understand a concept. We use the Discord platform as a course forum, where students can ask questions at any time and collaborate on solving the coding challenges.

Instructor Bios:

Joe Clapis is a Lead Software Systems Engineer at The MITRE Corporation. He has over 10 years of experience in a variety of software domains, from machine vision to virtualization, and now currently works on quantum software systems. His latest research involves bridging the gap between quantum algorithm theories and their practical implementations.

Richard Preston is a Network Analytics Group Leader in the Infrastructure and Networking Innovation Center at MITRE. He also serves as Co-Chair of MITRE's STEM

Council, a group that supports STEM education initiatives across the company. He has been collaborating with Joe on quantum software research since 2019 and seeks to raise awareness and proficiency around this new technology.

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Approved for Public Release; Distribution Unlimited.
Public Release Case Number 21-3742.

**Decision (Run/Cancel) Date for this Course is
Tuesday, February 3, 2022**

IEEE Members	\$250
Non-members	\$325

<https://ieeeboston.org/event/ieeequantumsoftware>

VHDL Circuit Design, Simulation and FPGA Programming Using VIVADO

(LAST NOTICE, PLEASE
REGISTER NOW!)

Web-based Course with live Instructor!

Times & Dates: 11AM - 12 noon ET, February 15, 17, 22, 24, March 1, 3, 8, 10, 15, 17

Speaker: Orhan Gazi, Cankaya University, Ankara-Turkey

Course Format: Live Webinar, 10, one hour, sessions

Introduction: In this course VHDL circuit design language will be taught. VIVADO Platform will be used for VHDL coding, simulation and FPGA programming. The attendee should have basic knowledge of digital circuit design. VHDL language is an hardware design language. Its popularity is increasing in years. It is used to program FPGA devices. It is not exaggerating to say that most of the future electronic systems will include FPGA devices in their structures since FPGA devices are flexible, reconfigurable platforms for hardware designs. The attendee taking this course will learn VHDL language and he or she will be able to make digital circuit design using VHDL language. Besides, the attendee will learn how to program FPGA devices for circuits designed using VHDL.

Prerequisite: The one who is interested in taking this course should have basic knowledge of digital logic design. He or She should be familiar with the terms binary encoders, decoders, multiplexers, counters, registers, etc.

Topics:

Entity, Architecture and VHDL Operators
Project Creation Using VIVADO, Schematic, Synthesis
Internal Structure of FPGAs, LUTs, Slices
Combinational Logic Circuit Design and Concurrent Coding in VHDL
Testbench Writing and Simulation of VHDL Codes Using VIVADO
Constraint Files and FPGA Programming with VIVADO
User Defined Data Types in VHDL
Sequential Circuit Implementation in VHDL
Frequency Division in VHDL
Testing Sequential Logic Circuits on VIVADO
Packages, Components, Functions, and Procedures in VHDL
Fixed and Floating Point numbers in VHDL
Target Audience: Electronic and Communication Engineers, electronic engineers, computer engineers, engineers working in communication industry

Benefits of Attending Course:

- 1) The participant will learn how to design digital circuits using VHDL.
- 2) The participant will learn how to create projects and make simulations in VIVADO.
- 3) The participant will learn how to program an FPGA device.
- 4) The participant will have an idea about the architecture of FPGA device.

Speaker Bio: Prof. Orhan Gazi is the author of the book "A Tutorial Introduction to VHDL Programming" <https://www.springer.com/gp/book/9789811323089>

Prof. Orhan Gazi is the author of 10 books written in electrical engineering subjects. He is also one of the authors of the book "State Machines using VHDL: FPGA Implementation of Serial Communication and Display Protocols" which can be reached from <https://www.springer.com/gp/book/9783030616977>

The research area of Prof. Orhan Gazi involves "channel coding", and "digital communication subjects". Recently, he focuses on over capacity data transmission using polar codes. He is also interested in practical applications of communication systems involving FPGA devices. He is delivering courses with titles "VHDL circuit design", "interface design using VHDL for FPGA devices" and "system on chip design".

Materials to be included: Lecture slides will be provided.

**Decision (Run/Cancel) Date for this Course is
Tuesday, February 8, 2022**

IEEE Members	\$250
Non-members	\$300

State Machines and Timed State Machines in VHDL: FPGA Implementation of RS232, SPI and I2C Serial Communication Protocols

Web-based Course with live Instructor!

Times & Dates: 11AM - 12 noon ET, March 22, 24, 29, 31, April 5, 7, 12, 14, 19, 21

Speaker: Orhan Gazi, Cankaya University, Ankara-Turkey

Course Format: Live Webinar, 10, one hour, sessions

Introduction: State machines are used to characterize the behavior of digital electronic circuits. State machines are widely used in industrial applications. For instance, they are used in factories for control applications. State machines are also used in communication technology. It is essential for an electronic engineer to have knowledge of state machines and their practical implementations. In this course, we first provide information about state machines, and then teach the implementation of state machines in VHDL language. We use VIVADO platform for development, simulation and FPGA programming purposes. For practical applications, we implement serial communication protocols such as RS232, SPI, I2C in VHDL. We consider the VHDL implementation of SPI protocol for AD7303 device, and also we implement I2C protocol for ADT7420 Digital Temperature Sensor.

Prerequisite: Basic knowledge of VHDL circuit design.

Topics:

State machines and Modeling of Mathematical and Physical Problems by State Machines

Mealy and Moore State Machines

VHDL Implementation of Finite State Machines, Example Implementations

Timed State Machines and Their VHDL Implementations, Example Implementations

RS232 Asynchronous Serial Communication and its VHDL Implementation

Simulation of State Machines Using VIVADO

Serial Peripheral Interface and Its VHDL Implementation

Sine Signal Generation and SPI Protocol Development in VHDL for Digital to Analog Converter (DAC) AD7303

Inter Integrated (I2C) Serial Communication Protocol and Its Implementation in VHDL

VHDL Implementation of I2C Communication Between FPGA and ADT7420 Digital Temperature Sensor

Target Audience: Electronic and Communication Engineers, electronic engineers, computer engineers, engineers working in communication industry

Benefits of Attending Course:

- 1) The participant will learn about state machines.
- 2) The participant will learn how to implement state machines in VHDL.
- 3) The participant will learn how to implement timed state machines in VHDL.
- 4) The participant will gain knowledge about serial communication protocols, RS232, SPI, and I2C.
- 5) The participant will learn how to use SPI, I2C protocols in VHDL for practical electronic devices AD7303 (DAC) and for ADT7420 Digital Temperature Sensor.

Speaker Bio: Prof. Orhan Gazi is one of the authors of the book "State Machines using VHDL: FPGA Implementation of Serial Communication and Display Protocols" which can be reached from <https://www.springer.com/gp/book/9783030616977>

He is also sole author of the book “A Tutorial Introduction to VHDL Programming”

<https://www.springer.com/gp/book/9789811323089>

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The research area of Prof. Orhan Gazi involves “channel coding”, and “digital communication subjects”. Recently, he focuses on over capacity data transmission using polar codes. He is also interested in practical applications of communication systems involving FPGA

devices. He is delivering courses with titles “VHDL circuit design”, “interface design using VHDL for FPGA devices” and “system on chip design”.

Materials to be included: Lecture slides will be provided.

Decision (Run/Cancel) Date for this Course is, Thursday, March 17, 2022

IEEE Members	\$250
Non-members	\$300

https://ieeeboston.org/event/state-machines-and-timed-state-machines-in-vhdl-fpga-implementation-of-rs232-spi-and-i2c-serial-communication-protocols/?instance_id=3150

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, March 19

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 at-

tend, 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:

Introduction to Practical Neural Networks and Deep Learning (Part 1)

Feedforward Neural Networks.

- * Simple (Python) Network to classify a handwritten digit
- * Learning with 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
 - *** Hyper-parameters

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, March 14, 2022**

IEEE Members	\$110
Non-members	\$130

https://ieeeboston.org/event/neural-networks/?instance_id=3181

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.

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