

BOSTON



2019 IEEE PHASED
ARRAY SYMPOSIUM
CFP DEADLINE
APRIL 19, 2019

P.7

IEEE HOMELAND
SECURITY SYM
CFP DEADLINE
MAY 6, 2019

P.22

2019 IEEE RADAR
CONFERENCE

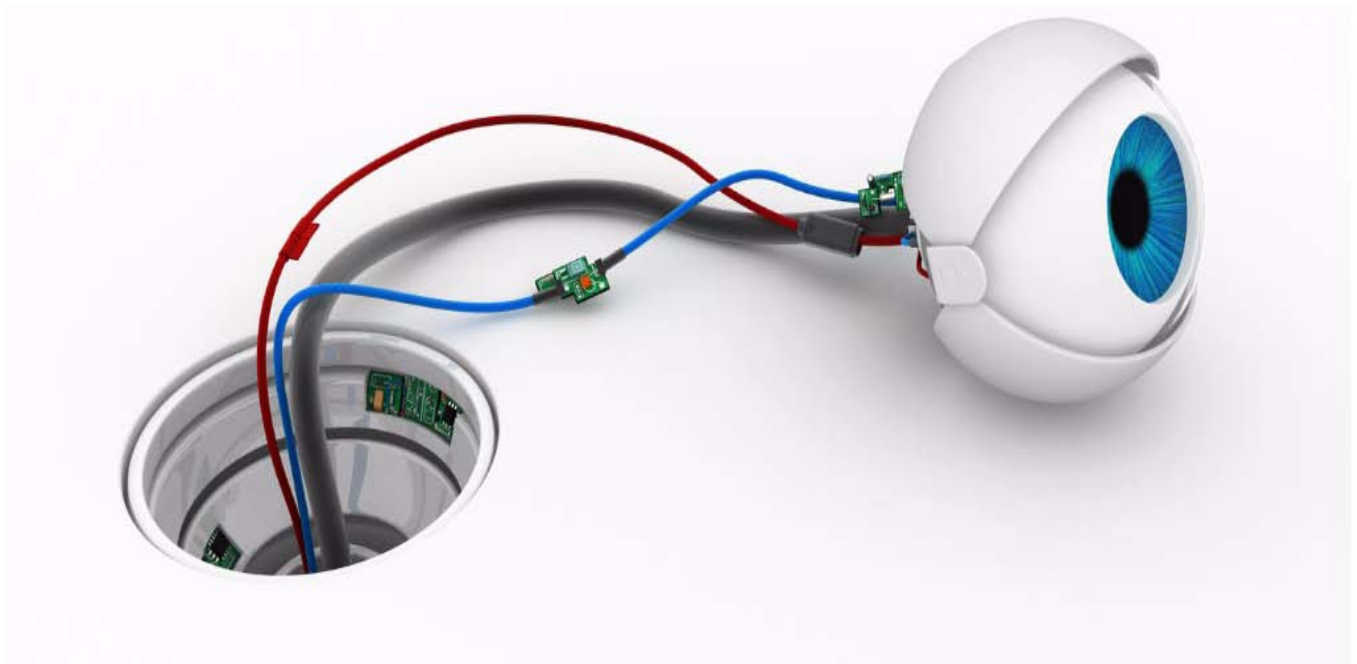
P.23

HIGH
PERFORMANCE
EXTREME
COMPUTING CONF.

P.24

THE REFLECTOR

ISSUE #4
APRIL 2019



2018 Outstanding Section Membership
Recruitment and Retention Performance

Boston Section

 **IEEE**
*Advancing Technology
for Humanity*

TABLE OF CONTENTS

Editorial: "Who Wants to be an Engineer", by Karen Panetta, Reflector Editor	Page 3
Call for Technical/Interest Articles	Page 4
Spring 2019 Course Program Summary	Pages 5 - 6
2019 IEEE International Symposium on Phased Array Systems and Technology - Call for Papers	Page 7
<u>(Deadline - April 19, 2019)</u>	
Online Course Summary Listing with Links to Full Course Descriptions	Page 8
Monthly Chapter Meeting Summary	Pages 9 - 10
Entrepreneurs' Network	Page 11
Entrepreneurs' Network	Page 13
Life Members	Page 15
Reliability Society	Page 16
Microwave Theory & Techniques Society	Page 17
Computer Society	Page 18
Consultants' Network	Page 19
Geoscience and Remote Sensing, and Aerospace and Electronic Systems Societies	Page 20
2019 IEEE International Symposium on Technologies for Homeland Security - Call for Papers	Page 22
<u>(Deadline - May 6, 2019)</u>	
2019 IEEE Radar Conference	Page 23
2019 IEEE High Performance Extreme Computing Conference (HPEC) Call for Papers	Page 24
<u>(Deadline - May 17, 2019)</u>	
Software Development for Medical Device Manufacturers (Last Notice, Please Register Now!!)	Page 25
Fundamentals of Bioelectronics for Applications in Neuroprosthetics	Page 27
(Last Notice, Please Register Now!!)	
Call for Course Speakers/Organizers	Page 28
DSP for Wireless Communications	Page 29
(Last Notice, Please Register Now!!)	
DSP for Software Radio	Page 31



Who Wants to be an Engineer?

Karen Panetta, Reflector Editor

I met with my department chair for a cup of coffee to talk. He needed to discuss something with me and promised we wouldn't be discussing anything bad. When we met, he asked me to teach the circuit theory course. My response was, "I thought you said we wouldn't be talking about anything bad?"

In case you didn't know, circuit theory is the number one reason students leave, actually run, from the electrical engineering major. It is considered the plague for most U.S. engineering institutions.

Upon informing my husband that I would be teaching this course, I returned home to find he bought me a beautiful shirt embossed with a sequined lighting bolt with the word "BOOM" written below it. This is what I call a sympathy gift, with a sense of humor.

I received many other condolences from friends and colleagues when they heard my news. They shared their circuit theory memories, or should I say horror stories. They even cited that it was a good thing computer science programs did not exist when they were in school, or they too would have fled electrical engineering and changed majors.

I decided to investigate why this course is considered the scourge of the earth for engineers. Moreover, why did all of us stay in Electrical Engineering, if we were tortured so badly by this course?

Students say, "I don't want to solder for the rest of my life", or "I don't care about how to turn on a light bulb." Obviously, their view is very limited, but whose fault is it if this is the way they think after taking a circuit theory course?

I try to explain to them that they are learning fundamentals and that I don't know a single engineer that solders all day. They nod in agreement and then continue to hand me a form requiring my signature allowing them to drop the course, despite my best reassurances.

I could tell them they would be millionaires if they would stay in Electrical Engineering, but not even money sways them. My dad used this line on me to make me go into Electrical Engineering, but today's kids are much smarter than when I was in school. Back then, we thought our parents knew more than we did, and we actually listened to their advice.

My colleagues also condemned to teach this course, try to ease my pain by offering me their notes and labs. It is a nice gesture, but turning on light bulbs doesn't turn me on either. I am with the students on this one. I have to bite the bullet and tame this beast myself.

Now, if we are talking about controlling airport runway lighting during all weather conditions, I am more interested. If we are talking about using sound signals to diagnose oncoming mechanical failures in helicopter gearboxes or to do audio forensics, I am all ears.

Ah ha! The light bulb is going on now. Students hate circuit theory because they don't see how any of it is useful or where it is used.

I told this to one of my seasoned colleagues. His response was, "Who said Electrical Engineering had to be easy, fun or enjoyable?" I interpreted this to be the equivalent of saying, "let them eat cake."

Telling students to wait a few years to see how it all comes together in their academic career is like telling

your kid, “some day you will thank me for punishing you.” It just doesn’t sell.

Our nation suffers from a horrendous shortage of young people pursuing engineering. If we don’t change our recruitment efforts and public awareness to show the impact engineers have on humanity, then we will never overcome this sad reality.

One of the most successful ways to do this is to have role models. We need role models who show us the “big picture”, lead by example and the best part is that to be a role model doesn’t mean the person has to be dead!

IEEE Boston is very proud that we have many wonderful role models among us.

There are many more of you out there that are great role models and we need you! With your help, those of us in the trenches of education may be able to find more exciting ways to make topics like voltage division cool.

Reprint from July 2017

Call for Articles

Now that the Reflector is all electronic, we are expanding the content the publication. One of the new features we will be adding are technical and professional development articles of interest 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 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 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

IEEE Boston Section Spring 2019 Professional Development Program

(Last Notice, Please Register Now!!)

Software Development for Medical Device Manufacturers - An intensive two-day course

Time & Date: 8:30AM - 4:30PM, Wednesday & Thursday, April 10 & 11, 2019
(14 hours of instruction!)

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

Speaker: Steve Rakitin, President, Software Quality Consulting, Inc.

OVERVIEW Developing software in compliance with FDA, EU regulations and international standards is challenging. This two-day intensive course provides practical guidance and suggestions for developing software that complies with applicable FDA and EU regulations, guidance documents and international standards such as IEC 62304 and ISO 14971. The focus of this course is interpreting Design Controls for software. Each section of the Design Controls regulation (820.30) is discussed from the software perspective. Corresponding requirements from IEC 62304 are woven into the flow.

In-depth discussion of critical topics such as Requirements, Software Verification & Validation, Risk Management and Fault Tree Analysis are included. In addition, techniques for validating software development tools and software used in Manufacturing and Quality Systems are also discussed. Interactive group exercises are included to facilitate discussion and learning.

WHO SHOULD ATTEND Software and firmware engineers, software managers, RA/QA staff, validation engineers, and project managers. Anyone interested in learning how to develop medical device software in compliance with regulations, standards and guidance documents. **See Page 26**

Full course Description at, <http://ieeeeboston.org/software-development-medical-device-manufacturers>

(Last Notice, Please Register Now!!)

The Fundamentals of Bioelectronics for Applications in Neuroprosthetics

Time & Date: 8:00AM - 3:00PM, Friday, April 12, 2019

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

Speaker: Marie Tupaj, Middlesex Community College

Description: This course covers the field of bioelectronics, specifically electrode design and implementation, for applications in neuroprosthetics. Electrode materials, electrode array fabrication, electrode modeling, electrical stimulation parameters, bioelectrode charge transfer mechanisms, and interfaces with biological systems are discussed. The fundamental theories of electromagnetism and a history of bioelectromagnetics are reviewed.

Target Audience: This class is designed for engineers transitioning into the field of bioelectronics, electronics engineers interested in neurobiologics, and professionals looking for an understanding of bioelectronics to complete their job. **See Page 25**

Full description at,

<http://ieeeeboston.org/fundamentals-of-bioelectronics-for-applications-in-neuroprosthetics/>

continued on next page

(Last Notice, Please Register Now!!)**DSP for Wireless Communications (13 hours of instruction!)****Time & Date:** 6:00 - 9:00PM, Tuesdays, April 9, 16, 23, 30, May 7**Location:** Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA**Speaker:** Dan Boschen

Course Summary: This course is a fresh view of the fundamental 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 bring a laptop to class, and all set-up information for installation will be provided prior to the start of class. **See Page 30**

Full Description at,**<http://ieeeboston.org/digital-signal-processing-dsp-wireless-communications/>****DSP for Software Radio (13 hours of instruction!)****Time & Date:** 6:00 - 9:00PM, Wednesdays, May 15, 22, 29, June 5, 12**Location:** Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA**Speaker:** Dan Boschen

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. The course title has been changed with some minor additions but this is the same course that was previously taught titled “More DSP for Wireless Communications”, with the addition of Python demonstrations using Jupyter Notebooks.

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.

Target Audience: All engineers involved in or interested in signal processing for wireless communications. Students should have either taken the earlier course “DSP for Wireless Communications” or have been sufficiently exposed to basic signal processing concepts such as Fourier, Laplace, and Z-transforms, Digital filter (FIR/IIR) structures, and representation of complex digital and analog signals in the time and frequency domains. Please contact Dan at boschen@loglin.com if you are uncertain about your background or if you would like more information on the course. **See Page 32**

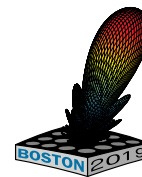
Full description at, <http://ieeeboston.org/digital-signal-processing-dsp-wireless-communications-2/>



CALL FOR PAPERS

2019 IEEE International Symposium on Phased Array Systems and Technology

Revolutionary Developments in Phased Arrays



Sponsors

Platinum



Gold



Silver



LINCOLN LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY



Exhibitors



Micro-Mode



Media Sponsors



Technical Co-Sponsors



15–18 October 2019

Westin Waltham Hotel, Greater Boston, Massachusetts, USA

www.array2019.org

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



Sessions

- Array Design
- Array Measurements
- Beamforming and Calibration
- T/R Modules
- Radar Systems
- Communications Arrays
- Metamaterial Phased Arrays
- Signal Processing and Architectures
- Millimeter Wave and Terahertz

Special Sessions

- European Phased Array Systems and Technology
- Asia-Pacific Phased Array Systems and Technology
- Dual-Polarization Weather Radar Arrays
- Wideband Array Apertures

See website: www.array2019.org for details

General Paper Submission Information

All paper submissions will be peer reviewed and must be received in PDF format via the symposium web site on or before **Friday, 19 April 2019**. Papers must be in IEEE dual-column format and must be 2 pages (minimum) to 8 pages (maximum) in length including figures. Additional instructions are on the website.

www.array2019.org/call-for-papers

Paper Template and Submission Procedures

Template and submission procedures are available at www.array2019.org/call-for-papers

Technical Program Schedule

Please note: Our submission process and dates have been streamlined – plan accordingly.

19 April 2019 – Full paper submission deadline

- Submitted paper must be final and in IEEE dual-column format, not an abstract
- Submitted paper must be 2–8 pages in length including figures

01 June 2019 – Author notification of paper acceptance

01 Sept. 2019 – Conference registration deadline for accepted authors

Conference Committee

Conference Chair:

Jeffrey S. Herd, MIT LL

Vice Chair:

William Weedon, Applied Radar

Technical Program Chair:

Alan J. Fenn, MIT LL

Technical Program Vice Chair:

David Mooradd, MIT LL

Honorary Chair:

Eli Brookner, Raytheon (retired)

Secretary:

Duane J. Matthiesen, Technia

Publicity:

Glenn Meurer, MITRE

Don McPherson, SRC, Inc.

Publications:

Raoul Ouedraogo, MIT LL

Mark McClure, STR

Plenary Session:

Bradley T. Perry, MIT LL

Eli Brookner, Raytheon (retired)

Tutorials:

Will Moulder, MIT LL

Wajih Elsallal, MITRE

Student Program:

Justin Kasemodel, Raytheon

Honglei Chen, The MathWorks

International Liaison:

Alfonso Farina, Selex (retired)

Alberto Moreira, DLR

Sponsorships

Dan Culkin, NGC

Social Media:

Andrew Zai, Raytheon

Special Sessions:

Sean Duffy, MIT LL

Glenn Hopkins, GTRI

Web page:

Kathleen Ballos, Ballos Associates

Kenneth E. Kolodziej, MIT LL

5G Advisors:

Jonathan Williams, Teradyne

Tony Fischetti, RADA Technologies

Exhibits Chair:

Matt Facchine, NGC

Local Arrangements/Finance:

Robert Alongi, IEEE Boston

Poster Session:

Pierre Dufilie, MIT LL

Advisors:

Greg Charvat, Humatics Inc.

Greg Arlow, Lockheed Martin

IEEE Boston Section Online Courses:

(Students have 90 day access to all online, self-paced courses)

Verilog101:Verilog Foundations

Full course description and registration at ,
<http://ieeeeboston.org/verilog-101-verilog-foundations-online-course/>

System Verilog 101: Design Constructs

Full course description and registration at ,
<http://ieeeeboston.org/systemverilog-101-sv101-design-constructs-online-course/>

System Verilog 102: Verification Constructs

Full course description and registration at ,
<http://ieeeeboston.org/systemverilog-102-sv102-verification-constructs-online-course/>

High Performance Project Management

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

Introduction to Embedded Linux Part I

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

Embedded Linux Optimization - Tools and Techniques

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

Embedded Linux Board Support Packages and Device Drivers

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

Software Development for Medical Device Manufacturers

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

Fundamental Mathematics Concepts Relating to Electromagnetics

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

Reliability Engineering for the Business World

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

Design Thinking for Today's Technical Work

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

Fundamentals of Real-Time Operating Systems

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

April Chapter Meeting Summary

Entrepreneurs' Network – 6:30PM, Tuesday, 2 April

Project, Hobby ... or Company?

PRE-MEETING DINNER at 5:15 PM (sharp) at Bertucci's, Waltham

Great startups begin with intrepid entrepreneurs, bursting with creativity, energy and the ability to cope with sleep deprivation is often helpful. Also, an essential component of a successful startup is a great idea – an idea that can be commercialized or monetized in some way. Some successful companies can be spawned from a hobby - say, for example, Zuckerberg's online student directory and photo sharing program - or an interesting research project that can be massaged into a commercial product, like Humira (adalimumab), from Cambridge Antibody Technology. However, not all projects or hobbies will ever be anything more than an interesting tool or a pleasant way to pass time. Our panel of experts will help to clarify what it takes to make a company. Join us for a compelling discussion and some great networking. Meeting Location: Constant Contact, Inc., Reservoir Place, 3rd Floor Great Room, 1601 Trapelo Rd., Waltham, MA. **See Page 11.**

Entrepreneurs' Network Cambridge Meeting - 6:00PM, Tuesday, April 9

Making Your Pitch A Money Magnet

One of the most obvious and challenging key requirements for the success of an early stage entrepreneurial company is securing funding. Our Boston ENET April 9th meeting is focused on learning how to win potential investors with the right pitch deck and presentation. The investor presentation is your primary vehicle for conveying an organized thought process to investors about your business, team, and pathway to success. Entrepreneurs need well-conceived investor presentations and executive summaries to get the attention of investors and build interest in their business. We will also focus on how companies can build a value proposition which will enable an entrepreneur to raise value, a critical step prior to raising money. We have two excellent speakers for that evening, two are active angel investors. Our 3rd speaker is a founder CEO who has received seed and angel funding, who will speak to some of things that were most important in her pitch to enable her to gain angel funding. Meeting Location: Draper, Hill Building, One Hampshire Street, Cambridge, MA. **See Page 13.**

Life Members – 4:00PM, Wednesday, 10 April

Art for Engineers? An overview and deeper dive into the Worcester Art Museum

Engineers very seldom get to be invited to tour the world famous Worcester Art Museum which houses a medieval armor collection and many paintings. The Life Members will have a conducted tour May 15, 2019. This month's meeting will consist of an introduction to the tour and will be presented by an expert docent - Debra A. Wallace. Meeting Location: MIT Lincoln Laboratory's Main Cafeteria, 244 Wood Street., Lexington, MA. **See Page 15.**

Reliability Society – 5:30PM, Wednesday, 10 April

Dfr- Design For Rinse-Ability: Effect of SMT Component Package Design on Cleaning Effectiveness

Recent CCAs-circuit card assemblies manufactured using SMT-surface mount technology processes have exhibited cleaning residues remaining on the surface of components and within electronic component / package housings with discoloration (degradation) of Cu-wire insulation and discoloration (oxidation) of the metal contacts observed, which may compromise the surface conformal coating properties, and possibly degrade the component's electrical performance and long-term reliability. Meeting Location: Hampton Inn Boston Bedford Burlington, 25 Middlesex Turnpike, Billerica, MA. **See Page 16.**

Microwave Theory and Techniques Society – 6:00PM, Tuesday, 16 April**Analog Photonic Systems: Features & Techniques to Optimize Performance**

Dr. Edward I. Ackerman, Photonic Systems, Inc. Both the scientific and the defense communities wish to receive and process information occupying ever-wider portions of the electromagnetic spectrum. This can often create an analog-to-digital conversion “bottleneck”. Analog photonic channelization, linearization, and frequency conversion systems can be designed to alleviate this bottleneck. Moreover, the low loss and dispersion of optical fiber and integrated optical waveguides enable most of the components in a broadband sensing or communication system, including all of the analog-to-digital and digital processing hardware, to be situated many feet or even miles from the antennas or other sensors with almost no performance penalty. Meeting Location: MMIT Lincoln Laboratory, 3 Forbes, Road, Lexington, MA 02421. **See Page 17.**

Computer Society and GBC/ACM – 7:00PM, Thursday, 18 April**Kyrix: A Detail-on-Demand Visualization System**

Mike Stonebraker, MIT. Kyrix is a “detail-on-demand” visualization system. As such, it supports a pan/zoom/jump interface similar to Google Maps. The benefit of such systems is the interface can be learned quickly and no user manual is required. Also, it facilitates browsing over large amounts of data, drilling into areas of interest to get more information. Although Kyrix is a natural on geographic data, it can also be used on any kind of data that is amenable to a two-dimensional layout. Meeting Location: MIT Room 32-G449 (Kiva). **See Page 18.**

Consultants Network – 6:30PM, Tuesday, 23 April**Everything You Wanted To Know About Consulting But Were Afraid To Ask**

This meeting will feature our annual panel discussion with five independent consultants who will share their experience and ideas on how start and build a consulting practice. Meeting Location: Constant Contact, Great Room South, 3rd Floor, 1601 Trapelo Road, Waltham, MA. **See Page 19.**

Geoscience and Remote Sensing Society (GRSS) and Aerospace and Electronic Systems Society (AESS) – 6:00PM, Tuesday, 30 April**Distributed Detection and Data Fusion**

Prof. Peter K. Willett. The initial paper on the subject of distributed detection, by Tenney and Sandell, showed that under a fixed fusion rule, for two sensors with one bit outputs, the optimal Bayes sensor decision rule is a likelihood ratio test. It has been shown that the optimal fusion rule for N sensors is a likelihood ratio test on the data received from the sensors. Reibman and Nolte and Hoballah and Varshney have generalized the results to N sensors with optimal fusion, again with the restriction of one bit sensor outputs; this has been relaxed later to multi-bit quantizations. In this “primer” talk we explore a number of issues in distributed detection, including some pathologies, the benefits of fusion, optimal design, structures for decision flow, consensus, sensor biases, feedback, deliberate obfuscation (i.e., security) and censoring. Meeting Location: MIT Lincoln Laboratory, 3 Forbes Rd, Lexington, MA 02421. **See Page 20.**

Entrepreneurs' Network – 6:30PM, Tuesday, 2 April

Project, Hobby ... or Company?

Location: Constant Contact, Inc., Reservoir Place, 3rd Floor Great Room, 1601 Trapelo Rd., Waltham, MA

PRE-MEETING DINNER at 5:15 PM (sharp) at Bertucci's, Waltham

Great startups begin with intrepid entrepreneurs, bursting with creativity, energy and the ability to cope with sleep deprivation is often helpful. Also, an essential component of a successful startup is a great idea – an idea that can be commercialized or monetized in some way. Some successful companies can be spawned from a hobby - say, for example, Zuckerberg's online student directory and photo sharing program - or an interesting research project that can be massaged into a commercial product, like Humira (adalimumab), from Cambridge Antibody Technology. However, not all projects or hobbies will ever be anything more than an interesting tool or a pleasant way to pass time. Our panel of experts will help to clarify what it takes to make a company. Join us for a compelling discussion and some great networking.

Agenda:

6:30-7:30 PM - Registration & networking
 7:30-7:40 PM - ENET Chairman's announcements
 7:40-7:55 PM - E Minute - Up to 3 Startup companies' presentations
 7:55-8:45 PM - 4 expert speakers on the night's topic
 8:45-9:00 PM - Audience / Speakers Q & A
 900-930 PM - Final networking includes meeting presenting speakers

A question and answer session follow the presentation, and panelists will be available afterward for responses to individual questions. As with every ENET meeting, you will also get the chance to network with the panelists and other meeting attendees, both before the start of the meeting and afterward.

Panel:

Tanya Kanigan, Ph.D., Chief Operating Officer, Genomic Expression

Great startups begin with intrepid entrepreneurs, bursting with creativity, energy

- and the ability to cope with sleep deprivation is often helpful. Also, an essential component to a successful startup is a great idea – an idea that can be commercialized or monetized in some way. Some successful companies can be spawned from a hobby - say for example, Zuckerberg's online student directory and photo sharing program - or an interesting research project that can be massaged into a commercial product, like Humira (adalimumab), from Cambridge Antibody Technology. However, not all projects or hobbies will ever be anything more than an interesting tool or a pleasant way to pass time. Our panel of experts will help to clarify what it takes to make a company. Join us for a compelling discussion and for some great networking.



Steve Gullans, Ph.D., CEO, Gemphire Therapeutics

Steve is an experienced biotech exec, venture investor, scientist, entrepreneur, and author. Prior to his leadership at Gemphire, he was Managing Director at Excel Venture Management. He has held executive and board positions in a number of private and public companies. Steve loves innovation and has spoken widely, including at TED, TEDMED, and TEDx. He co-authored *Evolving Ourselves*, a book that provides a sweeping tour of how humans are changing the course of evolution—sometimes intentionally, sometimes not. Steve began his career as a professor at Harvard Medical School where he published more than 130 scientific papers and was elected a Fellow of the American Association for the Advancement of Science.



Charlie Maher, MBA, Executive Director, Performance and Reliability, CAI

A proven leader who builds high-performing teams, Charlie enables life science firms achieve ambitious goals for the development and manufacture of novel therapeutics and medical devices. He works with clients to deliver innovative technical and business solutions that create exceptional value for patients, sponsors and investors. He provides clients with experienced leadership to drive critical phases of



the product lifecycle including process validation, manufacturing strategy, supplier selection, tech transfer and scale-up, commissioning and qualification and product lifecycle management. Charlie has over 25 years of experience leading organizations in the biopharma industry and in the United States Navy, including director-level leadership of several multi-million biopharma engineering projects, Commanding Officer of a nuclear-powered submarine and Chief of Staff of Naval Undersea Warfare Center, the Navy's 7,000-person organization for research, development, acquisition and lifecycle support for undersea weapon systems.



Brian Popiel, Group CFO/COO, COSIMO Ventures

Brian is a finance specialist with an extensive background in technology, fintech and financial services. His diverse career has allowed him to garner valuable skills and experience in finance, management, operations, compliance, and law. After

starting his professional career as a corporate lawyer at Holland & Knight, Brian then spent most of his career in key roles at Venture Capital and Investment Management firms, including SOFTBANK, Independence Investments, a Manulife Financial company, and Amundi Pioneer, where his work consisted of researching, assessing and investing in a wide range of businesses – both public and private. Most recently, Brian served as the Chief Financial Officer, Chief Compliance Officer and General Counsel of ObserveIT Inc., a Bain Capital Ventures-backed cybersecurity company. He holds an A.B., cum laude, from Harvard University and a J.D. from Boston College Law School.



Roger Frechette, Ph.D., Founder and Principal, NEPAAssociates

My daily purpose is to exercise an innate drive to transform ideas and projects into life-changing commercial assets. In the life science business, this is the long game, requiring boundless energy and

creativity, coupled with knowledge, experience, and patience.

In my consulting work, I leverage an extensive global network and insights derived from >20 years of experience in business development, calibrated with an extensive science background. My career has encompassed success as a business executive, project/alliance manager and entrepreneur, and also as a scientist, including leadership of discovery/preclinical development teams resulting in a new drug candidate – NDAs for omadacycline submitted by Paratek in early 2018.

E-Minute Presentations will be given at the start of the meeting. These very short presentations enable young startup entrepreneurs to gain experience in presenting their summary business plans to expert panels and audiences.

Registration:

ENET Member Rate - Free

MDG Member – \$15.00

Non-ENET Member Rate – \$20.00

Student – \$10.00

Register at <https://boston-enet.org/event-3097491>

Directions: Constant Contact is adjacent to RT 128 / 95 at Exit 28B.

Reservations: Please register at <https://boston-enet.org/event-3097491>

ENET Constant Contact meetings are free to ENET members and \$20 for non-members. No reservations are needed for the pre-meeting dinner. To expedite sign-in for the meeting, we ask that everyone -- members as well as non-members -- pre-register online. Pre-registration is available until midnight the day before the meeting. If you cannot pre-register, you are welcome to register at the door.

REFRESHMENTS: Snacks and soft drinks will be served at the meeting

Entrepreneurs' Network Cambridge Meeting - 6:00PM, Tuesday, April 9

Making Your Pitch A Money Magnet

Location: Draper, Hill Building, One Hampshire Street, Cambridge, MA

One of the most obvious and challenging key requirements for the success of an early stage entrepreneurial company is securing funding. Our Boston ENET April 9th meeting is focused on learning how to win potential investors with the right pitch deck and presentation. The investor presentation is your primary vehicle for conveying an organized thought process to investors about your business, team, and pathway to success. Entrepreneurs need well-conceived investor presentations and executive summaries to get the attention of investors and build interest in their business. We will also focus on how companies can build a value proposition which will enable an entrepreneur to raise value, a critical step prior to raising money. We have two excellent speakers for that evening, two are active angel investors. Our 3rd speaker is a founder CEO who has received seed and angel funding, who will speak to some of things that were most important in her pitch to enable her to gain angel funding.

Our moderator is one of "Boston's 20 top startup lawyers" and ENET chairman.

Agenda:

6:00-7:00 PM - Registration & networking
 7:00-7:10 PM - ENET Chairman's announcements
 7:10-7:25 PM - eMinute - Up to 3 Startup companies' presentations
 7:25-8:15 PM - Two expert speakers on the night's topic
 8:15- 8:30 PM - Audience / Speakers Q & A
 8:30 - 9:00 PM - Final networking includes meeting presenting speakers

A question and answer session follows the presentation, and panelists will be available afterward for responses to individual questions. As with every ENET meeting, you will also get the chance to network with the panelists and other meeting attendees, both before the start of the meeting and afterward.

Speakers:

David Verrill, Founder/Managing Director, Hub Angel Investment Group, Chair Emeritus--Angel Capital Association: Hub Angels

David currently manages a portfolio of more than 40 companies across six funds. The Hub funds and Members have invested more than \$40 million in a broad range of sectors including Mobile/Media, Internet/Web Services, Software, Life Sciences, and Electronics/Industrial. <http://www.hubangels.com> David's professional career began as a research scientist at the Center for Blood Research in Boston focusing on the MHC of genetically engineered mice. After receiving his master's degree from Sloan in 1987, he spent a decade at MIT raising capital from industry and facilitating technology transfer. David still holds a partial appointment at the MIT Initiative on the Digital Economy. In 1996 he joined Xerox as Manager of International Sales and Business Development for the Adaptive Products Division before it was sold. In 1998 David joined third party marketing firm Winchester International Group as Managing Director. In 2000 Winchester helped found the Hub Angels, an early stage investment group in Boston. David sits on the Boards of several Hub portfolio companies, and is Chair Emeritus of the Angel Capital Association. David was educated at Bowdoin College and the MIT Sloan School of Management.



Jason Allen, Vice President – Investments, MassVentures

A venture capital firm focused on fueling the Massachusetts innovation economy by funding early-stage, high-growth Massachusetts startups as they move from concept to commercialization. <https://www.mass-ventures.com> In this role, Jason sources and executes new investment opportunities, manage investments in portfolio companies, and engage with the Massachusetts entrepreneurial and innovation community. Prior to MassVentures, Jason was at Launch Capital where he focused on sourcing and evaluating new investments across industry verticals. Jason is an experienced operator in SaaS, B2B enterprise software, and marketplace companies. Over the course of his career, he has overseen sales, marketing and business operations at emerging technology companies. Most recently, he served as general manager of Ovia Insights, a division of Ovia Health, where he led sales and marketing efforts. Jason has also worked as the Director of Inside Sales at Attivio—a natural language processing, AI powered search and text company.



Jason earned a J.D. from Northeastern University School of Law, a Master of Theological Studies from Harvard Divinity School, and a B.A. from Denison University.



Sheela Sethuraman, CueThink.

Sheela has over 20 years of experience in building and implementing educational technology solutions in K-12 classrooms. At CueThink, Sheela and her team have successfully taken the vision of a peer platform for math problem solving and built and deployed a scalable application to foster critical thinking and collaboration skills. As Founder and CEO, Sheela has been instrumental in securing \$3MM from the National Science Foundation, NewSchools Venture Fund, MassVentures and angel investors. She has been successful in fostering partnerships with leading Math groups and selling to school districts across the country. Prior to CueThink, Sheela was Project Director at Pearson Education and before that, she was Director of Technology at CAST, where she spearheaded numerous technical products including CAST eReader and Thinking Reader. Sheela has been a member of various consortiums such as Web Access Initiative (WAI), National Instructional Materials Accessibility Standard (NIMAS) and Open eBook Forum. She has also been a podcaster for the Stanford Business School's Center for Social Innovation.



Moderator:

Robert Adelson, business and tax attorney, partner at Boston law firm of Engel & Schultz LLP, and Chairman of The Boston Entrepreneurs' Network.

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 his present firm in 2004. Rob represents entrepreneurs, startups 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. 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 since 2009. 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. His website - www.ExecutiveEmploymentAttorney.com

eMinute Presentations will be given at the start of the meeting. These very short presentations enable young startup entrepreneurs to gain experience in presenting their summary business plans to expert panels and audiences.

Registration:

ENET Member - Free

Non-ENET Member – \$10.00

Register at:

<https://www.boston-enet.org/event-3097505>

COST AND RESERVATIONS: ENET meetings are free to ENET members and \$10 for non-members. To expedite sign-in for the meeting, we ask that everyone -- members as well as non-members -- pre-register for the meeting online. Pre-registration is available until midnight the day before the meeting. If you cannot pre-register, you are welcome to register at the door.

REFRESHMENTS: Pizza, salad and soft drinks will be served at this meeting.

LOCATION: Draper, Hill Building, One Hampshire St. Cambridge, MA 02139 (directions). The address is One Hampshire St but the entrance is actually on Broadway. Attendees must arrive at Draper before 7pm. Entrance will be locked after 7pm.

PUBLIC TRANSPORTATION: Kendall Square stop on the Red Line.

PARKING: Parking Near Draper - Kendall Center Blue, Yellow, and Green Parking Garages. Metered parking is often available after 6pm.

Life Members – 4:00PM, Wednesday, April 10

Art for Engineers? An overview and deeper dive into the Worcester Art Museum

Debra A. Wallace

Engineers very seldom get to be invited to tour the world famous Worcester Art Museum which houses a medieval armor collection and many paintings. The Life Members will have a conducted tour May 15, 2019. This month's meeting will consist of an introduction to the tour and will be presented by an expert docent. The Worcester Art Museum is home to several significant portraits from the Massachusetts Bay Colony, including portraits of John and Elizabeth Freake, and Captain Thomas Smith. During this presentation we will explore these significant portraits and several other portraits that demonstrate the transition in portraiture over the intervening centuries to the 21st century. We will look for clues to the occupation, status and perhaps even the identity of the subject, as well as view a few ghostly images. Finally, we will explore how important the brain is in interpreting what we see.

Debra Wallace is a Docent at the Worcester Art Museum (WAM), Worcester MA. She completed her Docent Training at the museum. Ms. Wallace is devoted to fostering community engagement with the museum and

enhancing the museum guest experience. Recently, she led the WAM Tour of the Month on Art in the Islamic World.

Previously, Ms Wallace led cross-functional and multi-organizational teams to design and implement new health plan products, utilization management programs, medical cost containment strategies, software development and new process definition at Fallon Health, and was recipient of the Fallon Health Extraordinary Accountability Award and Extraordinary Teamwork Awards. This expertise has followed her into the non-profit sector, where she facilitates strategic planning, business development and implementation.

The meeting will be held at MIT Lincoln Laboratory's Main Cafeteria, 244 Wood Street., Lexington, MA at 4:00 PM. Refreshments will be available at 3:30 PM. Please use the Wood Street Gate to the Laboratory. Follow signs from outside reception to the Main Cafeteria (elevators are available via reception). For directions go to <http://www.ll.mit.edu/>.

IEEE Boston Section Social Media Links:

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

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

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

Google+: <https://plus.google.com/107894868975229024384/>

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

Reliability Society – 5:30PM, Wednesday, 10 April

DfR- Design For Rinse-Ability:

Effect of SMT Component Package Design on Cleaning Effectiveness

WHERE: NOTE LOCATION CHANGE FOR THIS MEETING

**Hampton Inn Boston Bedford Burlington, 25
Middlesex Turnpike, Billerica, MA 01821**



Recent CCAs-circuit card assemblies manufactured using SMT-surface mount technology processes have exhibited cleaning residues remaining on the surface of components and within electronic component / package housings with discoloration (degradation) of Cu-wire insulation and discoloration (oxidation) of the metal contacts observed, which may compromise the surface conformal coating properties, and possibly degrade the component's electrical performance and long-term reliability.

Given that military applications require a high level of performance and reliability, CCAs- circuit card assemblies and components undergo a semi-aqueous chemical cleaning process after SMT-surface mount technology assembly in order to properly prepare CCAs for the conformal coating process and protect the electronic components as intended from moisture and harsh environments.

However, if any active cleaning constituents and un-reacted by-products are not removed or rinsed completely from the surface or from within the components, then the surface may not be suitable for subsequent conformal coating, and may also result in materials degradation and/or corrosion, which may detrimentally affect the electrical performance, if entrapped within the components.

This paper will discuss the “physics” of liquid entrainment / entrapment / cleaning / rinsing and their effects on component materials with experiments performed to determine the, major component design parameters required to adequately aqueous-rinse components of their cleaning residues with the objective of developing and providing “Design for Rinse-ability” guidelines to deploy. In addition, accelerated humidity testing with electrical testing will be discussed, that was performed to determine the degree of

degradation / corrosion or electrical reliability of components exposed to cleaning chemistries.

Norman Armendariz is an Engineering Fellow at Raytheon responsible for materials engineering design, materials analysis, process equipment development, production support and technology roadmaps associated with the manufacturing of CCA- circuit card assemblies used in missiles, smart munitions, ground based radars, and mobile sensors across multiple US and international sites.

Norm has over 25 years of industrial experience, having worked for Lockheed/NASA, Motorola, Intel, Texas Instruments and American University.

He holds an interdisciplinary PhD in Chemical Engineering from New Mexico State University, MS in Materials Science Engineering from the University of Illinois at Urbana-Champaign, and BS Metallurgical Engineering from Colorado State University, with 9 US patents and 29 peer-reviewed publications.

Registration: [click here](http://ewh.ieee.org/r1/boston/rl/events.html)

Copy and paste link

<http://ewh.ieee.org/r1/boston/rl/events.html>

MEETING LOCATION: Hampton Inn Boston Bedford Burlington 25 Middlesex Turnpike, Billerica, MA 01821 1-978-262-9977

From the North: Take Route 3 South to Exit 26 (Route 62 Burlington / Bedford). Turn left at traffic light at bottom of ramp onto Route 62 East. Continue ~0.6 miles, then at third traffic light turn left onto Middlesex Turnpike. Continue ~0.7 miles, then at first traffic light turn right. Continue ~0.1 miles to Hampton Inn on left

From the South: Take Route 3 North to Exit 26 (Route 62 Burlington / Bedford). Keep right at bottom of ramp onto Route 62 East. Continue ~0.3 miles, then at second traffic light turn left onto Middlesex Turnpike. Continue ~0.7 miles, then at first traffic light turn right. Continue ~0.1 miles to Hampton Inn on left

Microwave Theory and Techniques Society – 6:00PM, Tuesday, 16 April
Part of the IEEE MTT-S Microwave Distinguished Lecture Series

Analog Photonic Systems: Features & Techniques to Optimize Performance

Speaker: Dr. Edward I. Ackerman, Photonic Systems, Inc.



Both the scientific and the defense communities wish to receive and process information occupying ever-wider portions of the electromagnetic spectrum. This can often create an analog-to-digital conversion “bottleneck”. Analog photonic channelization, linearization, and frequency conversion systems can be designed to alleviate this bottleneck. Moreover, the low loss and dispersion of optical fiber and integrated optical waveguides enable most of the components in a broadband sensing or communication system, including all of the analog-to-digital and digital processing hardware, to be situated many feet or even miles from the antennas or other sensors with almost no performance penalty. The anticipated presentation will highlight the advantages and other features of analog photonic systems (including some specific systems that the author has constructed and tested for the US Department of Defense), and will review and explain multiple techniques for optimizing their performance.

Edward I. Ackerman received his B.S. degree in electrical engineering from Lafayette College in 1987 and his M.S. and Ph.D. degrees in electrical engineering from Drexel University in 1989 and 1994, respectively. From 1989 through 1994 he was employed as a microwave photonics engineer at Martin Marietta's Electronics Laboratory in Syracuse, New York, where he used

low-loss narrowband impedance matching techniques to demonstrate the first amplifierless direct modulation analog optical link with RF gain (+3.7 dB at 900 MHz). From 1995 to July 1999 he was a member of the Technical Staff at MIT Lincoln Laboratory, where he developed high-performance analog photonic links for microwave communications and antenna remoting applications. During this time he achieved the lowest noise figure ever demonstrated for an amplifierless analog optical link (2.5 dB at 130 MHz). While at Lincoln Laboratory he also developed and patented a novel linearization technique that uses a standard lithium niobate modulator with only one electrode to enable improved analog optical link dynamic range across broad bandwidths and at higher frequencies than other linearization techniques currently allow.

Since 1999 he has been Vice President of R & D for Photonic Systems, Inc. of Billerica, Massachusetts. He has co-edited a book and has authored or co-authored three book chapters as well as more than 70 technical papers on the subject of analog photonic subsystem performance modeling and optimization. Dr. Ackerman is a Fellow of the IEEE. He holds eight US patents.

Meeting Location: 5:30PM refreshments, talk begins at 6:00PM. MIT Lincoln Laboratory, 3 Forbes, Road, Lexington, MA 02421

Computer Society and GBC/ACM – 7:00PM, Thursday, 18 April

Kyrix: A Detail-on-Demand Visualization System

Mike Stonebraker, MIT

This talk will be webcast on the MIT CSAIL Youtube channel <http://www.youtube.com/channel/UCYs2i-UgksAhgoidZwEAimmg/live> beginning at 7pm.



Kyrix is a “detail-on-demand” visualization system. As such, it supports a pan/zoom/jump interface similar to Google Maps. The benefit of such systems is the interface can be learned quickly and no user manual is required. Also, it facilitates browsing over large amounts of data, drilling into areas of interest to get more information. Although

Kyrix is a natural on geographic data, it can also be used on any kind of data that is amenable to a two-dimensional layout.

Many detail-on-demand systems have been constructed in the past; mostly hard-coded to support a single application. In contrast, Kyrix is easily programmable to support any kinds of objects, not just maps or satellite imagery.

Kyrix is now operational, and we will demo the system on a Massachusetts General Hospital (MGH) application using 30T of EEG sleep study data. We also have a genomics browser (in conjunction with Paradigm4), a browser into internet traffic (in conjunction with Recorded Futures), and a browser for the MIT Data Civilizer data integration system.

We also, show how we achieve end-to-end response time of 500 msec. or less and discuss the concept of supporting multiple co-ordinated viewports on the screen at once.

More details can be obtained from our CIDR paper on Kyrix, available from <http://cidrdb.org/cidr2019/papers/p70-tao-cidr19.pdf>

Dr. Stonebraker has been a pioneer of data base research and technology for more than forty years. He was the main architect of the INGRES relational DBMS, and the object-relational DBMS, POSTGRES. These prototypes were developed at the University of California at Berkeley where Stonebraker was a Professor of Computer Science for twenty five years. More recently at M.I.T. he was a co-architect of the Aurora/Borealis stream processing engine, the C-Store column-oriented DBMS, the H-Store transaction processing engine, the SciDB array DBMS, and the Data Tamer data curation system. Presently he serves as Chief Technology Officer of Paradigm4 and Tamr, Inc. Professor Stonebraker was awarded the ACM System Software Award in 1992 for his work on INGRES. Additionally, he was awarded the first annual SIGMOD Innovation award in 1994, and was elected to the National Academy of Engineering in 1997. He was awarded the IEEE John Von Neumann award in 2005 and the 2014 Turing Award, and is presently an Adjunct Professor of Computer Science at M.I.T.

See http://amturing.acm.org/award_winners/stonebraker_1172121.cfm for more biographical details.

This joint meeting of the Boston Chapter of the IEEE Computer Society and GBC/ACM will be held in MIT Room 32-G449 (the Kiva conference room on the 4th floor of the Stata Center, building 32 on MIT maps) . You can see it on this map of the MIT campus.

Up-to-date information about this and other talks is available online at <http://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 <http://mailman.mit.edu/mailman/listinfo/ieee-cs>, our self-administered mailing list.

Consultants Network – 6:30PM, Tuesday, 23 April

Everything You Wanted To Know About Consulting But Were Afraid To Ask

Location: *Constant Contact, Great Room South, 3rd Floor, 1601 Trapelo Road, Waltham, MA 02451*

This meeting will feature our annual panel discussion with five independent consultants who will share their experience and ideas on how start and build a consulting practice.

Topics covered will include:

Should you be a consultant? Pros & cons. Skills, experience, technology, personal preferences

Business prospecting: sourcing leads; the value of networking

Proposals, pricing, payment schedule

On site or off?

Your tools vs. client's tools

Finalizing a contract

Record keeping

Subcontracting through job shops

Business structure: Incorporation, sole proprietorship, partnership

Payment choices: 1099, Corp to Corp, or W2

Business finances: funding, salaries, operating expenses, benefits, health insurance, retirement

Pitfalls to avoid.

Panel Members:

(To be announced)

PLEASE NOTE: The meeting is open to the public. No charge for Consultants Network members or employees of Constant Contact; \$5 entrance fee for all others. Casual dress.

The Consultants Network meeting starts at 6:30 PM. The meeting will take place at Constant Contact, Reservoir Place - 1601 Trapelo Road, Waltham, MA 02451, in the Great Room on the third floor.

Registration - No registration required, non-member admission fee – \$5.00

A no host, PRE-MEETING DINNER will take place at 5:15 PM (sharp) at Bertucci's, 475 Winter Street, Waltham, MA (exit 27B, Rte. 128)

Driving Directions to Constant Contact; Follow I-95/ route 128 to Trapelo Rd in North Waltham, Waltham. Take exit 28 from I-95/route 128.(<https://goo.gl/maps/tvn3l>)

Consultants Network meetings generally take place on the fourth Tuesday of each month, but are not held during the summer months.

For more information, e-mail or contact the chairman Frederick Beihold, at 508-405-0499. email@blackoakshop.com

IEEE Boston Section Social Media Links:

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

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

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

Google+: <https://plus.google.com/107894868975229024384/>

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

Geoscience and Remote Sensing (GRSS), and Aerospace and Electronic Systems (AESS) Societies – 6:00PM, Tuesday, 30 April

Distributed Detection and Data Fusion

Speaker: Prof. Peter K. Willett



The initial paper on the subject of distributed detection, by Tenney and Sandell, showed that under a fixed fusion rule, for two sensors with one bit outputs, the optimal Bayes sensor decision rule is a likelihood ratio test. It has been shown that the optimal fusion rule for N sensors is a likelihood ratio test on the data re-

ceived from the sensors. Reibman and Nolte and Hoballah and Varshney have generalized the results to N sensors with optimal fusion, again with the restriction of one bit sensor outputs; this has been relaxed later to multi-bit quantizations.

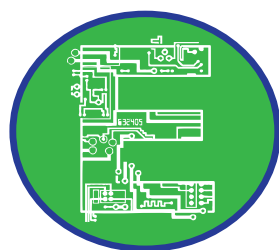
In this “primer” talk we explore a number of issues in distributed detection, including some pathologies, the benefits of fusion, optimal design, structures for decision flow, consensus, sensor biases, feedback, deliberate obfuscation (i.e., security) and censoring. We also devote some time to distributed estimation (i.e., fusion for tracking): why is it difficult and what seems to work best?

Peter Willett received his BSc (Engineering Science) from the University of Toronto in 1982, and his PhD degree from Princeton University in 1986. He has been a faculty member at the University of Connecticut ever since, and since 1998 has been a Professor. He has

published 168 journal articles (14 more under review), 355 conference papers, and 10 book chapters and a book on target tracking and data association. He was awarded IEEE Fellow status in 2003. His primary areas of research have been statistical signal processing, detection, machine learning, data fusion and tracking. He has interests in and has published in the areas of change/abnormality detection, optical pattern recognition, communications and industrial/security condition monitoring.

He was editor-in-chief for IEEE Transactions on Aerospace and Electronic Systems from 2006-2011, and served as the AESS Vice President for Publications from 2012-2014. He now serves as Associate EiC of the AES Systems Magazine. Until recently he was associate editor for three active journals – IEEE Transactions on Aerospace and Electronic Systems (for Data Fusion and Target Tracking) and IEEE Transactions on Systems, Man, and Cybernetics, parts A and B. He is also associate editor for the IEEE AES Magazine, associate editor for ISIF’s electronic Journal of Advances in Information Fusion and is Area Editor for the IEEE Signal Processing Society’s Signal Processing Letters.

Meeting Location: MIT Lincoln Laboratory, 3 Forbes Rd, Lexington, MA 02421



LEARNING CENTER

Presented by: 

April Short Course Webinars

Technical Education Training 4/10
MIMO Radar: Introduction and Applications
Sponsored by: Rohde & Schwarz

Technical Education Training 4/24
AESA Radar
Sponsored by: Rohde & Schwarz and Wolfspeed

Signal Integrity Journal Training 4/16
Understanding SNDR
Sponsored by: Rohde & Schwarz

Register to attend at
mwjournal.com/webinars

Past Webinars On Demand



Critical Material Properties for Millimeter-Wave Radar Applications for Autonomous Driving

Sponsored by:  **ROGERS CORPORATION**

Presented by: Joey Kellner, Market Segment Manager and John Coonrod, Technical Marketing Manager

microwavejournal.com/events/1841



Alternatives for Measuring Linearity of 5G and Radar GaN Devices

Sponsored by:  **Boonton**

Presented by: Walt Strickler, VP and General Manager of Boonton Electronics & Matthew Diessner, Director of Business Development for Boonton Electronics and NoiseCom

microwavejournal.com/events/1840



Designing for DDR4 and Beyond

Sponsored by:  **KEYSIGHT TECHNOLOGIES**

microwavejournal.com/events/1838



5G mmWave -- A Challenge for Device Testing and How to Solve It

Sponsored by:  **ROHDE & SCHWARZ**

microwavejournal.com/events/1834

Call for Papers and Posters



Co-Sponsor:
IEEE★USA

2019 IEEE International Symposium on Technologies for Homeland Security

November 5–6, 2019 • Crown Plaza, Woburn MA • information@ieee-hst.org

Call for Papers & Posters

The 19th annual IEEE Symposium on Technologies for Homeland Security (HST '19), will be held November 5–6, 2019 in the greater Boston, MA area. This symposium brings together innovators from leading academic, industry, businesses, Homeland Security Centers of Excellence, and government agencies to provide a forum to discuss ideas, concepts, and experimental results.

Produced by IEEE with technical support from IEEE, IEEE Boston Section, and IEEE-USA and organizational support from MIT Lincoln Laboratory, and Raytheon, this year's event will once again showcase selected technical papers and posters highlighting emerging technologies in:

Humanitarian Assistance
& Disaster Relief

Land/Maritime Borders & Critical
Infrastructure Protection

Biometrics &
Forensics

Cyber Security

Frontier and
Emerging Technologies

We are currently seeking technical paper and poster session submissions in the above areas. This year, we are opening submissions for new Emerging Technologies with promise to affect Homeland Security. Papers examining the feasibility of transition to practice will also be considered. All areas cover the following common topics:

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

Contact Information

For more detailed information on the Call for Papers and Posters, as well as Sponsorship and Exhibit Opportunities, visit the website <http://ieee-hst.org/> or email: information@ieee-hst.org. Submissions should be made at the following website: <https://cmt3.research.microsoft.com/HST2019/>

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

Paper Extended Abstract Deadline: May 6, 2019
Paper and Poster Acceptance Notification: July 1, 2019
Final Paper Submission Deadline: September 16, 2019

Organizing Committee

General Chairs: Melissa Choi, MIT Lincoln Laboratory
James Flavin, MIT Lincoln Laboratory
Deputy Chair: Fausto Molinet, Matrix Internationale
Technical Chairs: Gerald Larocque, MIT Lincoln Laboratory
Anthony Serino, Raytheon
Local Arrangement Chair: Bob Alongi, IEEE Boston
Marketing Chair: Jessica Kelly, Raytheon
Publications Chair: Adam Norige, MIT Lincoln Laboratory
Sponsorship/Exhibits Chair: Fausto Molinet, Matrix Internationale
Special Advisor to the Chair: Lennart Long, EMC Consultant
Registration Chair: Karen Safina, IEEE Boston

Technical Program Committee

Humanitarian Assistance and Disaster Relief
Mischa Shattuck, MIT Lincoln Laboratory
Matt Daggett, MIT Lincoln Laboratory
Lance Fiondella, UMass Dartmouth

Biometrics and Forensics
Eric Schwoebel, MIT Lincoln Laboratory
Bengt Borgstrom, MIT Lincoln Laboratory

Land/Maritime Borders & Critical Infrastructure Protection
John Aldridge, MIT Lincoln Laboratory
Rich Moro, Raytheon
Arash Samani, MITRE

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

Announcing

Radar Conference 2019

Boston



Revolutions in Radar

Corporate Supporters

Platinum



Silver



About the Conference

22-26 April 2019

Westin Waterfront Hotel
Boston, Massachusetts, USA

www.radarconf19.org

A radar revolution is underway, made possible by the rapid evolution of digital electronics, and powered by new innovative architectures, advanced components, novel waveforms and sophisticated processing techniques. Please join us in historic Boston, birthplace of the original American Revolution, as we continue this new revolution in radar technology. The beautiful Westin Waterfront hotel, located in the heart of Boston's seaport district, will make the perfect venue for the international community as we meet to share the latest advances in radar. The conference will include three days of parallel technical sessions, and two days of tutorials with ample opportunity to interact with international radar experts from around the world.

Technical Sessions

- Radar Phenomenology
- Environmental Sensing
- Commercial Radar
- Antenna Technology
- Radar Electronics
- Over the Horizon Radar (OTHR)
- Bistatic/Multistatic
- Passive Radar
- Networked & Distributed Radar
- mm-wave & THz Radar
- Detection & Estimation
- Airborne & Space Based
- SAR and ISAR Imaging
- ATR and Classification
- Ground and Naval
- Tracking
- Cognitive Methods
- Waveform Diversity
- Spectrum Sharing
- Electronic Warfare
- Emerging Systems
- Special Sensors
- Fully Digital Radar*
- Machine Learning/Imaging*
- Mobile Passive Radar*
- Automotive Radar*
- Dynamic Spectrum*
- Machine Learning /Micro-Doppler*

* Indicates Special Session

Tutorials

- Convex Optimization
- OTHR
- Ultra Wideband Surveillance
- Machine Learning (ATR)
- Bistatic and Multistatic
- Adaptive Array Antennas
- Adv Radar Processing Tech
- Into Synthetic Aperture Radar
- RF Convergence
- Detection, Analysis & CFAR
- Radar Systems Prototyping
- ISAR Satellite Imaging
- Tracking and Estimation
- Signal Processing
- GB Passive Radar
- Signal Processing Passive

Conference Agenda

	Mon 22	Tues 23	Wed 24	Thu 25	Fri 26	Sat 27
Morning		Intro/ Plenary	Technical Session	Technical Session	Radar Summer School	
Afternoon	Tutorial Session I	Technical Session	Technical Session	Technical Session		
	Tutorial Session II	Exhibitor Reception	Banquet			
Evening						

Organizing Committee

General Chair

Eric Evans
MIT Lincoln Laboratory (MIT LL)

Deputy Chairs

Mark Russell, Raytheon
Eric Reinke, Northrop Grumman
Anthony DiSimone, Lockheed Martin

Vice Chair

Jennifer Watson, MIT LL

Technical Chair

Dan Rabideau, MIT LL

Technical Vice Chair

Dan Bliss, Arizona State University

Exhibits

Pamela Evans, MIT LL

International

Alfonso Farina, Selex (ret.)
Hugh Griffiths,
University College London

Plenary

Eli Brookner, Raytheon (ret.)
Frank Robey, MIT LL

Publications

Jeffrey Herd, MIT LL
Vito Mecca, MIT LL

Publicity

David Mooradd, MIT LL
Mabel Ramirez, MIT LL

Tutorials

James Ward, MIT LL
Katherine Rink, MIT LL

Student Program

Julie Jackson, AFIT

Sponsorships

Bill Weedon, Applied Radar

Business Manager

Robert Alongi, IEEE Boston

Website

Andrew Zai, Raytheon

Event Planner

Patty Woodard

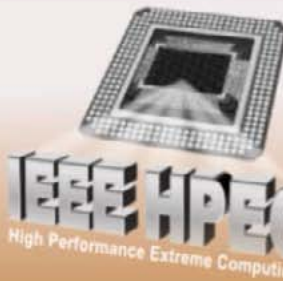
CALL FOR PAPERS




2019 IEEE High Performance Extreme Computing Conference (HPEC '19)

Twenty-third Annual HPEC Conference

24 - 26 September 2019
Westin Hotel, Waltham, MA USA



www.ieee-hpec.org

Chairman & SIAM Liaison

Dr. Jeremy Kepner
Fellow, MIT Lincoln Laboratory

Senior Advisory Board Chair

Mr. Robert Bond
CTO, MIT Lincoln Laboratory

Technical Chair

Dr. Albert Reuther
MIT Lincoln Laboratory

Senior Advisory Board

Prof. Anant Agarwal
MIT CSAIL

Prof. Nadya Bliss
Arizona State University

Dr. Richard Games
Chief Engineer, MITRE
Intelligence Center

Mr. John Goodhue
Director, MGHPC

Dr. Bernadette Johnson
Chief Venture Technologist
MIT Lincoln Laboratory

Dr. Richard Linderman,
ASDR&E

Mr. David Martinez
Associate Division Head
MIT Lincoln Laboratory

Dr. John Reyniers
Vice President
Alexion Pharmaceuticals

Dr. Michael Stonebraker
Co-founder SciDB and Vertica;
CTO VoltDB and Paradigm4

Publicity Chair

Mr. Dan Campbell, GTRI

CFP Co-Chairs

Dr. Patrick Dreher, MIT
Dr. Franz Franchetti, CMU

Publications Chair

Prof. Miriam Leeser
Northeastern University

Administrative Contact

Mr. Robert Alongi
IEEE Boston Section

The IEEE High Performance Extreme Computing Conference (HPEC '19) will be held in the Greater Boston Area, Massachusetts, USA on 24 – 26 September 2019. 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:

- | | |
|---|---|
| <ul style="list-style-type: none"> Machine Learning Graph Analytics and Network Science Advanced Multicore Software Technologies Advanced Processor Architectures Automated Design Tools Big Data and Distributed Computing Case Studies and Benchmarking of Applications Advanced Cloud Computing Computing Technologies for Challenging Form Factors ASIC and FPGA Advances | <ul style="list-style-type: none"> Data Intensive Computing Digital Front Ends Fault-Tolerant Computing General Purpose GPU Computing High Performance Data Analysis Interactive and Real-Time Supercomputing Mapping and Scheduling of Parallel and Real-Time Applications New Application Frontiers Open System Architectures Secure Computing & Anti-Tamper Technologies Quantum/Hybrid Computing AI Computing |
|---|---|

HPEC accepts two types of submissions:

1. Full papers (up to 6 pages, references not included), and
2. Extended abstracts (up to 2 pages, references included).

IMPORTANT DATES:

Submission Deadline: **May 17, 2019**
Notification of Acceptance: **July 1, 2019**
Camera Ready Deadline: **August 31, 2019**

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.

2018 Sponsors



(Last Notice Before Course Begins, Please Register Now!!!)

Software Development for Medical Device Manufacturers -

An intensive two-day course

Time & Date: 8:30AM - 4:30PM, Wednesday & Thursday, April 10 & 11, 2019
(14 hours of instruction!)

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

Speaker: Steve Rakitin, President, Software Quality Consulting, Inc.

OVERVIEW

Developing software in compliance with FDA, EU regulations and international standards is challenging. This two-day intensive course provides practical guidance and suggestions for developing software that complies with applicable FDA and EU regulations, guidance documents and international standards such as IEC 62304 and ISO 14971. The focus of this course is interpreting Design Controls for software. Each section of the Design Controls regulation (820.30) is discussed from the software perspective. Corresponding requirements from IEC 62304 are woven into the flow.

In-depth discussion of critical topics such as Requirements, Software Verification & Validation, Risk Management and Fault Tree Analysis are included. In addition, techniques for validating software development tools and software used in Manufacturing and Quality Systems are also discussed. Interactive group exercises are included to facilitate discussion and learning.

WHO SHOULD ATTEND

Software and firmware engineers, software managers, RA/QA staff, validation engineers, and project managers. Anyone interested in learning how to develop medical device software in compliance with regulations, standards and guidance documents.

COURSE OUTLINE

• Introduction

- Medical Device Definitions – FDA and EU
- Regulatory Roadmap and FDA/EU Device

Classification Schemes

- FDA Regulations and Guidance Documents for Software
- Standards – ISO 13485, IEC 62304, ISO 14971, EN-14971, IEC 60601, and IEC 62366-1
- All Software is Defective

• Interpreting Design Controls for Software

- Software Development Models
- Design and Development Planning
- Design Inputs
 - About Requirements...
 - Requirements Exercise

–Design Outputs

–Design Reviews

–Design Verification

• Software Verification Techniques

–Design Validation

• Software Validation Process

–Design Transfer

–Design Changes

–Design History File

• Validation of...

–Software Tools used to develop Medical Device Software

–Software used in Manufacturing

–Software used in Quality Systems

• Risk Management

- Standards and Regulations
- Terms and Concepts

- **Fault Tree Exercise**
 - Data Collection and Analysis
 - Documentation Requirements
- **Summary**
- **Comprehensive reference materials included**

Speaker Bio:

Steven R. Rakitin has over 40 years experience as a software engineer including 25 years of experience in the medical device industry. He has worked with over 85 medical device manufacturers worldwide, from start-ups to Fortune 100 corporations. He has written several papers on medical device software risk management as well as a book titled: Software Verification & Validation for Practitioners and Managers.

He received a BSEE from Northeastern University and an MSCS from Rensselaer Polytechnic Institute. He earned certifications from the American Society for Quality (ASQ) as a Software Quality Engineer (CSQE) and Quality Auditor (CQA). He is a Senior Life member of IEEE and a member of MassMEDIC. He is on the Editorial Review Board for the ASQ Journal Software Quality Professional.

As President of Software Quality Consulting Inc., he helps medical device companies comply with FDA regulations, guidance documents, and international standards in an efficient and cost-effective manner.

***notes, lunch and coffee breaks
included with registration***

**Decision (Run/Cancel) Date for this Course is
Monday, March 25, 2019**

Payment received by March 19

IEEE Members	\$495
Non-members	\$535

Payment received after March 19

IEEE Members	\$535
Non-members	\$565

<http://ieeeboston.org/software-development-medical-device-manufacturers>

IEEE Boston Section Social Media Links:

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

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

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

Google+: <https://plus.google.com/107894868975229024384/>

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

(Last Notice Before Course Begins, Please Register Now!!!)

The Fundamentals of Bioelectronics for Applications in Neuroprosthetics

Time & Date: 8:00AM - 3:00PM, Friday, April 12, 2019

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

Speaker: Marie Tupaj, Middlesex Community College

Description:

This course covers the field of bioelectronics, specifically electrode design and implementation, for applications in neuroprosthetics. Electrode materials, electrode array fabrication, electrode modeling, electrical stimulation parameters, bioelectrode charge transfer mechanisms, and interfaces with biological systems are discussed. The fundamental theories of electromagnetism and a history of bioelectromagnetics are reviewed.

Target Audience:

This class is designed for engineers transitioning into the field of bioelectronics, electronics engineers interested in neurobiology, and professionals looking for an understanding of bioelectronics to complete their job function.

Outline

Module #1: Electromagnetics in Biological Systems

The first lecture will identify and describe electromagnetic fields in biology then explain the effects of electric fields when applied to biological tissue and living systems. Topics covered include: Maxwell's Equations, history of bioelectromagnetics, biological effects (tissue growth, regeneration, cell communication) and biological mechanisms (action potentials, impulse propagation, ion channel and receptor activation) of electrical stimulation, and charge transfer to biological systems.

Module #2: Bioelectronics: Electrode Materials, Design, and Fabrication

The second lecture will discuss electrode materials,

electrode configurations, and electrode fabrication techniques. Topics include: key electrode properties (biocompatibility, mechanics, surface chemistry, charge transfer), common electrode materials (gold, platinum, titanium, carbon, PEDOT), electrode substrates, electrode configurations (capacitors, coils, microelectrode arrays), microelectrode array structure, electrode arrays (microwires, polymer arrays), and electrode micro-fabrication techniques (photolithography, sputtering).

Module #3: Bioelectronics: Electrode Characterization and Testing

Topics of this lecture include: electrode characterization techniques (impedance, wettability, roughness, conductivity, thickness, composition, mechanical integrity), and electrode rejuvenation.

Module #4: Bioelectronics: Electrode Modeling, Stimulation, and Devices

Topics include: electrode modeling with COMSOL, stimulation regimens (pulse shape, location, duration), field strength, stimulation devices (inductively coupled, capacitively coupled, microelectrode array systems), neurotransmission, and neural recordings (local field potentials, noise).

Module #5: Neuroprosthetic Implantation and Biological Interfaces

The last lecture discusses electrode implantation, applications, and use. Topics include: clinical background, nervous system anatomy, neuroprosthetic devices (retinal prosthetics, auditory implants, nerve guides, vagus

nerve stimulation, TEMS, EEG, ECoG, limb prosthetics), neuroprosthetic-tissue interfaces, design requirements, short term and long term cell-tissue responses, electrode sterilization techniques, and device/patient safety.

Upon Completion of This Course You Will:

- Understand the effects of electric fields on cells and the optimal parameters for a biological response
- Learn bioelectrode design and fabrication techniques
- Understand key challenges in designing neuroprosthetic devices

About the Instructor:

Marie Tupaj is a biomedical scientist and engineer with 10 years' experience in biomaterials, bioelectronics, and nerve cell biology. Marie has a B.S. in electrical engineering and a Ph.D. in biomedical engineering from Tufts University. As a doctoral student, Marie designed electrodes for encouraging nervous tissue development and developed silk based biomaterial conduits for peripheral nerve regeneration. These projects were

supported by the NIH and the Armed Forces Institute of Regenerative Medicine. As a postdoctoral fellow, Marie fabricated miniaturized biosensors and chemically modified surfaces for applications in the field of neuroprosthetics. Marie has worked at high tech and biotech companies in the Boston area including Sun Microsystems, Organogenesis, and Histogenics Corporation. She is currently an Assistant Professor at Middlesex Community College in Bedford, MA.

***notes, lunch and coffee breaks
included with registration***

**Decision (Run/Cancel) Date for this Courses is
Friday, April 5**

Payment received by March 29

IEEE Members	\$225
Non-members	\$250

Payment received after March 29

IEEE Members	\$250
Non-members	\$275

<http://ieeeboston.org/fundamentals-of-bioelectronics-for-applications-in-neuroprosthetics/>

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.

(Last Notice Before Course Begins, Please Register Now!!!)

DSP for Wireless Communications

(13 hours of instruction!)

Time & Date: 6:00 - 9:00PM, Tuesdays, April 9, 16, 23, 30, May 7

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

Speaker: Dan Boschen

Course Summary:

This course is a fresh view of the fundamental 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”.

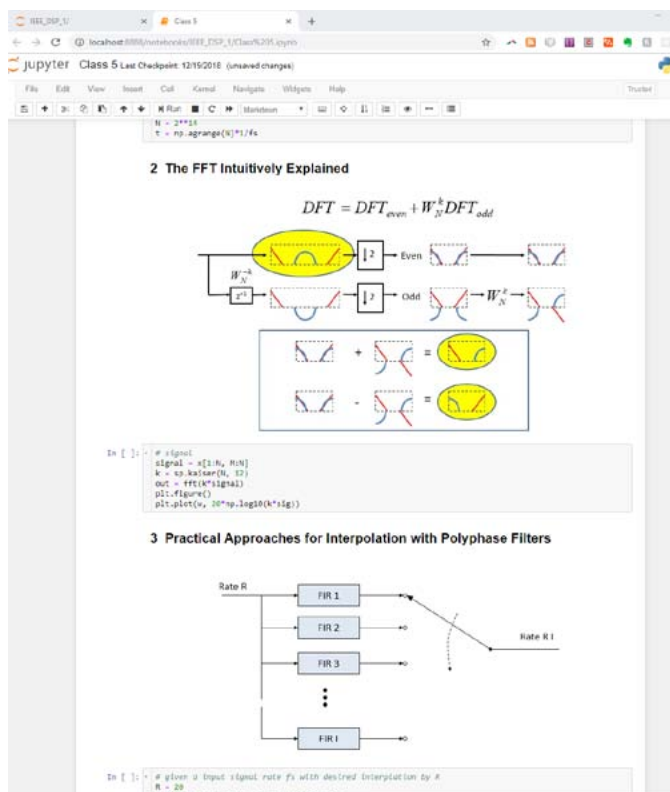
Students will be encouraged but not required to bring a laptop to class, and all set-up information for installation will be provided prior to the start of class.

Target Audience:

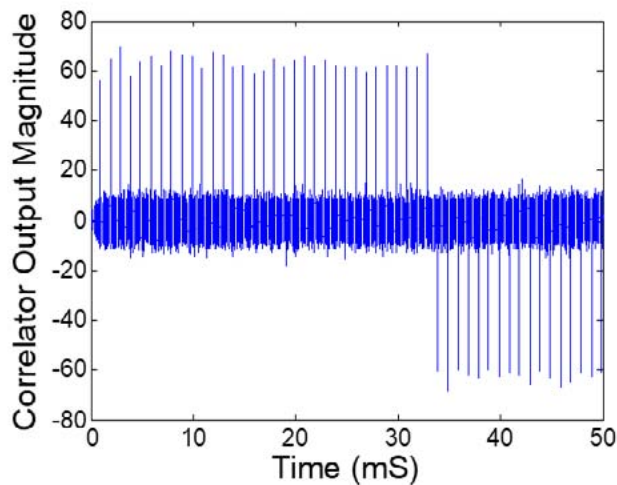
All engineers involved in or interested in signal processing applications. Engineers with significant experience with DSP will also appreciate this opportunity for an in-depth review of the fundamental DSP concepts from a different perspective than that given in a traditional introductory DSP course.

Benefits of Attending/ Goals of Course:

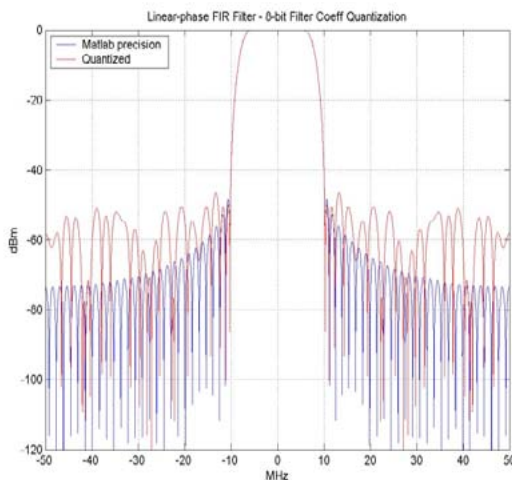
Attendees will build a stronger intuitive understanding of the fundamental signal processing concepts involved with digital filtering and mixed signal analog and digital design. With this, attendees will be able to implement more creative and efficient signal processing architectures in both the analog and digital domains.



Sliding Correlation



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

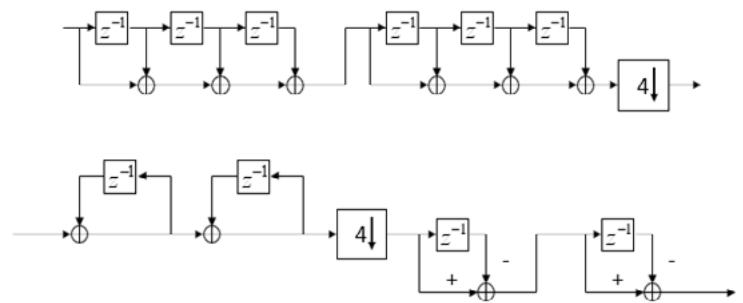


Class 5: Fast Fourier Transform, Multi-rate Signal Processing, Multi-rate Filters

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

Multi-stage CIC



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>

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

Decision (Run/Cancel) Date for this Courses is Tuesday, April 2

Payment received by March 26

IEEE Members \$350

Non-members \$385

Payment received after March 26

IEEE Members \$385

Non-members \$420

DSP for Software Radio

(13 hours of instruction!)

Time & Date: 6:00 - 9:00PM, Wednesdays, May 15, 22, 29, June 5, 12

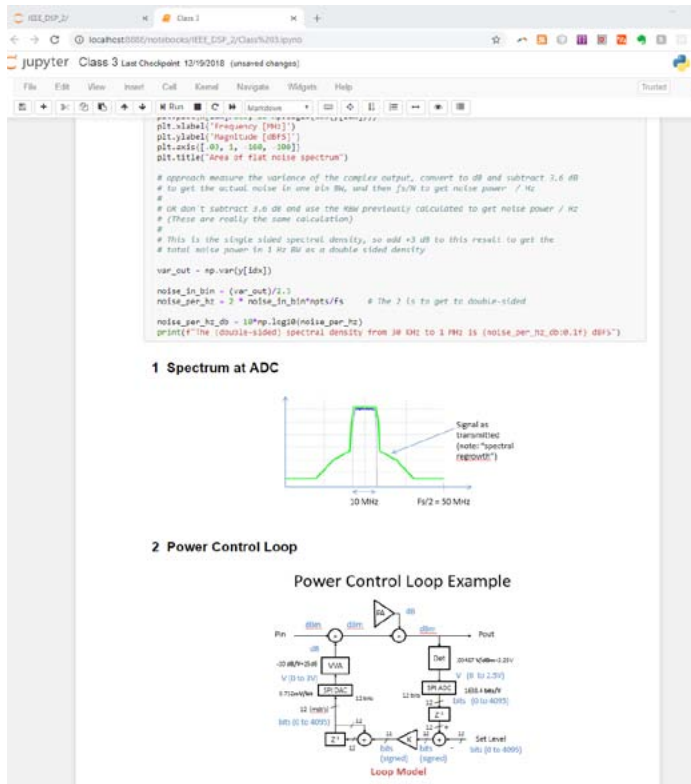
Location: Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA

Speaker: Dan Boschen

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

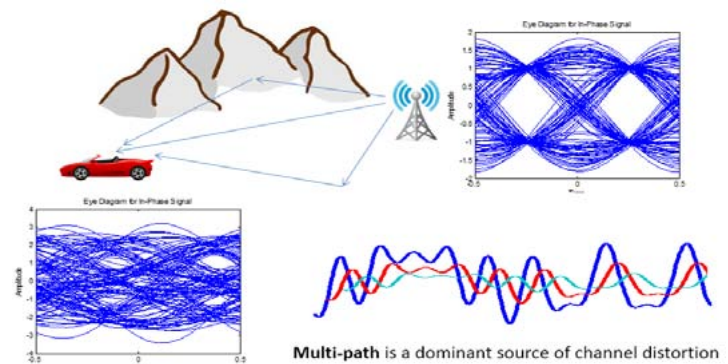
radios and modems for modern wireless communications. Specific areas covered include carrier and timing recovery, equalization, automatic gain control, and



and basic digital filter design principles. The course title has been changed with some minor additions but this is the same course that was previously taught titled “More DSP for Wireless Communications”, with the addition of Python demonstrations using Jupyter Notebooks.

This course brings together core DSP concepts to address signal processing challenges encountered in

Channel Distortion



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

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

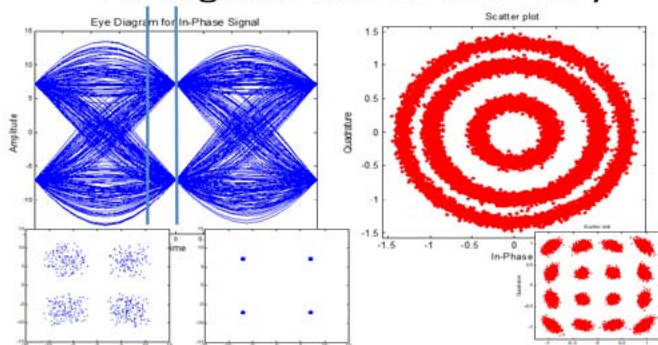
Class 5: RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers

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. 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>

Timing and Carrier Recovery



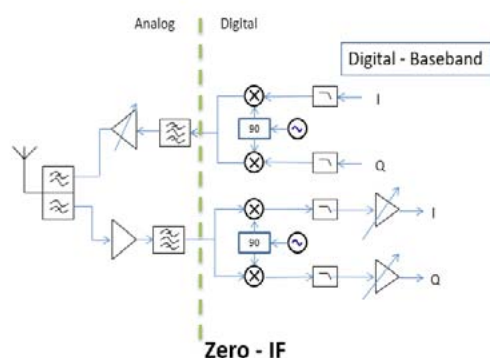
is covered in a separate IEEE Course "Python Applications for Digital Design and Signal Processing".

Students will be encouraged but not required to bring a laptop to class, 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 for wireless communications. Students should have either taken the earlier course "DSP for Wireless Communications" or have been sufficiently exposed to basic signal processing concepts such as Fourier, Laplace,

Radio Architectures



and Z-transforms, Digital filter (FIR/IIR) structures, and representation of complex digital and analog signals in the time and frequency domains. Please contact Dan at boschen@loglin.com if you are uncertain about your background or if you would like more information on the course.

Decision (Run/Cancel) Date for this Courses is Wednesday, May 8

Payment received by May 1

IEEE Members	\$340
Non-members	\$375

Payment received after May 1

IEEE Members	\$375
Non-members	\$440