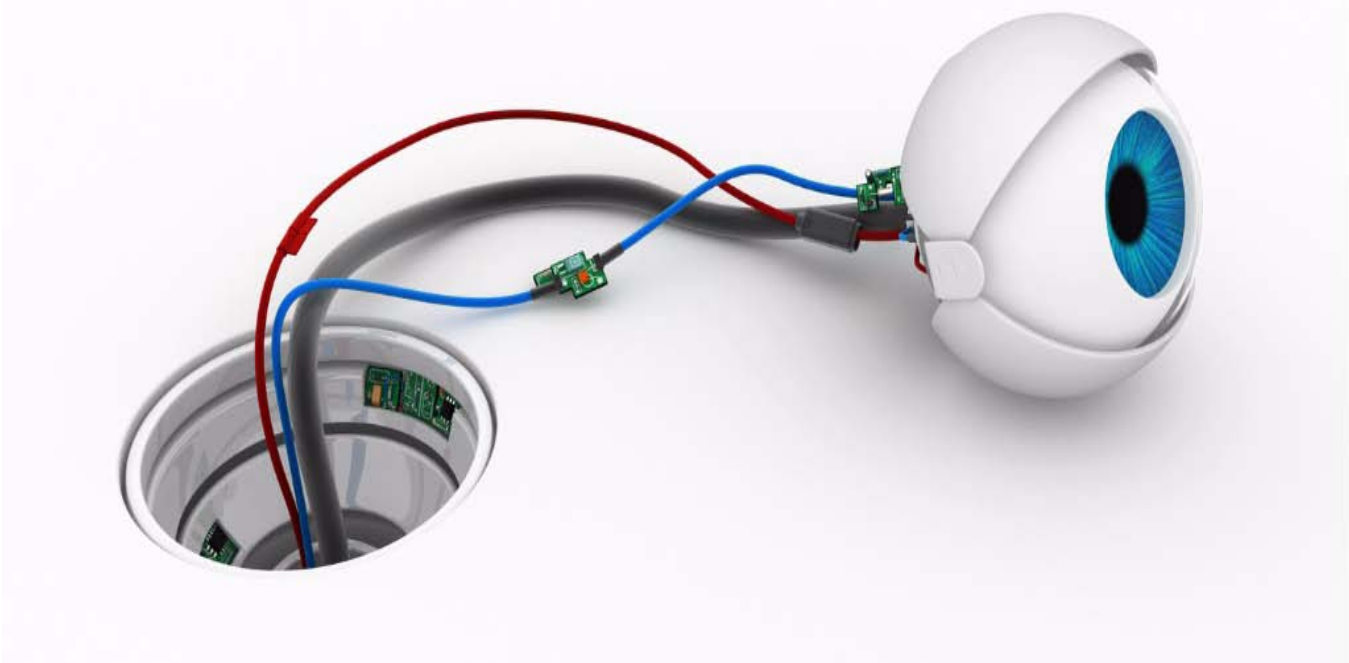
BOSTON

THE REFLECTOR

ISSUE #11
NOVEMBER 2018



2018 Outstanding Section Membership Recruitment and Retention Performance

Boston Section

IEEE
Advancing Technology for Humanity

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Learning on the Job!

Kevin Flavin, Electronic Communications Chair, Boston Section

As I write this, my daughter is taking her driving test tomorrow. Unlike many of her friends, she didn't do through the driver's education program, but I had the luxury of teaching her how to drive myself. It's not that I think I'm better - I don't believe that - but it's a matter of availability and timing.

For the record, my father taught me when he retired from the police force in Maine, so I had the bonus instructions like how to drive in a blizzard conditions. Driving in a blizzard was kind of common up there, however. So is driving a 3-on-the-stick down dirt roads when you're 12 or 13, because it's easier to send the kid back to the house to get lunch, or the lures, or more bar oil for the chainsaw.

I can't teach her how to drive a standard on the steering column anymore, but it's probably not as necessary anyways. I will teach her how to drive in snow though - that IS important and a necessary skill to comfortably and safely reach the destination.

There are so many situations, like blizzard driving, that are not part of standard training and education, but people are thrown into situations to learn via trial-by-fire. It's expected that if we want to be successful, or at least survive, we must be continuously learning - sharpening the saw, if you will.

On another note: you may have noticed, if you went to the website, that we've moved some things around. We have a new section for open positions for engineers - basically, companies that are looking for the type of people that read these pages - that would be you, so go ahead and check it out, you may not find something for you, but maybe you know someone that would be a perfect fit.

It's opportunities for engineers and scientists (http://ieeeboston.org/jobs/)

Along those lines, I am joining a new company myself. While I worked my way through financial services during the 90s and the 00s, these last ten years I've worked with many of you on this side of the tech - effectively returning to my roots. But early this summer, I suddenly found myself talking to an old friend about rejoining him on a new adventure, so I'm back in the financial services, or fintech as they are calling it these days. This does mean that I will have less time to volunteer, possibly - we'll see, right?

One of the successes, I think, that helped me during the interview process - it was a long process, with five interviews and a final presentation - was my work as a volunteer with the Boston Section. It kept me fresh on the developments in the market, what was working, and especially what wasn't working anymore in the marketing methods and technologies.

If there is anything I can't impress on anyone that is trying to keep up in their career - keep learning, learn something new, and volunteer!

By volunteering, you are getting a chance to learn for free! Think about that.

And if you need to spend a few bucks to learn something new, it's the best "Return on Investment" out there! Even spending $500 on a course, it can earn you back thousands in an increased salary.

As a volunteer organization, the Boston Section has so many ways to keep learning - from volunteering to keep your skills sharper to courses on specific topics for short money and to the Universities and Colleges that advertise with the Boston Section.

Keep learning, Stay Sharp.

Tufts UNIVERSITY | School of Engineering

Executive Director and Professor of the Practice
Tufts Gordon Institute
apply.interfolio.com/55254

The School of Engineering at Tufts University seeks an executive director for the Tufts Gordon Institute (TGI), who will have the vision, creativity, and management skills to lead the institute to national prominence in innovation, entrepreneurship, and leadership education. The executive director will continue TGI's mission to provide students with the practical leadership tools and knowledge necessary to encourage and develop innovative ideas that will make a difference in the world.

Tufts School of Engineering (SOE) is distinguished through the interdisciplinary and integrative nature of its engineering education and research programs. As both a "Research Class 1" University and a top-ranked undergraduate institution, Tufts SOE is an important leader in STEM higher education. Home to seven graduate and professional schools across three campuses, Tufts University prides itself on its culture of cross-school partnerships. Areas of strategic emphasis within the SOE include: Engineering for Human Health, Engineering for Sustainability, and Engineering the Human/Technology Interface.

As an integral part of Tufts SOE, Tufts Gordon Institute engenders skills and inspires individuals to become technological leaders capable of addressing the challenges of the 21st century. TGI offers a minor in Entrepreneurial Studies for Tufts undergraduates from any school and/or discipline, and a minor in Engineering Management for Tufts engineering undergraduates. TGI also offers a Master of Science in Engineering Management for technology professionals, a Master of Science in Innovation Management for aspiring innovative technological leaders, and professional education programs tailored to the needs of practicing engineers.

The executive director of Tufts Gordon Institute will be an exceptional leader who enables the development and execution of strategic initiatives that advance TGI's goal of national prominence in innovation, entrepreneurship, and technological leadership education. To this end, the executive director will be responsible for building and enhancing educational programs, expanding student enrollment and educational reach, supporting the development of a core faculty, enhancing student quality, and assuring curricular excellence and educational innovation. He or she will have primary responsibility for the general management of TGI, including strategic planning, budget development and oversight, staff supervision, and faculty recruitment and management. As a Professor of the Practice, the executive director will also be an integral voting member of the SOE faculty, teach 1-2 courses per year, at his/her discretion consistent with their expertise and administrative responsibilities.

The executive director will also be a strong ambassador, raising the visibility and thought leadership of TGI both within the university community as well as externally around the world. Internally, the new executive director will cultivate relationships across the Tufts community, and will conceive and develop programs by leveraging the broad talents and expertise across the schools at Tufts. Externally, the new executive director will expand relationships with industry partners and alumni in an effort to fundraise and expand the profile of the institute and the university. As a member of the leadership team assembled by the dean, the executive director will work collaboratively to help Tufts strengthen its position as an innovative university of creative scholars working across disciplines to have a profound impact on one another and the world.

Qualifications: The successful candidate will have significant industry leadership achievement and technical expertise, with a demonstrated track record of world-class thought leadership in engineering management, innovation, and/or entrepreneurship. The candidate must possess exceptional communication and relationship-building skills, and a demonstrated ability to foster community, creativity, and innovation. Teaching experience and a demonstrated interest in education are strongly desired. Candidates must have a graduate level education (PhD preferred but not required), with at least one degree in an engineering or applied science field, and demonstrated professional achievement leading technical organizations.

Tufts University, founded in 1852, prioritizes quality teaching, highly competitive basic and applied research and a commitment to active citizenship locally, regionally and globally. Tufts University also prides itself on creating a diverse, equitable, and inclusive community. Current and prospective employees of the university are expected to have and continuously develop skill in, and disposition for, positively engaging with a diverse population of faculty, staff, and students.

Tufts University is an Equal Opportunity/ Affirmative Action Employer. We are committed to increasing the diversity of our faculty and staff and fostering their success when hired. Members of underrepresented groups are welcome and strongly encouraged to apply. If you are an applicant with a disability who is unable to use our online tools to search and apply for jobs, please contact us by calling Johny Laine in the Office of Equal Opportunity (OEO) at 617.627.3298 or at Johny.Laine@tufts.edu. Applicants can learn more about requesting reasonable accommodations at http://oeo.tufts.edu.

IEEE Boston Section Fall 2018 Professional Development Program

Applications of Python for Digital Design and Signal Processing (This course is set to run)

(Last notice, please register now!!!)

Time & Date: **6 - 9PM; Thursdays, Nov. 15, 29, Dec. 6, 13 (Note Dec. 6 is a Wednesday)**
Speaker: **Dan Boschen**
Location: **Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA**

Course Summary: This is a bring-your-own laptop, hands-on course in the popular and powerful open source Python programming language. Dan provides simple, straight-forward navigation through the multiple configurations and options, providing a best-practices approach for quickly getting up to speed using Python for solving signal processing challenges. Students will be using the Anaconda distribution, which combines Python with the most popular data science applications, and will be making extensive use of the Jupyter Notebook.

Target Audience: This course is targeted toward users with little to no prior experience in Python, however familiarity with other modern programming languages and an exposure to object-oriented constructs is very helpful. Students should be comfortable with basic signal processing concepts in the frequency and time domain. Familiarity in Matlab or Octave is not required, but the equivalent operations in Python using the Numpy package will be provided for those students that do use Matlab and/or Octave for signal processing applications. **See page 30**
Full course description at, http://ieeeboston.org/%20python-for-signal-processing/

Write Right Agile User Stories and Acceptance Test Rights (Go, No-Go date, Dec. 4)

2 - Day Intensive Seminar Workshop
Time & Date: **8:30AM - 5PM; Tuesday & Wednesday, December 18 -19**
Speaker: **Robin Goldsmith, Go Pro Management, Inc.**
Location: **Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA**

Everyone complains that poor requirements are the major cause of project problems. Yet, like the weather, nobody does much about it, at least not effectively. Traditional approaches advocate writing voluminous requirements documents that too often don't seem to help much and may even contribute to difficulties. Agile goes to the opposite extreme, relying on brief requirements in the form of three-line user stories that fit on the front an index card and a few user story acceptance criteria that fit on the card's back. Surprise, as Mark Twain noted, in some ways it's even harder to write Agile's brief requirements effectively. This interactive workshop reveals reasons user stories and their acceptance tests can fall short of their hype, explains critical concepts needed for effectiveness, and uses a real case to provide participants guided practice writing and evaluating user stories and their acceptance criteria/tests.

Participants will learn:

* Major sources of poor requirements that cause defects, rework, and cost/time overruns.
* How Agile user stories and their acceptance criteria/tests address these issues.
* Difficulties that still afflict requirements in Agile projects and why they persist.
* Writing more effective user stories and acceptance criteria/tests.
* What else is necessary to produce working software that provides real value.

WHO SHOULD ATTEND: This course has been designed for product owners, analysts, developers, and other Agile (and other) project team members who are or should be involved in defining requirements. **See page 33.**

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Making You a Leader - Fast Track (Go, No-Go date, Dec. 3)

Date & Time: **Monday, December 17; 8:30AM - 5:00PM**
Location: **Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA**
Speaker: **Robin Goldsmith, President, GoPro Management**

We do projects to make change. Yet, change will not occur without leadership, and leaders are rare. Leaders make others want to do what the leader wants done. Leaders cause ordinary people to achieve extraordinary things. Managing is not the same as leading, and titles do not make leaders. Seminars can teach you to manage, but they cannot teach you to be a leader. Rather, making a leader takes special techniques—such as our personal development clinics—that can change deep-seated behaviors learned over a lifetime.
However, since clinics usually last about ten weeks, this mini-clinic was devised as a more convenient alternative. This format places responsibility upon the participant to carry out an extended informal follow-on program after completion of the formal seminar workshop session. During the follow-on period, the participant uses time-condensed methods that simulate the lifetime learning which makes a leader. Therefore, commitment to carrying out these exercises is essential for successful transformation.

PARTICIPANTS WILL LEARN:

- Leadership characteristics and practices that are essential for project and personal success.
- Differences between management and leadership, how they conflict, and why leaders are so rare.
- Behaviors leaders use to influence others, up and down, to want to do what the leader wants them to do
- Special techniques personal development clinics use to change lifetime learning and make leaders.
- How to employ those special techniques in a follow-on mini-clinic to develop the leadership skills they need to make their projects successful.

WHO SHOULD ATTEND: This course has been designed for business and systems professionals who want to improve their ability to lead and influence other people. **See page 35.**
Full course description at, **http://ieeeboston.org/%20making-leader-fast-track-become-leader-want-need/**

Practical RF PCB Design, Wireless Networks, Products and Telecommunications

Dates: **Tuesday, December 18 and Wednesday, December 19, 2018**
Location: **Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA**
Speaker: **Henry Lau, Lexiwave Technology**

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

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

Benefits: This course aims to provide participants with an insightful training on RF PCB design from a practical, industrial perspective. Participants will be led through a systematic, theoretical presentation with case studies on commercial products in the training. The course will be conducted by an RF expert with rich industrial experience. It is suitable for RF professionals who want to keep up-to-date their skills and knowledge in RF PCB design and stay competitive. **See Page 24**
Full Course description at :
http://ieeeboston.org/practical-rf-pcb-design-wireless-networks-products-telecommunications-fall-2017/

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://ieeeboston.org/verilog-101-verilog-foundations-online-course/

System Verilog 101: Design Constructs
Full course description and registration at ,
http://ieeeboston.org/systemverilog-101-sv101-design-constructs-online-course/

System Verilog 102: Verification Constructs
Full course description and registration at ,
http://ieeeboston.org/systemverilog-102-sv102-verification-constructs-online-course/

High Performance Project Management
Full course description and registration at ,
http://ieeeboston.org/high-performance-project-management-online-course/

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

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

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

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

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

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

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

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

November Chapter Meeting Summary

Communications Society – 7:00PM, Thursday, 1 November
Vanu Bose's Mission & Legacy: Nobody Should be Left Unconnected - David Bither

This meeting is preceded by dinner with our guest speaker at Bertucci's, 475 Winter St, Waltham, MA at 5:30 PM. Vanu Bose founded Vanu Inc. nearly 20 years ago, armed with a technical vision of Software Defined Radio and the belief that nobody should be left unconnected in a wirelessly connected world. These are the basic principles that have caused a revolution in cellular communications, by expanding wireless access via Small Cell basestations. A brief history of Vanu Inc. commercial deployments will be presented along with lessons learned, ranging from technical to business and regulatory issues. The talk will conclude with a summary of forward-looking initiatives that have the potential to more fully realize Vanu's vision of universal connectivity. Meeting Location: Verizon Technology Center, 60 Sylvan Rd., Waltham, MA 02451. **See Page 10.**

Computer, Robotics and Automation Societies and GBC/ACM – 6:30PM, Thursday, 1 November
Robotics and Visual Computing Lab tours at Brown University CS Department

Visitors will have their choice of a variety of demos in the labs on the ground floor of the CS Building on the Brown campus, the Watson Center for Information Technology, corner of Waterman St. and Brook St, Providence. Parking is available in a lot across the street from the CIT. Meeting Location: Brown University. Visitors will have their choice of a variety of demos in the labs on the ground floor of the CS Building on the Brown campus, the Watson Center for Information Technology, corner of Waterman St. and Brook St, Providence. Parking is available in a lot across the street from the CIT. **See Page 11.**

Entrepreneur's Network – 6:30PM, Tuesday, 6 November
Seeding with the Angels

Discover how Angel and Seed investors approach the problem of making a good investment. Go behind the scenes of the decision making to discover the process our panelist-investors use to choose and to invest in emerging and seed stage companies. Whether you are planning to launch a company or you are planning the next level, a Seed or Angel investor could be the funding source you are looking for. Maybe you're not even sure what angel investment is? This panel will focus on the nature of angel and seed investments in New England technology-based companies, and on how to obtain that initial or angel or seed-stage investment in your company. The panelists will also offer candid views and discussion on how to prepare a company for raising angel capital or seed stage investment, the raise itself, and how to work with angel groups or seed investors after getting the investment. PRE-MEETING DINNER at 5:15 PM (sharp) at Bertucci's, Waltham. Meeting Location: Constant Contact, Inc., Reservoir Place, 3rd Floor Great Room, 1601 Trapelo Road, Waltham, MA. **See Page 13.**

Consumer Electronics Society, co-sponsoring Entrepreneur's Network, Life Members and Medical Development Group – 6:30PM, Wednesday, 7 November
The New Market of Hearing Healthcare

The last decade has seen a flurry of activity in the US hearing healthcare marketplace. A result of this activity is a pending new category of over-the-counter hearing healthcare products exempt from state dispensing laws. The future marketplace for OTC hearing healthcare products will be unlike those of traditional consumer products or clinical care, and both existing marketing may need to evolve to accommodate it. There is much excitement and uncertainty. We asked Kevin Franck, a veteran of both medical and consumer product companies to share his insights and to convene a panel who will share theirs. Meeting Location: Massachusetts Eye and Ear, The Starr Center, 185 Cambridge, Street, 2nd Floor, Boston, MA 02114-2500. **See Page 15.**

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Entrepreneur's Network Cambridge Meeting - 6:00PM, Tuesday, 13 November
Outsourcing – Why, When, and How
Digital is at the heart of most marketing and communication programs, which has complicated life for entrepreneurs who are not steeped in how to attract prospects and retain customers. The internet-infused marketing options include web site, social media and blogging, email, search engine optimization, and more. Meeting Location: Draper, Hill Building, One Hampshire St. Cambridge, MA 02139. **See Page 16.**

Life Members – 4:00PM, Tuesday, 13 November
Can Nuclear Energy Thrive in a Carbon-Constrained World? – Findings from a new MIT study -
On Tuesday, November 13th, MIT Professor Jacopo Buongiorno, Associate Department Head of Nuclear Science and Engineering at MIT, will present findings from a recent MIT study on nuclear energy sponsored by the IEEE Boston Section Life Members. With 60 new reactors under construction worldwide, the nuclear industry is currently experiencing moderate growth, mostly concentrated in Asia. A much greater expansion is needed if nuclear is to play a significant role in combating climate change, but there are a number of challenges hindering the further growth of nuclear energy utilization. If these challenges are properly addressed, though, there are major opportunities for nuclear energy to reduce carbon emissions worldwide and conquer new markets. Meeting Location: MIT Lincoln Laboratory's Main Cafeteria, 244 Wood Street., Lexington. **See Page 18.**

Reliability Society – 5:30PM, Wednesday, 14 November
Keyence Inspection Solutions – Superior Analysis through Clearer Observation
ReliAlik Apelian - Area Product Sales Manager, Digital Microscope Team, Keyence Corporation of America
Keyence is a rapidly growing leader in factory automation products and turnkey inspection equipment. Their microscope and surface measurement systems ensure that their customers can meet increasing quality standards and guarantee the reliability of their products. During our November meeting, two specialists from Keyence will discuss High-Resolution Microscope systems and how they are an asset in Reliability, Failure Analysis, and R&D. These systems are designed to allow the researcher or engineer to make better decisions through superior imaging and metrology with reduced subjectivity. Meeting Location: MIT Lincoln Laboratory, 3 Forbes Rd, Lexington, Massachusetts, 02421. **See Page 19.**

Robotics and Automation Society – 6:30PM, Wednesday, 14 November
The Robotics Revolution: How robotic technology will disrupt all market sectors, major corporations and global civilization in the next 20 years. Professor Dave Barrett. Meeting Location: Olin College of Engineering, 1000 Olin Way, Needham, MA, 02492. Join the linkedIn group: IEEE Robotics and Automation Society - Boston Chapter and/or check the calendar for updates: https://calendar.google.com/calendar?cid=NWJia2M3Y2g1OXJyZXBqZzM5MXRiM2w1MTBAZ3JvdXAuY2FsZW5kYXIuZ29vZ2xlLmNvbQ

Geoscience and Remote Sensing Society – 6:00PM, Tuesday, 20 November
Integrated Ferroics for Sensing, Power, RF, Microwave and mm-Wave Electronics
Prof. Nian Sun, Laboratory for Integrated Ferroics, ECE Dep., Northeastern University
The coexistence of electric polarization and magnetization in multiferroic materials provides great opportunities for realizing magnetoelectric coupling, including electric field control of magnetism, or vice versa, through a strain mediated magnetoelectric coupling in layered magnetic/ferroelectric multiferroic heterostructures. Strong magnetoelectric coupling has been the enabling factor for different multiferroic devices, which however has been elusive, particularly at RF/microwave frequencies. In this presentation, I will cover the most recent progress on new integrated ferroic materials which are deposited at room temperature, magnetoelectric NEMS (nanoelectromechanical system) based sensors and antennas. **See Page 20.**

Communications Society – 7:00PM, Thursday, 1 November

Vanu Bose's Mission & Legacy: Nobody Should be Left Unconnected

Speaker: David Bither

Verizon Technology Center, 60 Sylvan Rd., Waltham, MA 02451.
This meeting is preceded by dinner with our guest speaker at Bertucci's, 475 Winter St, Waltham, MA at 5:30 PM.

Vanu Bose founded Vanu Inc. nearly 20 years ago, armed with a technical vision of Software Defined Radio and the belief that nobody should be left unconnected in a wirelessly connected world. These are the basic principles that have caused a revolution in cellular communications, by expanding wireless access via Small Cell basestations. A brief history of Vanu Inc. commercial deployments will be presented along with lessons learned, ranging from technical to business and regulatory issues. The talk will conclude with a summary of forward-looking initiatives that have the potential to more fully realize Vanu's vision of universal connectivity.

David Bither has over 30 years of experience leading hardware and embedded software teams to deliver products ranging from boards to large-scale systems. Technology areas include Telecom, IP Routing, and Wireless. He holds 2 U.S. patents and a M.S. in Electrical Engineering and Computer Science from Berkeley. Dave was a co-founder and VP of Engineering at Crescent Networks. For the past 10 years he has been leading Platform Engineering at Vanu Inc, building cellular basestations using Software Defined Radio technology.

Please circulate to interested parties.

Venue Note. This is our venue at the new Verizon Technology Center Campus in Waltham.

The meeting begins at 7 PM at the new meeting auditorium at the Verizon Technology Center. The address is 60 Sylvan Road, Waltham, MA 02451. The entrance is by the far corner – with the picnic tables out front – and not the tower or the new building. It is most easily reached by the West Street entrance.

Important Note: Verizon Technology Center requests the names of the meeting attendees in advance of the meeting. If you plan to attend, please send a note via e-mail with your name to John Nitzke at RF@ieee.org by Wednesday, October 31st.

The meeting is preceded by dinner at Bertucci's, 475 Winter St, Waltham at 5:30 PM. The speaker will be joining us at dinner. Please let Bob Malupin know if you plan to attend the dinner at Bertucci's. Bob can be contacted at Robert.Malupin@VerizonWireless.com .

Directions to Bertucci's restaurant in Waltham: Take Exit 27B on I95/128, heading west on Winter Street. After exiting, stay all the way to the right and take the first right turn into the shopping plaza.

Directions to Verizon Technology Center (old Verizon Labs location), 60 Sylvan Rd. campus, Waltham, MA 02451: Take Exit 27B on I95/128, heading west on Winter Street. Stay all the way to the right. Verizon Technology Center is 1/2 mile ahead. At the second traffic light, turn left onto WEST ST. and then take the first right (at the Verizon sign) which leads into the Verizon campus. Take the first left. The building and entrance for the meeting are on your right. Note that the entrance to the auditorium area is by the far corner – with the picnic tables out front – and not the tower or the new building.

Computer, Robotics and Automation Societies and GBC/ACM – 6:30PM, Thursday, 1 November

Robotics and Visual Computing Lab tours at Brown University CS Department

Visitors will have their choice of a variety of demos in the labs on the ground floor of the CS Building on the Brown campus, the Watson Center for Information Technology, corner of Waterman St. and Brook St, Providence. Parking is available in a lot across the street from the CIT.

Registration required: https://www.eventbrite.com/e/robotics-and-visual-computing-lab-tours-at-brown-university-tickets51638169154?utm_source=eb_email&utm_medium=email&utm_campaign=new_event_email&utm_term=viewmyevent_button

1) Robotics: Prof. Stefanie Tellex, colleagues and students
a. Demo 1: Virtual reality teleoperation. Visitors put on a VR headset. They see a visualization of the robot's sensor stream and teleoperates the robot in VR to pick up objects and manipulate them.
b. Demo 2: Drones. Students from Brown and the PCTA will do a live demo of our low-cost autonomous drone. This is part of our goal to empower every person with a collaborative robot.
c. Demo 3: Social feedback. Visitors use language and gesture to point out an object to the Baxter robot. The robot responds by delivering the object.

2) Visual Computing: Prof. Daniel Ritchie and students
a. Indoor scene synthesis: learning how to choose and lay out furniture & other objects in indoor spaces using deep neural networks. We have a short narrative video that overviews how the method works, and PhD student Kai can also present a poster about the same project
b. Learning visual style compatibility of 3D objects: Given two 3D objects, e.g., assets that might be used for a game / VR application, can a computer quantify how well they would "go together" if used in the same scene? We're training neural networks to do this. One source of data is human judgments about style similarity
c. Building a large dataset of articulated 3D models: Existing large 3D model datasets consist of only static geometry. We're building a large dataset of objects annotated with part mobilities (e.g. door handles can turn) for use in VR, robotics, and other applications.
d. Visual program induction: Given an image or a 3D model, can a computer infer a high-level program that, when executed, reproduces the input image/model? This ability facilitates interesting 'semantic' edits to the image/shape. We can show results from recent systems that do this in several domains, including converting hand-drawn graph sketches into LaTeX-like programs.

3) Visual Computing: Prof. James Tompkin and students
a. Unsupervised Machine Learning-based Image Translation: See yourself transformed into a cat or an anime character using machine learning techniques which automatically learn how to 'translate' between classes of objects in images
b. Organizing Databases of Imagery with Interactive Labeling: It is easy to scrape databases of imagery online, but how can we organize these easily when they are unlabeled? We show an interactive labeling system to quickly organize databases of human body geometry or artistic paintings into user-defined criteria.
c. Light field Segmentation and Rendering for Image Editing: As smartphones become multi-camera systems, how can we consistently edit images captured with these camera arrays (images/video)
d. Machine Perception of Data Visualizations: Can current machine-learning perception systems reason about data visualizations like graphs, and what does this tell us about the pros and cons of machine vision systems and human vision? (images/video)

4) Visual Computing: Prof. Andy van Dam and students
a. Vizdom: interactive analytics through pen and touch. Vizdom's frontend allows users to visually compose complex workflows of machine learning and statistics operators on an interactive whiteboard, and the backend leverages recent advances in workflow compila-

tion techniques to run these computations at interactive speeds (joint work with Prof. Tim Kraska of MIT, and van Dam's Ph.d. student Emanuel Zgraggen, now post-doc'ing with Tim at MIT)

b. Dash: a pen- and touch-enabled 2D information management system for desktops, slates and large interactive whiteboards. Using unbounded 2d workspaces users can gather documents and fragments from a variety of sources, organize them spatially and hierarchically, annotate them, and hyperlink related content to discover and encode relationships. New insights can be presented via customizable dashboards and slide sequence style presentations.

5) Visual Computing: Prof. David Laidlaw and associates

a. The YURT, a high-resolution VR facility: it displays over 100 million stereo pixels using 69 full HD projectors driven by 20 nodes of an HPC cluster. The projectors display onto 145 mirrors covering a 360 degree surface including overhead and underfoot. At normal viewing distances, the pixels are smaller than are resolvable by the human retina. Visitors will walk 2 blocks to 180 George St, put on 3D stereo glasses to have an immersive virtual reality demonstration of some science and education projects as well as some applications that are a bit more frivolous.

Entrepreneurs' Network - 6:30PM, Tuesday, 6 November

Seeding with the Angels

Location: Constant Contact, Inc., Reservoir Place, 3rd Floor Great Room, 1601 Trapelo Rd., Waltham, MA
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-2990367/Registration. PRE-MEETING DINNER at 5:15 PM (sharp) at Bertucci's, Waltham

Discover how Angel and Seed investors approach the problem of making a good investment. Go behind the scenes of the decision making to discover the process our panelist-investors use to choose and to invest in emerging and seed stage companies. Whether you are planning to launch a company or you are planning the next level, a Seed or Angel investor could be the funding source you are looking for. Maybe you're not even sure what angel investment is? This panel will focus on the nature of angel and seed investments in New England technology-based companies, and on how to obtain that initial or angel or seed-stage investment in your company. The panelists will also offer candid views and discussion on how to prepare a company for raising angel capital or seed stage investment, the raise itself, and how to work with angel groups or seed investors after getting the investment.

We have three excellent speakers for that evening; two are active angel investors, one is a founder CEO who has received seed and angel funding. Our moderator is one of "Boston's 20 top startup lawyers" and ENET chairman.

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 - 3 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.
Speakers:

Henry Kay, active angel investor and a member of Boston Harbor Angels and Sky Venture Group, both Angel investing groups in the Boston area. He retired from Boston Scientific in 2006, where he was Group Vice President of New Market Development / Strategic Planning, Endosurgery Boston Scientific Corporation (BSC). Before joining BSC, Henry was based in the UK for five years as Senior Vice President, Sales, and Marketing for Allergan Europe, a global eye care company. He has 40 years of experience in the medical industry in roles which include R&D, International Marketing, Regulatory Affairs, and Strategic Planning for major pharmaceutical companies, including Schering-Plough, American Home Products, Sterling Drug, and Allergan. Henry is a retired fellow of the Royal Society of Medicine (UK). He is invested in more than 15 companies, several of which are in Canada (e-Sight, Exact Imaging, Cellaegis, MyndTec). He currently serves on the Boards of several start-up health care companies, including Smart Cells (sold to Merck in 2010), Cool Systems, Cristcot Medical, and Cannuflow. He was a member of the board of Directors of Microfluidics, a public company in the equipment space for pharmaceutical manufacture (sold to IDEX in 2010). Internationally, he serves on the board of a Canadian Medical Device company (MyndTec) in Toronto and as an advisor to 2 Halifax based companies. Henry works closely with the Canadian Consulate in Boston to mentor several Canadian startups. He serves on the Board of Overseers of Beth Israel-Deaconess and Newton Wellesley Hospitals. Henry holds Bachelors (Augusta College) and Master's Degrees in Chemistry from Rutgers University, and an MBA in International Marketing from Seton Hall University. Henry and his wife Laurie have one grown daughter and reside in Wellesley, Massachusetts.

John Hallal, an active angel investor, who has built a track

record of success in entrepreneurship, mergers, and acquisitions (M&A) and in operating and advising emerging growth companies. For the first 12 years of his business career, John practiced as an attorney in Boston. From 2003 to January 2005, John served as Vice President of Rehab Medical, Inc., a manufacturer, and distributor of medical devices used to rehabilitate joints after surgeries. John led management in its sale of Rehab Medical to Otto Bock Healthcare, L.P. in January 2005. John then successfully co-founded a durable medical equipment supply company. He launched the company, assisted in raising millions of dollars, hired key employees and ultimately merged it with a public company in 2008. John has invested in, advised and counseled a number of other start-up and emerging growth companies. He is the managing director of Network Blue, an M&A advisory firm, and a member of a Boston Harbor Angels. Currently, John is the Chief Operating Officer of a cannabis products start-up company located in Northern, California. As an Adjunct Professor at Babson College F.W. Olin Graduate School of Business, John teaches M&A for Entrepreneurs. John also serves as a Mentor in Babson's Launch Pad, advising start-up businesses on structure, operation plans, sales, and fundraising. John is a graduate of Bucknell University (1987) and Boston College Law School (1991).

Jennifer J. Davagian, founder, President, and CEO of Cristcot, a global biotech pharmaceutical development company located in Concord, Massachusetts, www.cristcot.com. Ms. Davagian has 20+ years' experience assembling teams of individuals to build businesses from conception to commercialization. In 2014 Cristcot launched Sephure, the first-of-its-kind disposable suppository applicator. The device, invented by Ms. Davagian, has FDA clearance, global patent protection, and is manufactured in the United States and Cristcot has ISO-13485 certification. Cristcot intends to launch its first over-the-counter drug by the end of 2016 and anticipates approval of its first prescription drug in late 2018. As an IBD patient, Jennifer knows the daily struggles of IBD patients and compliance decisions facing healthcare outcomes. As a businesswoman in the area of Science, Technology, and Manufacturing, she has a keen understanding of new medical technology development, regulatory submissions, and GMP compliance, in addition to new product commercial execution. As an IBD patient, Jennifer knows the daily struggles of patients and compliance decisions facing healthcare outcomes. As a business woman in the area of Science, Technology, and Manufacturing, she has a keen understanding of new medical technology development, regulatory submissions, and GMP compliance, in addition to new product commercial execution. Ms. Davagian teaches at Boston University School of Management on a variety of business topics. She has written for both the National Institute of Health and the Food and Drug Administration.

Moderator:

ROBERT ADELSON, business and tax attorney, a 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, start-ups and small companies, independent contractors and employees and executives. Rob is a frequent speaker on business law topics and author of numerous articles published in Boston Business Journal, Mass High Tech and other publications. 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

E-Minute Presentations will be at the start of the meeting. These very short presentations enable young startup en-

trepreneurs to gain experience in presenting their summary business plans to expert panels and audiences.
Directions: Constant Contact is adjacent to RT 128 / 95 at Exit 28B.

See: http://www.constantcontact.com/about-constant-contact/office-location-waltham.jsp

Reservations: Please register at https://boston-enet.org/event-2990367/Registration.

ENET Constant Contact meetings are free to ENET members and $20 for non-members. No reservations 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.

Consumer Electronics Society cosponsoring Entrepreneurs' Network, Life Members and Medical Development Group - 6:30PM, Wednesday, 7 November

The New Market of Hearing Healthcare

Kevin Franck, Ph.D. Massachusetts Eye & Ear – Advances in Audiology.







The last decade has seen a flurry of activity in the US hearing healthcare marketplace. A result of this activity is a pending new category of over-the-counter hearing healthcare products exempt from state dispensing laws. The future marketplace for OTC hearing healthcare products will be unlike those of traditional consumer products or clinical care, and both existing marketing may need to evolve to accommodate it. There is much excitement and uncertainty. We asked Kevin Franck, a veteran of both medical and consumer product companies to share his insights and to convene a panel who will share theirs.

https://www.masseyeandear.org/news/press-releases/2017/10/kevin-franck-named-director-of-audiology-at-mass-eye-and-ear

Massachusetts Eye and Ear, The Starr Center
185 Cambridge Street, 2nd floor
Boston, MA 02114-2500

The Starr Center - http://www.schepens.harvard.edu/starr-center

Schedule
6:30 – Pizza & soda
7:00 – Brief presentations by panel
8:00 – Panel discussion
9:00 – Close

Please RSVP to: BostonCESoc@gmail.com
Host & Moderator

Kevin Franck: Director of Audiology, Mass Eye and Ear / Harvard Medical School

Panel
Jahn Eichfeld: Engineering leader, Bose Hear
Christine Jones: US Vice President of Audiology, Phonak
Andrea Kaneb: Hearing assistive technology innovator
Henrik Matties: Co-Founder & Managing Director, Mimi Hearing Technologies
Sunil Puria: Amelia Peabody Scientist, Mass. Eye and Ear
Darleen Wilson: User experience researcher and designer

Entrepreneur's Network - 6:00PM, Tuesday, 13 November (Cambridge Meeting)

Outsourcing – Why, When, and How

Entrepreneurial leaders responsible for building and scaling their companies understand the conflicting pressures that face them: Sourcing the right talent, managing budgets, and maintaining enough agility to adapt the organization as the business evolves.

Join our panel discussion focused on understanding best-practice models for working with outsourced partners to support key business functions. Outsourcing benefits include operational excellence, cost savings, and business agility. However, leaders must understand when, how and what to outsource to make the right decisions for their firm based on their objectives, stage, and unique requirements. The goal of this session is to help you better understand the advantages and considerations of outsourcing and give you a chance to network with like-minded professionals.

Agenda
6:00-7:00 PM - Registration & Networking
7:00-7:10 PM - ENET Chairman's Announcements
7:10-7:25 PM - eMinute PITCH - up to 3 startups give a 90-second elevator pitch
7:25-8:15 PM - Expert speakers on the night's topic
8:15-8:30 PM - Q & A
8:30-9:00 PM - Final networking, including meeting speakers

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

Speakers

Natalie Nathanson - President of Magnetude Consulting, B2B marketing agency - specialists in B2B tech and cyber security marketing & markets

Natalie is a tech sector entrepreneur with a passion for innovation, technology, and the entrepreneurial spirit. With nearly 20 years of marketing, strategy and sales enablement experience, she has worked extensively with startups, small and mid-sized firms across the B2B tech sector to drive towards company growth objectives. Natalie has expertise across a variety of marketing & sales disciplines including go-to-market planning, branding, messaging & positioning, demand generation, digital marketing, sales enablement, product marketing, channel marketing, and inbound marketing and sales.

In 2012, she founded Magnetude Consulting, a B2B marketing firm that works with entrepreneurial firms who want to grow more rapidly and compete more effectively. Magnetude helps clients market the right way in today's increasingly complex environment by providing fractional marketing department services with full-service capabilities spanning marketing strategy, digital marketing, demand generation, channel & sales enablement, content development, and brand visibility.

Prior to founding Magnetude, Natalie managed a global marketing team at Forrester Research where she built and led programs around sales enablement, sales & marketing alignment, demand generation, and product marketing. Natalie has also held a few other marketing positions at B2B tech startups.

Arnon Tuval - Business Performance Advisor at Insperity
Arnon is a dynamic & versatile Sales and Business Operation Management Professional with chronicle success of 18 years in directing multimillion-dollar sales and business operations in highly competitive markets. He is proficient in Strategic Sales & Marketing, HR Management, Business & Operations Development, Channel & Distribution Management, Inventory Control, Key Account Management, Team Management, and Liaison & Coordination. He has expertise in creating, developing & executing innovative marketing/ business development plans & strategies together with designing, consolidating, & improving organizational processes.

Amon is well-versed in managing, coordinating, & controlling overall operational aspect including revenue growth, profit, implementing the strategic vision, and direction to business development so as to meet the medium and long-term objectives of the organization.

Tony Fiore - I help privately-owned businesses grow, succeed and become attractive to potential buyers
Tony is a business consultant that works with startups, small and medium size businesses to resolve the everyday operational, commercial and financial issues confronting them as they strive to launch, grow and compete successfully. When the rime is right, he helps business owners ready themselves and their company for sale and to optimize and navigate the sale process to achieve the owner's preferred outcome.

He has helped establish essential core operational processes and sales and marketing strategies for companies seeking further growth and market share. Tony strives to provide advice that "can be practiced" rather than advice that is conceptually sound but operationally unworkable, and to be an alternative source of trusted, practical and creative insight. His experience has involved varied roles, including a board membership on a number of startup and private companies, the general counsel of a large public technology company, a venture investor in medical device and life science industries and the VP Finance/Administration of a hardware and software service company.

Moderator
Susan McKenney - Founder Diversified Sales and Smarketing Institute
Susan McKenney is founder of Diversified Sales Solutions and the Smarketing Institute. She helps small companies and startups achieve sales success through management, performance, and planning. She helps corporations exceed their business goals by Team building, development, sales enablement and sales process improvement. She most recently launched the Smarketing Institute to address the close relationship and need for Sales and Marketing in small businesses and startups using Local Sales and Marketing Professionals.

She is a former Sales professional with over twenty years of experience across many industries. Her background includes executive sales management, sales team creation, sales training. Susan has helped build regional, sales organizations, creating direct selling teams. She has developed and conducted "custom" sales and product training programs for small companies and startups. She has consulted many small businesses in MA in the last six years.

eMinute PITCH Presentations will be given at the start of each meeting. These 90-second elevator-style presentations enable early-stage startup entrepreneurs to gain experience in presenting a summary of their business plans to expert panels and audiences.

LOCATION: Draper, Hill Building, One Hampshire St. Cambridge, MA 02139 (https://www.mapquest.com/us/massachusetts/draper-laboratory-274966461) The address is One Hampshire St, but the entrance is actually on Broadway. Attendees must arrive at Draper Labs before 7pm. Entrance will be locked after 7pm.

PARKING: Evening discounted parking available at Blue, Yellow, and Green Parking Garages http://greaterbostonparking.com/kendall.html. Metered parking is often available after 6pm.

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Life Members – 4:00PM, Tuesday, 13 November

Can Nuclear Energy Thrive in a Carbon-Constrained World? – Findings from a new MIT study -

On Tuesday, November 13th, MIT Professor Jacopo Buongiorno, Associate Department Head of Nuclear Science and Engineering at MIT, will present findings from a recent MIT study on nuclear energy sponsored by the IEEE Boston Section Life Members.

With 60 new reactors under construction worldwide, the nuclear industry is currently experiencing moderate growth, mostly concentrated in Asia. A much greater expansion is needed if nuclear is to play a significant role in combating climate change, but there are a number of challenges hindering the further growth of nuclear energy utilization. If these challenges are properly addressed, though, there are major opportunities for nuclear energy to reduce carbon emissions worldwide and conquer new markets.

MIT has recently completed a multi-disciplinary study to assess the prospects for new nuclear technologies, policies, business models, and regulatory governance to accelerate the transition to a lower-carbon global energy system in the U.S. and around the world. Prof. Buongiorno will discuss findings from the MIT study that are focused on (a) cost competitiveness of nuclear in various markets with and without carbon constraints, (b) technology innovations that could substantially reduce the capital cost of new nuclear plants, and (c) regulatory pathways to accelerate the deployment of advanced reactors.

Jacopo Buongiorno is the TEPCO Professor and Associate Department Head of Nuclear Science and Engineering, where he teaches a variety of undergraduate and graduate courses in thermo-fluids engineering and nuclear reactor engineering. Jacopo has published over 80 journal articles in the areas of reactor safety and design, two-phase flow and heat transfer, and nanofluid technology. For his research work and his teaching at MIT he won several awards, including the Ruth and Joel Spira Award (MIT, 2015), and the Landis Young Member Engineering Achievement Award (American Nuclear Society, 2011). He is the Director of the Center for Advanced Nuclear Energy Systems (CANES), which is one of eight Low-Carbon-Energy Centers (LCEC) of the MIT Energy Initiative (MITEI), as well as the Director of the MIT study on the Future of Nuclear Energy in a Carbon-Constrained World. J

Jacopo is a consultant for the nuclear industry in the area of reactor thermal-hydraulics and a member of the Accrediting Board of the National Academy of Nuclear Training. He is also a member of the Naval Studies Board (National Academies of Sciences, Engineering, and Medicine), a Fellow of the American Nuclear Society (including service on its Special Committee on Fukushima in 2011-2012), a member of the American Society of Mechanical Engineers, and a participant in the Defense Science Study Group (2014-2015).

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/.

Reliability Society – 5:30PM, Wednesday, 14 November

Keyence Inspection Solutions – Superior Analysis through Clearer Observation

Alik Apelian - Area Product Sales Manager, Digital Microscope Team, Keyence Corporation of America

Keyence is a rapidly growing leader in factory automation products and turnkey inspection equipment. Their microscope and surface measurement systems ensure that their customers can meet increasing quality standards and guarantee the reliability of their products.

During our November meeting, two specialists from Keyence will discuss High-Resolution Microscope systems and how they are an asset in Reliability, Failure Analysis, and R&D. These systems are designed to allow the researcher or engineer to make better decisions through superior imaging and metrology with reduced subjectivity.

We will be detailing how these products are used for a variety of applications including counterfeit electronic detection. Multi-directional lighting and full focus stacking make it easy to identify these in a fraction of the time, and with greater confidence. It is estimated that 70-80% of all potential counterfeits can be caught with a thorough inspection. Counterfeit inspection techniques are still new for many in the industry.

We will also be breaking down the many surface roughness parameters, and why Ra isn't always the best choice in analysis surface texture. Many companies are moving away from stylists and profilometers and toward laser scanning microscopes to get down to the true depth of a groove with 0.5nm resolution, and 87-degree slope angle detection.

Keyence will demonstrate 3 of their Microscope systems and discuss the value each one provides: A Digital Microscope, a Laser Scanning Confocal, and a 3D Measuring Macroscope. Keyence encourages attendees to bring samples to see the equipment in action after the meeting.

AUTHOR BIO: Alik started with Keyence in 2012 as product specialist for Digital Microscope and High Speed Camera. Since then, she has moved into management of a team of 5 who span that area. Alik is a member of the IEEE Reliability Society and has spent some time on the Boston Chapter Advisory Board. She graduated from UMass Amherst in 2007 with an International Business degree.

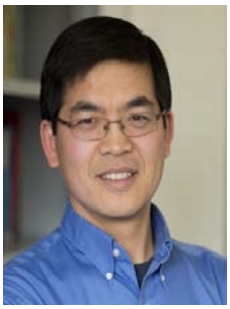
Meeting Location: MIT Lincoln Laboratory, 3 Forbes Rd, Lexington, Massachusetts, 02421
Registration: click here
Copy and paste link http://ewh.ieee.org/r1/boston/rl/events.html
Directions to 3 Forbes Road, Lexington, MA:

- Take Route 128/I-95 to Exit 30B, Route 2A Westbound.
- At the first traffic light, turn left onto Forbes Road.
- Go to the end of the street.
- At the traffic circle, turn right.
- Go halfway around the traffic circle and turn into the parking lot for MIT Lincoln Laboratory
- The main entrance is straight ahead, shared with "agenus".

Geoscience and Remote Sensing Society – 6:00PM, Tuesday, 20 November

Integrated Ferroics for Sensing, Power, RF, Microwave and mm-Wave Electronics

Prof. Nian Sun, Laboratory for Integrated Ferroics, ECE Dep., Northeastern University



The coexistence of electric polarization and magnetization in multiferroic materials provides great opportunities for realizing magnetoelectric coupling, including electric field control of magnetism, or vice versa, through a strain mediated magnetoelectric coupling in layered magnetic/ferroelectric multiferroic heterostructures. Strong magnetoelectric coupling has been the enabling factor for different multiferroic devices, which however has been elusive, particularly at RF/microwave frequencies. In this presentation, I will cover the most recent progress on new integrated ferroic materials which are deposited at room temperature, magnetoelectric NEMS (nanoelectromechanical system) based sensors and antennas. Specifically, we will introduce magnetoelectric multiferroic materials, and their applications in different devices, including: (1) novel ultra-compact RF NEMS acoustic magnetoelectric antennas immune from ground plane effect with < □0/100 in size, self-biased operation and ground plane immunity; and (2) ultra-sensitive RF NEMS magnetoelectric magnetometers with ultra-low noise for DC and AC magnetic fields sensing. These novel ferroic materials and devices show great promise for applications in compact, lightweight and power efficient sensors, antennas and tunable components for radars, communication systems, biomedical devices, IoT, etc.

Reference: 1. N.X. Sun and G. Srinivasan, SPIN, 02, 1240004 (2012); 2. J. Lou, et al., Advanced Materials, 21, 4711 (2009); 3. J. Lou, et al. Appl. Phys. Lett. 94, 112508 (2009); 4. M. Liu, et al. Advanced Functional Materials, 21, 2593 (2011); 5. T. Nan, et al. Scientific Reports, 3, 1985 (2013); 6. M. Liu, et al. Advanced Materials, 25, 1435 (2013); 7. M. Liu, et al. Advanced Functional Materials, 19, 1826 (2009); 8. Ziyao Zhou, et al. Nature Communications, 6, 6082 (2015). 9. T. Nan, et al. Nature Comm. 8, 296 (2017).

Dr. Nian Sun is professor at the Electrical and Computer Engineering Department, Director of the W.M. Keck Laboratory for Integrated Ferroics, Northeastern University, and founder and chief technical advisor of Winchester Technologies, LLC. He received his Ph.D. degree from Stanford University. Prior to joining Northeastern University, he was a Scientist at IBM and Hitachi Global Storage Technologies. Dr. Sun was the recipient of the NSF CAREER Award, ONR Young Investigator Award, the Søren Buus Outstanding Research Award, etc. His research interests include novel magnetic, ferroelectric and multiferroic materials, devices and subsystems. He has over 240 publications and over 20 patents and patent applications. One of his papers was selected as the “ten most outstanding full papers in the past decade (2001~2010) in Advanced Functional Materials”. Dr. Sun has given over 120 invited presentations and seminars. He is an editor of Sensors, and IEEE Transactions on Magnetics, and a fellow of the Institute of Physics, and of the Institution of Engineering and Technology.

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

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2019 IEEE International Symposium on

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BOSTON 2019

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www.array2019.org

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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.

Suggested Topics

- System Architecture
- Aperture Design
- Antenna Elements
- Beamforming Techniques
- T/R Modules
- Signal Processing for Arrays
- Array Measurements
- Advanced Materials
- Packaging and Manufacturing Techniques
- Applied Computational Electromagnetics
- 5 G
- Metamaterials
- Radio Astronomy

See website: www.array2019.org for details

Special Sessions

Please provide suggestions for special sessions to the Technical Program Chair at info@array2019.org

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, 15 March 2019.This is a firm deadline. Papers will not be accepted after this date. 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.

15 March 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

30 April 2019 – Author notification of paper acceptance

1 Sept. 2019 – Conference registration deadline for accepted authors

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Fall 2018 Professional Development and Education Program
www.ieeeboston.org

Digital Signal Processing for Wireless Communications
Dates and Time: Thursdays, October 11, 18, 25, Tuesdays, October 30 and November 6
6:00PM - 9:00PM

Fundamentals of Real-Time Operating Systems
Dates and Time: Mondays, October 15, 22, 29 and November 5
6:00PM - 9:00PM

Fundamentals of Bioelectronics for Applications in Neuroprosthetics
Date and Time: Friday, October 26
8:00AM - 4:00PM

Introduction to Embedded Linux
Dates and Time: Mondays, November 12, 19, 26 and December 3
6:00PM - 9:00PM

Applications of Python for Digital Design and Signal Processing
Dates and Time: Thursdays, November 15, 29, Wednesday, December 5 and Thursday, December 13
6:00PM - 9:00PM

Making You A Leader Fast Track
Date and Time: Monday, December 17
8:00AM - 5:00PM

Write Right Agile User Stories and Acceptance Tests Right - 2-Day Intensive Seminar Workshop
Dates and Time: Tuesday, December 18 and Wednesday, December 19
8:00AM - 5:00PM

Practical RF PCB Design, Wireless Networks, Products and Telecommunications
Dates and Time: Tuesday, December 18 and Wednesday, December 19
9:00AM - 4:30PM

Online Courses
(Each Online Course - 90 day access for registrants!!!)

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- Systems Verilog 101 (SV101) Design Construct
- Systems Verilog 102 (SV102) Verification Constructs
- High Performance Project Management
- Introduction to Embedded Linux

(Discounts available if register for all three Verilog Courses)

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- Embedded Linux BSPs and Device Drivers
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All Courses are being held at the Crowne Plaza Hotel, 15 Middlesex Canal Park Drive, Woburn
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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.

Tutorials and Special Sessions

Please submit suggestions for tutorial topics or special sessions to the Technical Program Chair at info@radarconf2019.org

Suggested Topics

- Radar phenomenology
- Antenna technology
- Radar Electronics
- Over the horizon radar (OTHR)
- Bistatic, multistatic & passive radar
- Networked & distributed radar
- Commercial radar
- mm-wave & THz radar
- Environmental Sensing
- Airborne & space based
- SAR and ISAR imaging
- ATR and classification
- Tracking
- Cognitive methods
- Waveform diversity
- Spectrum sharing
- Electronic warfare
- Emerging Systems and Technology

Paper Submission Procedures

See website for details

Important Dates	
Special Session Proposals Due	17 Aug 2018
Tutorial Submissions Due	30 Aug 2018
Paper Submissions Due	17 Oct 2018
Notification of Acceptance	14 Jan 2019
Paper Submission Due	25 Feb 2019

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Robert Alongi, IEEE Boston

Website
Andrew Zai

Draft 02

Practical RF PCB Design, Wireless Networks, Products and Telecommunications

Time & Date: **Tuesday & Wednesday December 18 & 19, 2018**
(13 hours of instruction!)

Speaker: **Henry Lau, Lexiwave Technology**

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

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

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

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

OUTLINE

1. Printed circuit board design for RF circuits
From product design, circuit design to PCB design
Layer stack-up assignment
Grounding methods and techniques
Interconnects and I/O
Bypassing and decoupling
Partitioning methods

2. Printed circuits board design for other circuits
Clock circuits
Base-band circuits
Audio circuits
Power supplies
Impedance-controlled circuits

3. PCB design for EMC/EMI compliance
EMC/EMI compliance
Grounding methods
Decoupling methods
Shielding methods

4. Additional Design Techniques
Production concerns
Systematic product design approach
RF Modules
Evaluation boards
Other RF concerns
Casing design

5. Case studies

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

notes, lunch and coffee breaks included with registration

Decision (Run/Cancel) Date for this Courses is Tuesday, December 11, 2018

Payment received by December 4
IEEE Members $415
Non-members $445

Payment received after December 4
IEEE Members $445
Non-members $465

http://ieeeboston.org/practical-rf-pcb-design-wireless-networks-products-telecommunications-fall-2017/

2019 IEEE Boston Section Executive Committee Nominations

At the October 17, 2018 Executive Committee meeting for the IEEE Boston Section, the following names were submitted and approved by the Nominations Commmitee for 2019. These were posted on the section website (www.ieeeboston.org) on October 19, 2018.

Chair - Gilmore Cooke
Vice Chair - Ramon de la Cruz
Secretary/Treasurer - Marie Tupaj
At-large (2) 2019 - 2020
Karen Panetta
Soon Wan

Additional candidates can be submitted by petition up to 30 days after the posting date. The deadline for submitting addtional candidates by petition is November 18, 2018. Petition candidates must have at least 25 active status members of member grade or higher and submitted to the section Secretary .
These can be submiteed to ieeebostonsection@gmail.com.

Applications of Python for Digital Design and Signal Processing

Time & Date: 6 - 9PM; Thursdays, Nov. 15, 29, Dec. 5, 13 (Note Dec. 5 is a Wednesday) (11 hours of instruction!)

Speaker: Dan Boschen

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

Course Summary

This is a bring-your-own laptop, hands-on course in the popular and powerful open source Python programming language. Dan provides simple, straight-forward navigation through the multiple configurations and options, providing a best-practices approach for quickly getting up to speed using Python for solving signal processing challenges. Students will be using the Anaconda distribution, which combines Python with the most popular data science applications, and will be making extensive use of the Jupyter Notebook.

The course begins with basic Python data structures and constructs, including key "Pythonic" concepts, followed by an overview and use of popular packages for scientific computing enabling rapid prototyping for system design. Once a basic working knowledge of the language is established, students will create example designs including a sigma delta converter and direct digital synthesizer both in floating point and fixed point. This will include considerations for cycle and bit accurate models useful for digital design verification (FPGA/ASIC), while bringing forward the signal processing tools for frequency and time domain analysis.

Target Audience:

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

A laptop (Mac or PC) preconfigured with Anaconda is required; the specific installation instructions will be emailed to students prior to the start of class.

Benefits of Attending/ Goals of Course:

Each student that completes the course will have the tools in place to immediately put Python to use in their current work environment for scientific computing applications. After this course, you will love using Python as much as Dan does!

Topics / Schedule:

Class 1:
Intro to core Python constructs, functions, iterators, reading/writing data files, Jupyter Notebooks.

Class 2:
Using popular packages including Itertools, Numpy, Scipy, Matplotlib, Pandas, h5py.

Class 3:
Implementation examples including Sigma Delta Converter and DDS, bit/cycle accurate models, analysis.

Class 4:
Continuation of examples with class constructs and using the Spyder IDE, debugging techniques.

Speaker's Bio:

Dan Boschen has a MS in Communications and Sig-

nal Processing from Northeastern University, with over 20 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/danboschen

Decision (Run/Cancel) Date for this Courses is Thursday, November 1, 2018

Payment received by Nov. 1
IEEE Members $325
Non-members $350

Payment received after Nov. 1
IEEE Members $350
Non-members $375

http://ieeeboston.org/%20python-for-signal-processing/

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

Write Right Agile User Stories and Acceptance Test Rights

2 - Day Intensive Seminar Workshop

Time & Date: **8:30AM - 5PM; Tuesday & Wednesday, December 18 - 19**
(14 hours of instruction!)

Speaker: **Robin Goldsmith, Go Pro Management, Inc.**

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

Everyone complains that poor requirements are the major cause of project problems. Yet, like the weather, nobody does much about it, at least not effectively. Traditional approaches advocate writing voluminous requirements documents that too often don't seem to help much and may even contribute to difficulties. Agile goes to the opposite extreme, relying on brief requirements in the form of three-line user stories that fit on the front an index card and a few user story acceptance criteria that fit on the card's back. Surprise, as Mark Twain noted, in some ways it's even harder to write Agile's brief requirements effectively. This interactive workshop reveals reasons user stories and their acceptance tests can fall short of their hype, explains critical concepts needed for effectiveness, and uses a real case to provide participants guided practice writing and evaluating user stories and their acceptance criteria/tests.

Participants will learn:

* Major sources of poor requirements that cause defects, rework, and cost/time overruns.
* How Agile user stories and their acceptance criteria/tests address these issues.
* Difficulties that still afflict requirements in Agile projects and why they persist.
* Writing more effective user stories and acceptance criteria/tests.
* What else is necessary to produce working software that provides real value.

WHO SHOULD ATTEND: This course has been designed for product owners, analysts, developers, and other Agile (and other) project team members who are or should be involved in defining requirements.

AGILE, USER STORY FUNDAMENTALS

Agile Manifesto's relevant points
Characterization of traditional approaches
Waterfall and big up-front requirements
Agile's sprints and backlogs alternative
Agile project team roles
User story "As a <role>…" (Card)
User story acceptance criteria (Confirmation)
Estimating user story size
Splitting and refining
Prioritizing and allocating to backlogs/sprint
Constructing/implementing (Conversations)
Reviewing, retrospectives
Grooming backlog and reprioritizing
Exercise: Write Needed User Stories
Exercise: Define their Acceptance Criteria
Exercise: Review Your User Stories/Criteria

REQUIREMENTS ARE REQUIREMENTS—OR MAYBE NOT

User stories are backlog items, features
Chicken and egg relation to use cases
Issues and inconsistencies
Business vs. product/system requirements
"Levels Model" of requirements
Other mistaken presumptions
Requirements overview
Where user stories should fit, do fit instead
Conversation conundrum
Exercise: Re-review Your User Stories
Exercise: Re-review their Acceptance Criteria
Exercise: Write another User Story
Exercise: Review Your New User Story

WRITING MORE SUITABLE USER STORIES

Focus on what provides value
Users, customers, and stakeholders
Exercise: Identify Overlooked Stakeholders
Problem Pyramid™ tool to get on track
Exercise: Find Value
Exercise: Using the Problem Pyramid™
Exercise: Business Requirement User Stories
Issues identifying requirements
Exercise: Size a User Story
Strategies for splitting user stories
Exercise: Split a User Story

AND USER STORY ACCEPTANCE TESTS

Confirming vs. defining requirements
Suitability of using for quality factors
Differences from test-first unit tests
Missed and unclear criteria
Turning criteria into tests, issues
How many tests are really needed
Given, when, then format
Exercise: Write User Story Acceptance Criteria
Exercise: Design their Tests
Exercise: Review Your User Stories/Tests

TESTING CONCEPTS

Should tests equal requirements
How testing actually works
Defining correctness independently
Test-first illusion
UAT vs. User Story Acceptance Test
Demo illusory UAT
Test design techniques
Checklists and guidelines
Decision trees, decision tables
Boundary testing
Testing is main means to control risk
Reactive vs. proactive risk analysis
Putting Agile TDD on steroids
Exercise: Applying Proactive Risk Analysis

PRODUCT OWNER VS. BUSINESS ANALYST

Business analysis discovers requirements
Product owner (PO) role created by Agile
Essential PO characteristics
Skills/knowledge for authority
Product owner viewed as the analyst
Should a business analyst (BA) be the PO
Rethinking the PO role
Exercise: Designing a Better PO Role

(HIDDEN) BACKLOG ISSUES

What is a backlog item
What else often also are backlog items
Apples, oranges, and fruitcakes impacts
Different needs and purposes
Different appropriate artifacts
User stories for prioritization on value
Features for product delivery
Tasks for estimating, performing work
Addressing quality factors
Dealing with defects
Agile's difficulty scaling and integrating
Sprint 0
Spikes
Exercise: Design a Better Backlog

CONVERSATION CONUNDRUM

Placeholder metaphor
Developer as BA, pros and cons
Data gathering and analysis
Planning an effective interview
Controlling with suitable questions
Then a miracle occurs…
Exercise: Design a Better Conversation

Speaker's Bio: Robin F. Goldsmith, JD is an internationally recognized authority on software development and acquisition methodology and management. He has more than 30 years of experience in requirements definition, quality and testing, development, project management, and process improvement. A frequent featured speaker at leading professional conferences and author of the recent Artech House book, Discovering REAL Business Requirements for Software Project Success, he regularly works with and trains business and systems professionals.

Decision (Run/Cancel) Date for this Courses is Tuesday, December 11, 2018

Payment received by Dec. 4
IEEE Members $445
Non-members $465

Payment received after Dec. 4
IEEE Members $465
Non-members $485

http://ieeeboston.org/%20writing-agile-user-story/

Making You a Leader - Fast Track

Date & Time: **Monday, December 17; 8:30AM - 5:00PM**
(7 hours of instruction!)

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

Speaker: **Robin Goldsmith, President, GoPro Management**

We do projects to make change. Yet, change will not occur without leadership, and leaders are rare. Leaders make others want to do what the leader wants done. Leaders cause ordinary people to achieve extraordinary things. Managing is not the same as leading, and titles do not make leaders. Seminars can teach you to manage, but they cannot teach you to be a leader. Rather, making a leader takes special techniques—such as our personal development clinics—that can change deep-seated behaviors learned over a lifetime.

However, since clinics usually last about ten weeks, this mini-clinic was devised as a more convenient alternative. This format places responsibility upon the participant to carry out an extended informal follow-on program after completion of the formal seminar workshop session.

During the follow-on period, the participant uses time-condensed methods that simulate the lifetime learning which makes a leader. Therefore, commitment to carrying out these exercises is essential for successful transformation.

PARTICIPANTS WILL LEARN:

- Leadership characteristics and practices that are essential for project and personal success.
- Differences between management and leadership, how they conflict, and why leaders are so rare.
- Behaviors leaders use to influence others, up and down, to want to do what the leader wants them to do
- Special techniques personal development clinics use to change lifetime learning and make leaders.
- How to employ those special techniques in a follow-on mini-clinic to develop the leadership skills they need to make their projects successful.

WHO SHOULD ATTEND: This course has been designed for business and systems professionals who want to improve their ability to lead and influence other people.

LEADERSHIP CHARACTERISTICS & ROLE
How leadership looks and feels
Management vs. leadership
Leadership components of project success
Basic leadership practices; power sources
Real change leaders in organizations

TEAMS AND LEADERSHIP
Everyone feels leadership is lacking
Everyone thinks s/he is a leader
Results, not actions or intent
Workgroups, teams, and leaders
Situational leadership styles
Coaching and sports analogies to projects

INSPIRING AND MOTIVATING
Gaining commitment to project success
Communicating that influences others
Addressing negativism and groupthink
Conscious and unconscious messages
Greatest management principle
Hierarchy of needs effects on projects
Hygiene factors vs. motivators
Helping project players get their rewards
Influencing up and down without authority
Inspiring the extra efforts projects need
Energizing the project team

SHARED VISIONS

Relating values and vision to projects
Getting others to embrace one's vision
Developing a motivating project vision

WHERE AND HOW LEADERS ARE MADE
Born or made? How do we know?
Habits of thought that affect project success
Overcoming self-limiting lifetime learning
Leader's critical success factors
Traditional education doesn't make leaders
Special way—personal development clinics

SETTING AND ACCOMPLISHING GOALS
S.M.A.R.T. goals for self and project
Action plans to achieve your goals
Visualizing and emotionalizing

DEFINING THE FOLLOW-ON PROGRAM
Clarifying project leadership objectives
Breaking into prioritized subgoals
Establishing rewarding daily achievements
Special techniques to change habits

CARRYING OUT THE MINI-CLINIC
Working with a follow-up support structure
Mapping results regularly to goals
Objectively recording leadership changes
Self-leadership through the process

Speaker's Bio: Robin F. Goldsmith, JD is an internationally recognized authority on software development and acquisition methodology and management. He has more than 30 years of experience in requirements definition, quality and testing, development, project management, and process improvement. A frequent featured speaker at leading professional conferences and author of the recent Artech House book, Discovering REAL Business Requirements for Software Project Success, he regularly works with and trains business and systems professionals.

Decision (Run/Cancel) Date for this Courses is Monday, December 10, 2018

Payment received by Dec. 3
IEEE Members $235
Non-members $260

Payment received after Dec. 3
IEEE Members $260
Non-members $280

http://ieeeboston.org/%20making-leader-fast-track-become-leader-want-need/

Fundamentals of Real-Time Operating Systems (*Online Edition*)

Students have access to this self-paced course for 90 days!!

Registration Fee: $350

Course Summary - This course introduces the basics of Real-Time Operating Systems (RTOSes) using VxWorks and Linux as examples. The course focuses on the primary principles of RTOSes including determinism, real-time scheduling, interrupt latency and fast context switching as well as time and space partitioning in hard real-time environments. The first part of the course focuses on acquiring an understanding of microkernel and memory architectures for Real-Time including scheduling, signals, system calls, synchronization, inter-process communications and interrupt handling. The latter part of the course covers considerations for timing, memory management, device drivers, booting, debugging and deployment of Real-Time embedded systems.

Who Should Attend - The course is designed for real-time engineers who are using or intending to use a Real-Time Operating System. It is also targeted at experienced developers requiring a refresher course on RTOSes. This course will clearly demonstrate both the strengths and weaknesses of Real-Time Operating Systems used in Embedded Systems.

Course Objectives

- To provide a basic understanding of Real-Time Requirements and Design Decisions
- To understand the complexities of RTOS scheduling and synchronization
- To learn how to configure, boot, test and deploy Real-Time embedded systems
- To give students the confidence to apply these concepts to their next RTOS project

Lecturer – Mike McCullough is President and CEO of RTETC, LLC. Mike has a BS in Computer Engineering and an MS in Systems Engineering from Boston University. He has held a variety of software engineering positions at LynuxWorks, Embedded Planet, Wind River Systems and Lockheed Sanders. RTETC, LLC provides Real-Time embedded training and consulting to many embedded systems companies. RTETC focuses on Real-Time operating systems (RTOS), Linux and Android solutions for the embedded systems market.

Hardware and Software Requirements - The student should have a working Linux desktop environment either directly installed or in a virtualization environment or have access to a development environment for a Real-Time Operating System such as VxWorks. An Embedded Linux or VxWorks target hardware platform is useful but not absolutely required for this course.

Embedded Development Basics

Embedded Systems Characteristics
Embedded Real-Time Systems
Real-Time Enough
Embedded Linux and Real-Time

Real-Time Operating System Basics

Microkernel Architecture
Microkernel Scheduling
Determinism
Rate Monotonic Analysis and Fixed Priority Scheduling
Latency and Latency Measurements
Fast Context Switching
Real-Time Memory Architectures
Time and Space Partitioning and ARINC
Multiprocessor Basics
Amdahl's Law

RTOS Kernel Overview

Real-Time Scheduling and Task Management
Signals and System Calls
Synchronization

Inter-Process Communications (IPC)
Interrupt Handling
Error Handling
Timing and Timers
Real-Time Memory Management

Real-Time Scheduling
OS Scheduling Types
Pre-emptive Multitasking
Typical Scheduling Issues
Linux Scheduling
VxWorks Scheduling
VxWorks Tasks
VxWorks Real-Time Processes (RTPs)
Linux Threads
Task and Thread-Specific Data (TSD)
Measuring Task and Thread Performance

Signals in Embedded RTOSes

System Calls in Embedded RTOSes

Synchronization
Via Global Data
Via Semaphores, Files and Signals
Condition and Completion Variables in Linux
Mutexes in VxWorks and Linux
Linux Futexes
Software Watchdog Timers

Inter-Process Communications (IPC)
More Semaphores
Message Queues
Shared Memory
Pipes and FIFOs
Remote Procedure Calls
Networking

Interrupts and Exception Handling
Basic Interrupt Process
VxWorks intLib and excLib
Routines You Can Call From Interrupt Context

Interrupt Service Routines (ISRs)
VxWorks and Linux ISRs

Bottom Halves in Linux

Deferring Work
Tasklets and Work Queues in Linux
Helper Tasks

Error Handling
Error Handling Approaches in OS Design

Error Handling in VxWorks
Error Handling in Tasks and Interrupts
Error Number Format
Using errnoSet, errnoGet and printErrno
Creating Your Own Errors

Error Handling in Linux
Standard Error Defines
errno and perror
strerror and strerror_r
Resets, OOPS, Panics and Segmentation Faults

Error Logging Approaches

Timing and Timers
How RTOSes Tell Time
VxWorks tickLib and timerLib
Linux Kernel, POSIX and Interval Timers
Linux High-Resolution Timers (HRTs)
VxWorks taskDelay
Linux Sleeping, Sleep Waiting and Spinlocks
VxWorks Watchdog Timers (wdLib)
Periodic Execution Example
Deadline Miss Detection
Embedded Recommendations for Timing

Memory Management and Paging
The VxWorks Memory Model
Real-Time Memory Algorithms
VxWorks memLib and memPartLib
Linux, Memory and Demand Paging
Mapping Device Memory in Linux
The Slab Allocators in Linux
The Linux /proc Filesystem
Memory Barriers
The Linux OOM Killer
Reserving and Locking Memory
Memory in Embedded Systems

Device Drivers in VxWorks
File Descriptors
The VxWorks IO Subsystem
VxWorks ioLib, fioLib and iosLib

The 5 Basic Device Driver Types
Char, Block and Network Drivers
Virtual Drivers and Basic I/O Drivers
Other Device Drivers
The VxBus in VxWorks

Device Drivers in Linux
File Descriptors in Linux
The UNIX Device Driver Model
Major and Minor Numbers
The New Device Driver Model

The VxWorks Boot Process
VxWorks Boot Example
Configuration Files
Application Startup
VxWorks 7

The Linux Boot Process
The Root Filesystem in Linux
Bootloaders and U-Boot
Configuring Linux
Embedded Linux Boot Methods
Building and Booting from SD Cards and eMMC
Yocto and Poky

Debugging Basics
How Software Debuggers Work
Debuggers and Intrusion
Types of Debugging Approaches
Process-Level vs System-Level Debug

Process-Level Debug
GDB, GDB Server and the GDB Server Debugger
The VxWorks Debug Agent (WDB)
Other Debug Tools for Linux and VxWorks
A Remote Debug Example
Printing and Logging

System-Level Debug
LTTng and the VxWorks Systems Viewer (Windview)
System-Level Debug Tools
The /proc and /sys Virtual Filesystems in Linux
Linux Kernel Debug
Linux Crash Dumps

Deploying VxWorks Systems
VxWorks Systems Customization and Configuration
VxWorks Field Upgrades

Deploying Embedded Linux Systems
Linux Systems Customization and Configuration
Choosing and Building the Root Filesystem
Module Decisions
Final IT Work
Final deployment of Embedded Linux Field Systems

RTOS Trends

Some Final Recommendations
Getting Help
Measuring Performance
Managing Memory
Things To Remember

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

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

Embedded Linux Board Support Packages and Device Drivers *(Online Edition)*

Students have access to this self-paced course for 90 days!!

Registration Fee: $350

Course Summary - This video course provides advanced training in the development of Embedded Linux Board Support Packages (BSPs) and Device Drivers. The first part of the course focuses on BSP and Software Development Kit (SDK) development in an Embedded Linux context with a focus on application performance measurement and improvement. The latter part of the course covers Embedded Linux Device Driver development including key device driver decisions and deployment considerations for Embedded Linux BSPs.

Who Should Attend - The course is designed for real-time engineers who are developing Embedded Linux BSPs and Device Drivers for Embedded Linux distributions. It is also targeted at experienced developers requiring a refresher course on Linux BSP and Device Driver development.

Course Objectives

- To gain an understanding of the complexities of BSP and SDK development and their uses in Embedded Linux systems.
- To provide a basic understanding of the Linux I/O Subsystem and the Device Driver Models provided with Embedded Linux distributions.
- To gain an in-depth understanding of character-based device drivers in Embedded Linux
- To understand key device driver subsystems including relatively slow I/O interconnects such as I2C, SPI and USB as well as high-speed interfaces such as Ethernet, USB 3.0 and PCIe
- To give students the confidence to apply these concepts to their next Embedded Linux project.

Lecturer – Mike McCullough is President and CEO of RTETC, LLC. Mike has a BS in Computer Engineering and an MS in Systems Engineering from Boston University. A 20-year electronics veteran, he has held various positions at LynuxWorks, Tilera, Embedded Planet, Wind River Systems, Lockheed Sanders, Stratus Computer and Apollo Computer. RTETC, LLC is a provider of Eclipse-based software development tools, training and consulting services for the embedded systems market.

Course Schedule

Getting Started with Embedded Linux

Embedded Linux Training Overview
Linux Terminology, History and the GPL
Building the Kernel Source Code
Embedded Linux Kernels
BSPs and SDKs
Linux References (Books and Online)
BSP Requirements
U-Boot and Bootloader Development
Embedded Linux BSP Development Basics
Basic BSP Development
Files and Filesystem Support
The I/O Subsystem: Talking to Hardware
Memory Management and Paging
Error Handling in Embedded Linux BSPs
Timing and Timers
Interrupt and Exception Handling in BSPs
BSP Deployment Issues and Practices
Embedded Linux SDK Basics
The 3 Pieces of an SDK
Embedded Linux Distributions and the GNU Compiler

Collection (GCC)
Other Embedded Linux Development Tools
Library Support, Glibc and Alternatives
SDK Deployment and Support
Debugging
GDB, GDB Server and the GDB Server Debugger
Other Debug and Test Tools
An Eclipse Remote Debug Example
Advanced Debug with printk and syslogd
System-Level Debug
System-Level Debug Tools
The /proc and sys Filesystems
Advanced Logging Methods
KGDB and KDB
Crash Dumps
Debugging Embedded Linux Systems
Configuring Embedded Linux
Config Methods
Config Syntax
Adding Code to the Linux Kernel
Booting Embedded Linux
Processor Startup
Initial Functions
The initcalls
Using __init Functions
NFS Booting
Root File Systems
RAMdisk Booting with initrd
RAMdisk Booting with initramfs
initrd vs initramfs
Root File System Development
Busybox Development
Building a RAMdisk for an initrd
Building a RAMdisk for an initramfs
Flash File System Development

Testing and Debug of Embedded Linux BSPs
Kernel Debug and Kernel Probes
Kexec and Kdump
The Linux Test Project (LTP)
Performance Tuning Embedded Linux BSPs
Virtualization
Measuring Embedded Linux BSP Performance
Common Considerations
Uncommon Considerations
BootLoader Optimizations
Boot Time Measurements
Effective Memory and Flash Usage
Filesystem Performance Measurement
Some Ideas on Performance Measurement

The Original UNIX Device Driver Model
The fops and file structs
The inode and dentry structs
Major and Minor Numbers
Embedding Channel Information
Deferring Work
The /proc Filesystem
Configuring the Device Driver
A Simulated Device Driver
Modularization Revisited
The Evolution of a New Driver Model
The Initial Object-Oriented Approach
Platform Devices and Drivers
A Generic Subsystem Model
The Generic Subsystem Model in Detail
Subsystem Registration
The Probe and Init Functions
The Show and Store Functions
User Access via the /sys Filesystem
Configuring the New Device Driver
The udev Linux Application
Comparing the Two Driver Models
The Flattened Device Tree (FDT)
openBoot and its Effect on Embedded Linux
The Device Tree Script (dts) File
The Device Tree Compiler (dtc)
The Device Tree Blob (dtb) File
Building a dtb File
Hybrid Device Drivers
Other fops Functions
The Need for Ioctl
Linux Device Driver Subsystems
Direct Connect Device Drivers
Serial/Console Drivers, I2C & SPI
Real-Time Clocks and Watchdogs
GPIO and the Pinmux
Flash MTDs and Direct Memory Access
USB, Power and CPU Management
Video and Audio

PCI and VME
Block Devices
RAMdisk and Flash Filesystems
MMCs and SD Cards
Network Device Drivers
MAC and PHY Device Drivers
net_device and net_device_stats
Network Device Initialization
Device Discovery and Dynamic Initialization
Network Interface Registration
Network Interface Service Functions
Receiving and Transmitting Packets
Notifier Chains and Device Status Notification
Unwired Device Drivers
Wireless Device Drivers (WiFi, WLAN)
Bluetooth and BlueZ
Infrared and IrDA
Cellular from 2G to 5G
Drivers in User Space
Accessing I/O and Memory Regions
User Mode SCSI, USB and I2C
UIO
High-Speed Interconnects
PCIe
iSCSI
Infiniband
FibreChannel
Debugging Device Drivers
kdb, kgdb and JTAG
Kernel Probes
Kexec and Kdump
Kernel Profiling
User Mode Linux
Performance Tuning Device Drivers
Some Final Recommendations

http://ieeeboston.org/embedded-linux-bsps-device-drivers-line-course/

Embedded Linux Optimization - Tools and Techniques (*Online Edition*)

Students have access to this self-paced course for 90 days!!

Registration fee: $250

Summary - This video course provides advanced training in the debugging, testing, profiling and performance optimization of Embedded Linux software. The first part of the course focuses on advanced debugging, testing and profiling in an Embedded Linux context with a focus on using Eclipse, Backend Debuggers, JTAG and In-Circuit Emulators as well as Kernel Logging capabilities and Kernel Hacking. The latter part of the course covers performance measurement and optimization affecting boot, memory, I/O and CPU performance and key performance optimization tools for Embedded Linux software including the perf tool, advanced cache usage and compiler-based optimization.

Who Should Attend - The course is designed for real-time engineers who are developing high-performance Linux applications and device drivers using Embedded Linux distributions. It is also targeted at experienced developers requiring a refresher course on Advanced Embedded Linux optimization.

Course Objectives

- To understand debugging, profiling and testing high performance Embedded Linux software.
- To provide an overview of Linux application performance measurement and optimization.
- To understand the tools used for performance optimization of Embedded Linux software.
- To give students the confidence to apply these concepts to their next Embedded Linux project.

Lecturer – Mike McCullough is President and CEO of RTETC, LLC. Mike has a BS in Computer Engineering and an MS in Systems Engineering from Boston University. He has held a variety of software engineering positions at LynuxWorks, Embedded Planet, Wind River Systems and Lockheed Sanders. RTETC, LLC provides real-time embedded training and consulting to many embedded systems companies. RTETC focuses on real-time operating systems (RTOS), Linux and Android solutions for the embedded systems market.

Getting Started with Embedded Linux
Embedded Linux Training Overview
Terminology
Linux Versioning
The GPL
Building the Kernel Source Code
Embedded Linux Kernels
BSPs and SDKs
Linux References (Books and Online)
A Development Cycle Focused on Performance
A Basic Optimization Process

Basic Debugging Review
Embedded Applications Debug
GDB, GDB Server and the GDB Server Debugger
Other Debuggers
An Eclipse Remote Debug Example
Debugging with printk, syslog, syslogd and LTTng

System-Level Debug
System-Level Debug Tools
The /proc and /sys Filesystems

Basic Logging
KDB and KGDB
Crash Dumps and Post-Mortem Debugging
Debugging Embedded Linux Systems
Backend Debuggers
In-Circuit Emulators
Hardware Simulators
Analyzers
Requirements Development
Performance Requirements
Derived Requirements
Testability and Traceability
Reviewing Requirements
Designing for Performance
Design for Test (DFT)
Agile Software Design
Software and Linux Decomposition
Memory Management
CPU and OS Partitioning
Design Reviews
Coding for Performance
Coding Standards and Consistency
Languages, Libraries and Open Source Components
Learning Magic Numbers
Letting Compilers Work For You
Global, Static and Local Variables
Code Reviews

Software Testing
Unit-Level Testing
System-Level Testing
Code Coverage Tools
gcov
Automated Testing
Some Embedded Linux Test Recommendations
DebugFS
Configuring DebugFS
DebugFS Capabilities
Advanced Logging
LogFS
Using Logwatch and Swatch
Using syslogd and syslog-ng
Tracing
ptrace and strace
New Tracing Methods
SystemTap
Ftrace, Tracepoints and Event Tracing
Tracehooks and utrace
Profiling
Basic Profiling
gprof and Oprofile
Performance Counters
LTTng
Another DDD Example
Manual Profiling
Instrumenting Code
Output Profiling
Timestamping
Addressing Performance Problems
Types of Performance Problems
Using Performance Tools to Find Areas for Improvement
Application and System Optimization
CPU Usage Optimization
Memory Usage Optimization
Disk I/O and Filesystem Usage Optimization
Measuring Embedded Linux Performance
Some Ideas on Performance Measurement
Common Considerations
Uncommon Considerations
Using JTAG Methods
BootLoader Measurements
Boot Time Measurements
The Perf Tool
Origins of Perf
The Perf Framework
Perf Commands and Using Perf
Listing Events
Counting Events
Profiling with Perf
Static Tracing with Perf
Dynamic Tracing with Perf
Perf Reporting
Performance Tool Assistance
Recording Commands and Performance
System Error Messages and Event Logging
Dynamic Probes
Jprobes and Return Probes
Kernel Probes

Kexec and Kdump
- Improving Boot Performance
- Boot Time Optimization
- The Linux Fastboot Capability
- Building a Smaller Linux
- Building a Smaller Application
- Filesystem Tips and Tricks
- Some Notes on Library Usage
- Improving Kernel Performance

Kernel Hacking
CONFIG_EMBEDDED
Configuring printk
Test Code
Configuring Kernel and IO Scheduling

- Improving CPU Performance

Run Queue Statistics
Context Switches and Interrupts
CPU Utilization
Linux Performance Tools for CPU
Process-Specific CPU Performance Tools
Stupid Cache Tricks
- Improving System Memory Performance

Memory Performance Statistics
Linux Performance Tools for Memory
Process-Specific Memory Performance Tools
More Stupid Cache Tricks
- Improving I/O and Device Driver Performance
- Disk, Flash and General File I/O
- Improving Overall Performance Using the Compiler
- Basic Compiler Optimizations
- Architecture-Dependent and Independent Optimization
- Code Modification Optimizations
- Feedback Based Optimization
- Application Resource Optimization
- The Hazard of Trust
- An Iterative Process for Optimization
- Improving Development Efficiency
- The Future of Linux Performance Tools

Some Final Recommendations

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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

Software Development for Medical Device Manufacturers *(Online Edition)*

Students have access to this self-paced course for 90 days!! ***Registration Fee : $125***

Course Description This course provides an introduction to the development of medical device software. The course is comprised of 4 modules that range from 30-45 minutes in duration. The focus is on complying with FDA Design Controls and IEC 62304 requirements.

This course is intended for software developers who are actively involved in developing medical device software.

Module 1

- Medical Device Definitions: FDA and European Union (EU)
- Regulatory Roadmap
- FDA/EU Device Classifications
- FDA QSR Regulation
- FDA Guidance Documents that pertain to medical device software

Module 2

- International Standards that pertain to medical device software
- Types of Software Regulated by FDA
- Quality System basics: Procedures, Work Instructions and Records
- ALL Software is Defective…

Module 3:

- Design Control Overview
- General Requirements
- Design and Development Planning
- Software Development Models
- Design Input
- About Requirements…
- Design Output
- Design Reviews

Module 4:

- Design Control (continued)
- Design Verification
- Software Verification Process
- Testing Overview
- Design Validation
- Software Validation Process
- Design Changes
- Design Transfer
- Design History File
- Course Summary

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 startups 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.

http://ieeeboston.org/software-development-medical-device-manufacturers-line-course/

Fundamental Mathematics Concepts Relating to Electromagnetics (*Online Edition*)

Students have access to this self-paced course for 90 days!!

Registration Fee: $150

Course Summary This course is designed for people wishing to refresh or to learn the fundamental mathematical concepts that are used to describe electromagnetic wave behavior. The modules address all of the basic math concepts covered in a traditional undergraduate electromagnetics course in an ECE curriculum. These concepts include Vector Basics, Integral Vector Calculus, Differential Vector Calculus, Fundamental Coordinate Systems and Complex Numbers. After completing these modules, a person should have sufficient math skills to pursue graduate studies in electromagnetics and/or be able to decipher the math presented in an upper-level text on the subject.

Target audience: This course is designed for people wishing to refresh or to learn the fundamental mathematical concepts that are used to describe electromagnetic wave behavior.

Course chapters

1. Vector Basics
2. Dot Product
3. Cross Product
4. Contour Integration
5. Vector Algebra
6. Surface Integration
7. Metric Coefficients
8. Coordinate Systems
9. Vector Coordinate Conversion
10. Del Operator and the Gradient
11. The Curl
12. Divergence
13. Stokes Theorem
14. Divergence Theorem
15. Laplacian
16. Complex Numbers

Instructor's Bio:

Dr. Kent Chamberlin is the Chair and a Professor in the Department of Electrical and Computer Engineering. In his more than thirty-five years in academia, he has performed research for more than twenty sponsors, including the National Science Foundation. He has received two Fulbright awards, including the prestigious Fulbright Distinguished Chair, which he served in Aveiro, Portugal. He has also served as an Associate Editor for the Institute for Electrical and Electronics Engineers, and he continues to be active in performing and publishing in a range of research areas.

http://ieeeboston.org/fundamental-mathematics-concepts-relating-electromagnetics-line-course/

Reliability Engineering for the Business World *(Online Edition)*

Students have access to this self-paced course for 90 days!!

Registration Fee: $320

Course Description

This course is about becoming a leader in reliability engineering. While statistics are the tools of reliability engineering, it takes knowledge not only of these tools but also of the business. Developing knowledge of the business, from sales, engineering, customer service, to supply chain management can determine how effective you can be in improving reliability.

Never take anything for granted, even some rules of thumb in reliability can be misleading, this course will show you how to prove what truly happens in the real world and how to effect change in any part of the business where it is needed. We will explore the balance sheet, organizational structure, customers, service, and high volume manufacturing. It's not just about how often things fail, it is also about where the defect came from, what is the financial effect, the recovery, when should a business take field action, effect of human error, failure analysis/material science, reliability testing, and much more. I will also discuss how you develop executive buy in for change. The course assumes a basic knowledge in reliability statistics. There are 12 sessions that cover the following topics.

Course Outline

Basics – Measurements
Business Model
Design Model (HW and SW)
HALT/RDT/Predictions
Manufacturing Model
Early Life Failures
Wear Out and Mid Life Crisis
Advanced Reliability

Course Objective

To teach you how to become the go to person in your business for objective business sensed reliability answers and requirements.

Instructor's Bio

Kevin is an innovative leader in reliability methodologies with more than 30 years experience in the storage industry. In his latest role as Director of Engineering, he developed a top down reliability/availability management process for design organizations developing mission-critical storage systems. Kevin previously directed the most extensive HALT/HASS operation in the industry, with over 300 chambers worldwide. He has written several papers, consulted with many companies, 3 patents awarded and 2 pending related to systems reliability and test.

His most recent work has been performing system architectural analysis to optimize system availability, serviceability and costs. Providing guidance to development to maximize system reliability and reduce service costs. He has provided consultation to many large companies such as EMC, CISCO, AT+T, HP, Seagate and many others. His position and experience has enabled him to perform extensive field studies and design of experiments. Kevin has developed many

http://ieeeboston.org/reliability-engineering-business-world-line-course/

Introduction to Embedded Linux
(Online Edition)

Students have access to this self-paced course for 90 days!! ***Registration Fee: $350***

Course Summary:
This first of a 2-part series introduces the Linux Operating System and the use of Embedded Linux Distributions. The course focuses on the development and creation of applications in an Embedded Linux context using the Eclipse IDE. The first part of the course focuses on acquiring an understanding of the basic Linux Operating System, highlighting areas of concern for Embedded Linux applications development using Eclipse. The latter part covers the methods for booting Embedded Linux distributions including embedded cross-development and target board considerations.

Who Should Attend:
The course is designed for real-time engineers who are building Embedded Linux solutions. It is also targeted at experienced developers requiring a refresher course on Embedded Linux. This course will clearly demonstrate both the strengths and weaknesses of the Linux Operating System in Embedded Systems.

Course Objectives:
To provide a basic understanding of the Linux OS and the Eclipse IDE framework.
To gain an understanding of the complexities of Embedded Linux Distributions and their use in embedded systems.
To give students confidence to apply these concepts to their next Embedded Linux project
Hardware and Software Requirements

The student should have a working Linux desktop environment either directly installed or in a virtualization environment. The desktop Linux should have the GNU compiler and binary utilities (binutils) already installed. A working Eclipse C/C++ installation or prior knowledge of C-based Makefiles is useful for completion of lab exercises. Lab solutions are also provided with the course. An Embedded Linux target hardware platform is useful but not absolutely required for this course.

Additional Reference Materials
Linux Kernel Development by Robert Love
Linux System Programming by Robert Love
Linux Debugging and Performance Tuning by Steve Best
Optimizing Linux Performance by Phillip G. Ezolt
Embedded Linux Primer by Christopher Hallinan
Pro Linux Embedded Systems by Gene Sally
Embedded Linux Development Using Eclipse by Doug Abbott
Linux Device Drivers by Jonathan Corbet et al
Essential Linux Device Drivers by Sreekrishnan Venkateswaran
Course Downloadable Content:

Video Lecture
Hands-On Lab Instructions
Hands-On Lab Solutions
Additional Related Materials

The Basics
Linux Terminology, History and Versioning
The Linux Community: Desktop & Embedded
The GPL
Linux References (Books and Online)

Getting Started
Kernel Source Code
Building the Kernel
Embedded Linux Kernels
Linux 2.6

Basic Kernel Capabilities
Process and Threads Management
Signals and System Calls
Synchronization, IPC and Error Handling
Timing and Timers

Memory Management and Paging
The I/O Subsystem: A Tale of Two Models
Modularization

Debugging
Process-Level and System-Level Debug
GDB and KGDB
GDB Server and Remote Debugging

An Eclipse Debug Example
Other Debug and Test Tools
Other System-Level Debug Approaches
Process & Threads Management
What are Processes and Threads?
Virtual Memory Mapping
Creating and Managing Processes and Threads
Thread-Specific Data (TSD) POSIX
The Native POSIX Threading Library (NPTL)
Kernel Threads

Signals
System Calls
Scheduling
Linux 2.4 and 2.6 Scheduling Models
The O(1) Scheduler
The Completely Fair Scheduler (CFS)

Synchronization
Via Global Data
Via Semaphores, Files and Signals

Inter-Process Communications (IPC)
Message Queues
Semaphores Revisited
Shared Memory
Pipes, FIFOs and Futexes
Remote Procedure Calls
Networking

Error Handling
errno and perror
strerror and strerror_r
oops, panics and Segmentation Faults
Timing
How Linux Tells Time
Kernel, POSIX and Interval Timers
High-Resolution Timers (HRTs)

Memory Management and Paging
Demand Paging and Virtual Memory
Allocating User and Kernel Memory
Mapping Device Memory
The Slab Allocator
The OOM Killer
Memory in Embedded Systems

Modularization
Creating a Module and Module Loading
Dependency Issues
In Embedded Systems

Shared Libraries
A Shared Library Example
Static and Dynamic Libraries

The I/O Subsystem: A Tale of Two Models
The Original Device Driver Model
The Standard I/O Interface
The New Device Driver Model and Kernel Object Classes
Initialization
Platform Devices, Busses, Adapters and Drivers
Comparing the Two Models

Embedded Linux Trends
Development, Monitoring and Testing

Some Final Recommendations

Lecturer:
Mike McCullough is President and CEO of RTETC, LLC. Mike has a BS in Computer Engineering and an MS in Systems Engineering from Boston University. A 20-year electronics veteran, he has held various positions at Tilera, Embedded Planet, Wind River Systems, Lockheed Sanders, Stratus Computer and Apollo Computer. RTETC, LLC is a provider of Eclipse-based development tools, training and consulting for the embedded systems market.

http://ieeeboston.org/introduction-to-embedded-linux-part-i-el201-online-course/

Design Thinking for Today's Technical Work
(Online Edition)

Students have access to this self-paced course for 90 days!!

Registration Fee: $160

Course Description:
This course covers the principles of Design Thinking; the steps commonly used; how it enhances the likelihood of success in a wide variety of applications; and, in particular, how to apply it to technical work. Examples of its application to technical work are presented along with the successes that followed.

Design Thinking has garnered much attention in recent years mainly as a way to design consumer products that engage users, such as Apple's iPhone. But its use is spreading to situations ranging from how to provide medical care to planning one's career. This course explains what Design Thinking is about, but, most important, explains how an individual can apply Design Thinking to their own technical work. Care has been taken to focus the course content on using Design Thinking as a structured, practical process for the daily work of technical professionals. A specific technical example is carried through the teaching of the five stages of Design Thinking. The course covers applying Design Thinking to the range of tasks performed during a technical project, including design of: technical functions; user interactions (if applicable); factors for business success; solutions to problems that arise; and project presentations and reports to influence adoption of project outcomes, funding approval, and hiring for consulting. The content applies to employees of large to small companies, start-ups, consultants and contact work, and government organizations. The course is focused on an individual worker employing Design Thinking.

Course Objectives
Provide an understanding of Design Thinking and how an individual can apply it to their technical work:
- Understand the steps of Design Thinking (Understand, Define, Ideate, Prototype, and Test)
- Learn how to apply Design Thinking in technical work
- Understand where Design Thinking can be applied in project activities.

Who Would Benefit from this Course
Anyone who works on solutions to problems or designs hardware, software, products, services, and processes. This includes technical professionals, project managers, and organizational managers. Also, anyone who wants to learn what Design Thinking is about in a practical sense.

Course Modules
- Module 1 – How Design Thinking Can Help Technical Work (60 minutes)
- Module 2 – Understand: Explore the Problem (44 minutes)
- Module 3 – Define: Synthesize What Is Needed (23 minutes)
- Module 4 – Ideate: Generate Solutions (26 minutes)
- Module 5 – Prototype: Build Versions to Test (23 minutes)
- Module 6 – Test: Examine and Learn (28 minutes)
- Module 7 – Design Thinking for Presenting and Writing (23 minutes)

• Module 8 – Getting Started with Design Thinking (30 minutes)

Speaker biography

Speaker: James L. Poage, President/Owner JLP Performance Consulting

Dr. James L. Poage has been designing future concepts for Air Traffic Control for 25 years, first with the Volpe National Transportation Systems Center and then for the past dozen years as an independent consultant (JLP Performance Consulting). He has taught short courses on Benefit-Cost analysis to the FAA and NASA, as well as spoken at conferences and published in professional journals. Over the past 15 years, Dr. Poage has been applying Design Thinking to his project work; to marketing his consulting services; and to planning briefings, reports, and courses. His clients have included FAA, NASA, BAE Systems, Engility, Georgia Tech University, San Jose State University, and Saab Sensis. Dr. Poage has co-authored the book, Flair: Design Your Daily Work, Products, and Services to Energize Customers, Colleagues, and Audiences (Maven House Press, 2016), with his daughter, Jennifer Poage who works in fashion design. Dr. Poage has a Ph.D. in applied mathematics from the Harvard University School of Engineering and Applied Sciences and a M.S. and B.S. in electrical engineering from Stanford University.

Note: Course participants will receive a copy of the book, Flair.

Call for Course Speakers/Organizers

IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity. The IEEE Boston Section, its dedicated volunteers, and over 8,500 members are committed to fulfilling this core purpose to the local technology community through chapter meetings, conferences, continuing education short courses, and professional and educational activities.

Twice each year a committee of local IEEE volunteers meet to consider course topics for its continuing education program. This committee is comprised of practicing engineers in various technical disciplines. In an effort to expand these course topics for our members and the local technical community at large, the committee is publicizing this CALL FOR COURSE SPEAKERS AND ORGANIZERS.

The Boston Section is one of the largest and most technically divers sections of the IEEE. We have over 20 active chapters and affinity groups.

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

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