

BOSTON



THE REFLECTOR

ISSUE #12
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CALL FOR
TECHNICAL/
INTEREST
ARTICLES

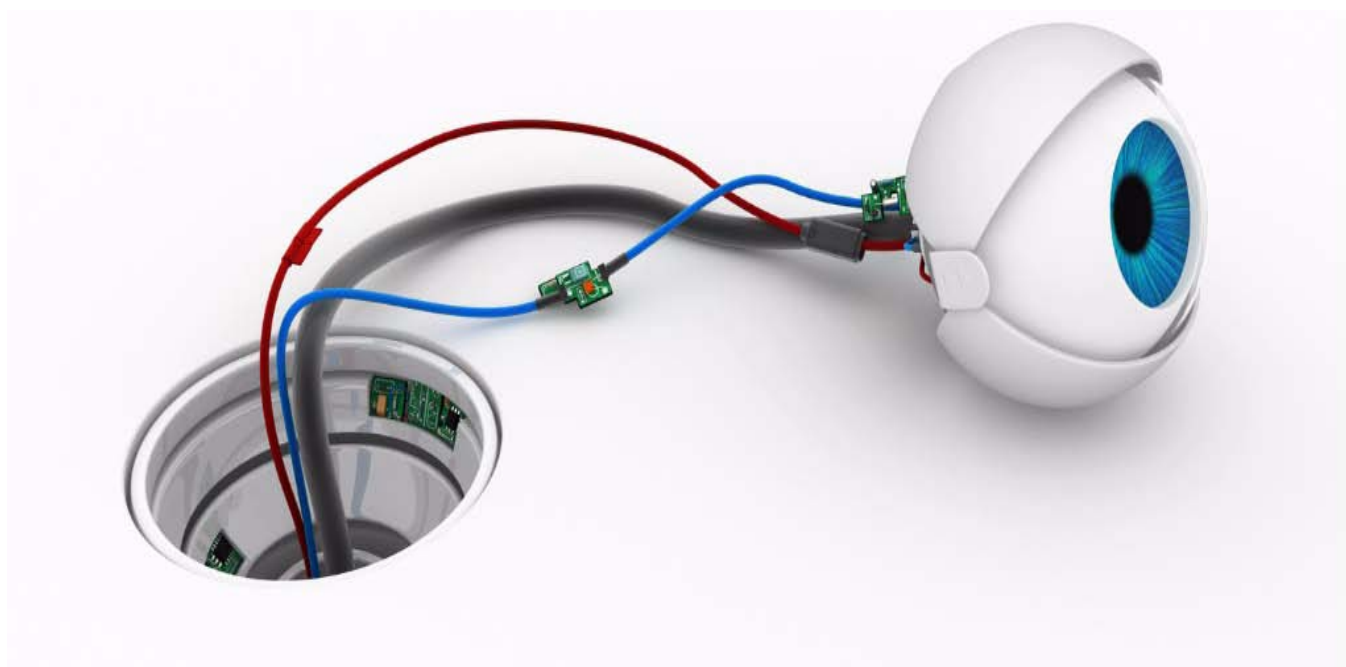
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2019 IEEE PHASED
ARRAY SYMPOSIUM
CALL FOR PAPERS

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2019 IEEE RADAR
CONFERENCE

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**2018 Outstanding Section Membership
Recruitment and Retention Performance**

Boston Section

 **IEEE**
*Advancing Technology
for Humanity*

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Wow! Old School - New School

by Fausto Molinet, Past Chair, IEEE Boston Section

I didn't realize how old school I was, at least with respect to cars, until I was forced to get a new one. What an electronics difference; lane departure warnings, Bluetooth phone and entertainment integration, crash location, parking assist, even parking spot identification and guidance into tight spots, built in navigation and touch screens, electronic ride control and adjustment, to mention a few. This is in addition to all sorts of mechanical "improvements", which I haven't explored yet. Things sure have changed since 2000, when I bought my last one. And just think, EEs of all kinds were responsible for figuring out how to make this stuff, integrate it and get it to be, hopefully, ultra-reliable (we have a Reliability Society chapter for that).

And then there's Tesla and others, who take a giant leap forward and eliminate the internal combustion engine. Whether you are a climate change believer or not, that seems to be a very good thing. Well maybe the manufacturing isn't so clean yet, but you do have to start somewhere.

Where am I going with this you ask? I always thought of myself as keeping up with the advancements in technology. What I didn't realize was I had settled into a comfort zone on my vehicles and just stayed with the "tried and true". I knew where everything was, how it worked and how to fix it, but I was missing out on some new features that could really make our travelling life a lot easier, presumably safer, and again, hopefully ultra-reliable. Com-

fort zones are pretty insidious things. We feel really good, so why investigate anything else.

Actually, as engineers that's our job. We want to get everyone else out of that zone and using the new things we invent or develop. And it's pretty easy to do. But, at some point we're going to run out of technological steam, if we don't look at our own knowledge base and education the same way.

How can we get out of this inhibiting comfort zone? Start by developing a new skill. Maybe learning how to use Linux, or the techniques of flexible electronics, or integrating things through wireless. Maybe you could explore how to become a (better) leader in your organization or how to justify that latest great idea to management. Courses in these areas and many more are offered by the Boston Section year 'round in an inexpensive and convenient environment. More and more are moving online and are easier and even more convenient. And if you have something you'd like to teach others, let us know. We can help you do that for both face to face and purely online programs.

Or consider writing a technical article for the new Digital Reflector. That's certainly a comfort zone expander. You'll probably get some comments disagreeing with your views and offering suggestions for improving them.

Well, now back out to the garage with the User Manual, thankfully still in printed form, to find and enjoy some new goodies. That's a part of my comfort zone I can live with.



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 Johnny Laine in the Office of Equal Opportunity (OEO) at 617.627.3298 or at Johnny.Laine@tufts.edu. Applicants can learn more about requesting reasonable accommodations at <http://oeo.tufts.edu>.

IEEE Boston Section Fall 2018 Professional Development Program

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

2 - Day Intensive Seminar Workshop

(Last notice, please register now!!!)

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.**

Full course description at, <http://ieeeboston.org/%20writing-agile-user-story/>

Practical RF PCB Design, Wireless Networks, Products and Telecommunications

Dates: ~~Tuesday, December 18 and Wednesday, December 19, 2018~~ **Postponed until spring 2019**

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/>

continued on next page

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

(Last notice, please register now!!!)

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/>

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

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

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

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

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

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

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

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

IEEE Boston Section Online Courses:

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

Verilog101:Verilog Foundations

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

System Verilog 101: Design Constructs

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

System Verilog 102: Verification Constructs

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

High Performance Project Management

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

Introduction to Embedded Linux Part I

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

Embedded Linux Optimization - Tools and Techniques

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

Embedded Linux Board Support Packages and Device Drivers

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

Software Development for Medical Device Manufacturers

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

Fundamental Mathematics Concepts Relating to Electromagnetics

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

Reliability Engineering for the Business World

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

Design Thinking for Today's Technical Work

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

Fundamentals of Real-Time Operating Systems

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

November Chapter Meeting Summary

Entrepreneurs' Network – 6:30PM, Tuesday, 4 December

What Startup Founders Need To Know About Legal Issues

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

E-Net's panel of legal experts will discuss fundamental legal issues that founders and executives of early stage companies must address to insure vital protections and the building of value. These issues are compounded by changes in technology, commerce, and the law. What is the preferred form of entity and where should it be established? What is the preferred method to protect the company's Intellectual Property by use of various forms of patent, copyright, trademark, and trade secrets, either alone or in combination? Meeting Location: Constant Contact, 3rd Floor Great Room, 1601 Trapelo Road, Waltham, MA. **See Page 10**

Computer Society and GBC/ACM – 7:00PM, Thursday, 6 December

Securing a World of Physically Capable Computers

Computer security is no longer about data; it's about life and property. This change makes an enormous difference, and will shake up our industry in many ways. First, data authentication and integrity will become more important than confidentiality. And second, our largely regulation-free Internet will become a thing of the past. Soon we will no longer have a choice between government regulation and no government regulation. Our choice is between smart government regulation and stupid government regulation. Given this future, it's vital that we look back at what we've learned from past attempts to secure these systems, and forward at what technologies, laws, regulations, economic incentives, and social norms we need to secure them in the future. Meeting Location: MIT Room 32-G449 (the Kiva conference room on the 4th floor of the Stata Center, building 32 on MIT maps). **See Page 12.**

Entrepreneur's Network - 6:00PM, Tuesday, 11 December

How Immigrants Help Startup Companies

Immigrants are inherently entrepreneurial. They have the courage, ambition, and determination to succeed in their new homeland. Skilled foreign-born workers help to build up economies and industries with the unique capital they bring: distinctive knowledge, backgrounds, skill sets, and styles. In the same way, interdisciplinary perspectives can help make a product more viable. The diversity of languages, experiences, and approaches is crucial to success in a globalized, interconnected innovation ecosystem. Meeting Location: Draper Labs, Hill Building, One Hampshire Street, Cambridge, MA. **See Page 13.**

continued next page

Life Members, and Nuclear and Plasma Sciences Society – 4:00PM, Wednesday, 12 December

The New England Lighthouse Storm

John Horrigan will present a lecture about the tragic destruction and the great heroism in the midst of one of the worst storms in New England's history. John Horrigan holds five Boston/New England Emmy Awards as creator, host and writer of 'The Folklorist' on Boston television. His historical accounts integrate history, engineering, and the arts. His other job titles include program manager at Analogic; professional sportscaster for the Bruins Alumni and New England Patriots Alumni, and historic researcher and lecturer. Meeting Location: MIT Lincoln Laboratory's Main Cafeteria, 244 Wood Street., Lexington, MA. **See Page 15.**

Reliability Society – 5:30PM, Wednesday, 12 December

Functional Electronic Clones & China's plan to Dominate the Semiconductor-Manufacturing Industry
The first half of the presentation will focus on the relatively recent appearance of cloned electronic components within global supply chains. The entire electronics industry is now facing a much more insidious counterfeit threat than at any time in the past. The existence of cloned electronic components bearing the markings of major component manufacturers in today's global supply chains has been clearly established within SMT's labs over the past 6 years. Meeting Location: MIT Lincoln Laboratory, 3 Forbes Rd, Lexington, MA 02421.

See Page 16.

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;
ieebostonsection@gmail.com

Entrepreneurs' Network – 6:30PM, Tuesday, 4 December

What Startup Founders Need To Know About Legal Issues

Meeting Location – Constant Contact, 3rd Floor Great Room, 1601 Trapelo Road, Waltham, MA.
PRE-MEETING DINNER at 5:15 PM (sharp) at Bertucci's, Waltham.

E-Net's panel of legal experts will discuss fundamental legal issues that founders and executives of early stage companies must address to insure vital protections and the building of value. These issues are compounded by changes in technology, commerce, and the law. What is the preferred form of entity and where should it be established? What is the preferred method to protect the company's Intellectual Property by use of various forms of patent, copyright, trademark, and trade secrets, either alone or in combination?

How should founders' equity be apportioned through stock options and what restrictions should apply? What compensation and benefits should be included in employee agreements including consideration of Non - Disclosure Agreements, the changing environment for Non - Compete Agreements, as well as Assignment of Invention Agreements? These issues and their benefits and pitfalls will be discussed and presented with you the business person in mind.

Speakers: Jeremy Cohen, Gesmer Updegrove

Jeremy Cohen is an attorney at Gesmer Updegrove, LLP, a firm specialized in the representation of emerging technology companies. His focus is on business creation and development, transactions and financings, and assisting

with any other advice you need to help your business grow. Jeremy's experiences and background have helped him develop a practice that is broad as well as deep, including: Business formation and organization: advising start-ups on how to best begin their business while looking to future growth. Mergers & Acquisitions: from spin-outs and carve-outs too complex transaction structures or outright sales of companies, Jeremy has

experience in a variety of transaction structures and can bring insight and know-how to any situation. Financings: Whether the funding is coming from a bank, a professional investor or a relative, Jeremy can help guide the process to a successful financing.



Mike Attisha, Associate, Wolf Greenfield & Sacks

Mike Attisha is an attorney at Wolf Greenfield, a boutique law firm that is focused entirely on intellectual property. Mike counsels clients on their patent portfolio in a wide range of technology areas, including electronics, additive fabrication (3D printing), display technologies (LCD, OLED, electrophoretic), software, semiconductors, optics, medical devices, electronic music, automated hardware testing, and signal processing. He has an extremely broad technical knowledge drawn largely from his experience working in experimental physics and as a software consultant. Prior to joining Wolf Greenfield, Mike worked at Ab Initio Software assisting clients with their enterprise data processing applications. During his graduate studies at Brown University, Mike worked on the Cryogenic Dark Matter Search (CDMS) experiment located a half mile underground in northern Minnesota.



Shawn Foley, Of Counsel, Burns Levinson

With more than 30 years of experience in the field, Shawn Foley brings refined legal and advocacy skills and technical versatility. His approach to patent procurement is practical, cost effective, distinctly business-oriented and personable. Prior to joining Burns & Levinson, Shawn played an integral role in developing his previous firm's practice in life sciences and pharmaceuticals. A wide spectrum of clients with diverse technologies and business needs have sought his counsel, including major pharmaceutical and personal care companies, medium-sized brand and generic drug companies, start-ups, universities, and entrepreneurs,

both in the U.S. and abroad. Shawn began his career as an examiner with the U.S. Patent Office, where he reviewed patent applications during the emergence of the biotechnology field. After an initial 2-year stint with a leading Southeastern IP firm, he gained valuable corporate experience as counsel for Ciba-Geigy. At Ciba, Shawn was co-in house counsel for its agricultural biotechnology research division (now Syngenta Seeds), where he worked on a daily basis with management and scientists to gain patent protection for transgenic crop seed and to bring these first generation products to market. He also collaborated with colleagues in Switzerland and prosecuted patent applications directed to pharmaceuticals. Thus, Shawn has experienced many different aspects of the patent system. Shawn is admitted to the Massachusetts Bar.



Moderator and Co-Organizer: Bob Weber, Managing Director, Patent Kinetics, LLC

Robert Weber is a successful intellectual property professional, inventor, serial entrepreneur, and management consultant. Presently, he is Managing Director, Patent Kinetics, LLC, a company that helps entrepreneurs and patent owners build and monetize valuable patent portfolios. Weber is an inventor with 28 issued US patents assigned to Intertrust Technologies, where he served as SVP Business and Technology Strategy, 1996-1999. The Intertrust portfolio was characterized in the Wall Street Journal as a once in a generation billion-dollar licensing opportunity. (Intertrust is presently a joint venture of Sony and Philips.) Weber has also been a Principal Consultant at Northeast Consulting Resources, Inc. At NCRI, his consulting practice focused on the intersection of business and technology. Weber divides his time between Boston and Silicon Valley. He is a former Vice Chair,

Programs, of the Boston Entrepreneurs Network and is a member of the Advisory Board and Program Committee of the Silicon Valley Chapter of the Licensing Executives Society.

Co-Organizer: William R. Byrnes

Bill's legal practice assists entrepreneurial companies with the legal issues they face with a focus on day-to-day commercial issues involving customers, vendors, and other third party relationships. Bill received his undergraduate degree in English Literature and Creative Writing from Boston University, a J.D. from Suffolk University Law School, and a L.L.M. degree in Taxation from Boston University Law School, Graduate Tax Program. He is also a Boston Entrepreneurs' Network board member.

Meeting Location: Constant Contact, Inc., Reservoir Place, 3rd Floor Great Room, 1601 Trapelo Rd., Waltham, MA (Exit 28B, I-95/Route 128)

Pre-meeting Dinner at 5:15 PM (sharp) at Bertucci's, Waltham, (Exit 27B, Route 128)

Check for Updates: Boston Entrepreneurs' Network Website at (<http://www.boston-enet.org>)

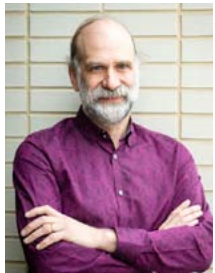
Directions: <http://www.constantcontact.com/about-constant-contact/office-location-waltham.jsp>

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

Computer Society and GBC/ACM - 7:00 PM, Thursday, 6 December

Securing a World of Physically Capable Computers

Bruce Schneier

This talk will be webcast on the MIT CSAIL Youtube channel***<http://www.youtube.com/channel/UCYs2iUgksAh-goidZwEAimmg/live> beginning at 7pm.***

Computer security is no longer about data; it's about life and property. This change makes an enormous difference, and will shake up our industry in many ways. First, data authentication and integrity will become more important than confidentiality. And second, our largely regulation-free Internet will become a thing of the past. Soon we

will no longer have a choice between government regulation and no government regulation. Our choice is between smart government regulation and stupid government regulation. Given this future, it's vital that we look back at what we've learned from past attempts to secure these systems, and forward at what technologies, laws, regulations, economic incentives, and social norms we need to secure them in the future.

Bruce Schneier is an internationally renowned security technologist, called a security guru by the Economist. He is the author of 14 books -- including the best-seller *Click Here to Kill Everybody* -- as well as hundreds of articles, essays, and academic papers. His influential

newsletter *Crypto-Gram* and blog *Schneier on Security* are read by over 250,000 people. Schneier is a fellow at the Berkman Klein Center for Internet and Society at Harvard University; a Lecturer in Public Policy at the Harvard Kennedy School; a board member of the Electronic Frontier Foundation, AccessNow, and the Tor Project; and an advisory board member of EPIC and VerifiedVoting.org. He is also a special advisor to IBM Security and the Chief Technology Officer of IBM Resilient.

You can read more about him at https://en.wikipedia.org/wiki/Bruce_Schneier and follow his blog at <https://www.schneier.com/>.

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

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

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>

Entrepreneurs' Network – 6:00PM, Tuesday, 11 December

How Immigrants Help Startup Companies

Immigrants are inherently entrepreneurial. They have the courage, ambition, and determination to succeed in their new homeland. Skilled foreign-born workers help to build up economies and industries with the unique capital they bring: distinctive knowledge, backgrounds, skill sets, and styles. In the same way, interdisciplinary perspectives can help make a product more viable. The diversity of languages, experiences, and approaches is crucial to success in a globalized, interconnected innovation ecosystem.

Hear from immigrant life science and biotech entrepreneurs as well as investors and employers on how immigrants add value to your team, give it an advantage, and help it to grow. How to access foreign markets, what multicultural perspectives bring to product innovation and how to engage with foreign-born investors. Moreover, learn the tools and strategies that capitalize on your team's diversity, to promote the flow of groundbreaking ideas and enhance the culture of your company for everyone's benefit

Agenda:

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

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

Claritza N. Abreu - Co-founder/CEO, LatInc.us; Vice President, Enterprise Technology Risk Management – Global Technology Operations, State Street Corporation

Claritza has extensive experience providing leadership



and vision to large information technology organizations. Ms. Abreu functions as VP of Enterprise Technology Risk Management for State Street Corporation, previous to this post she was one of the Directors at the Federal Reserve Bank of Boston serving the Federal Reserve System. Also, Claritza serves as Program Chair and Senior Faculty of In-

formation Technology at the Cambridge College School of Management.

LatInc Corporation is the first and only mobile social media platform available for Latino communities to connect and to advance their careers. A lifelong community leader is supporting public health, research, STEM education, mentorship, civic engagement, and social justice issues.

Born in the Dominican Republic, she holds a BS in computer systems engineering from the Technology Institute of Santo Domingo and an MS in computer information systems from Boston University.



Sandro Catanzaro - Co-Founder and Chief Innovation Officer, dataxu
 Before co-founding dataxu, Sandro held positions at Bain & Company and NASA, where he straddled the worlds of science and business strategy.

Dataxu's core technology platform is based on research Sandro conducted at MIT and a real-time optimization algorithm he co-invented. Sandro's perspective on the future of marketing has been influencing the industry for more than a decade. He is a founding member of the ABCD cross-functional PTV working group, which includes AOL, FOX, Havas, IPG and Omnicom Media Group. Sandro holds master's degrees from the MIT's Sloan School of Management and Department of Aeronautics and Astronautics, and a BS from the University of Buenos Aires.

Born in Peru, he is the winner of The Immigrant Learning Center's 2017 Immigrant Entrepreneur Award for High-Tech Business. Prior to attending MIT, he launched five businesses in South America, including one that was acquired by Unilever



Bernat Olle - Co-Founder and Chief Executive Officer, Vedanta Biosciences, Cambridge, MA

Dr. Olle been a member of the founding teams of several companies of the PureTech portfolio and served as a member of the Board of Directors of Vedanta Biosciences and Follica Bio-

sciences.

An immigrant from Spain, in 2013 Dr. Olle was named "Innovator of the Year" in MIT Technology Review Spain's "Innovators under 35" awards. He completed his doctoral work at the Chemical Engineering Department at MIT, where he developed a novel method for large-scale bacterial culture. During his graduate work, Dr. Olle was awarded the "la Caixa" fellowship. Dr. Olle received his BS in Chemical Engineering from Universitat Rovira i Virgili, in the Republic of Catalonia, his MS and Ph.D. in Chemical Engineering Practice from MIT, and his MBA from the MIT Sloan School of Management. He has published his work in journals including Nature and Nature Biotechnology



Clement Cazalot - Managing Director, Techstars Boston

Clement Cazalot is a serial entrepreneur, angel investor and startup advisor focused on working and advising early-stage startup. As managing director of Techstars Boston, he leads the expansion of one of the most prestigious, impactful and

founder-friendly startup accelerator and early-stage investors in the world. Techstart is the No. 1 Global Tech Accelerator with \$80 billion in value created.

Before TechStars, Cazalot was the co-founder and CEO of docTrackr, which was acquired by Intralinks in 2014, after having partnered with industry leaders among which Microsoft, Adobe, Autodesk and Box. He built the company from its inception in his hometown in the south of France to the point where their technology was deployed to 99% of the Fortune 1000 in the

U.S. four years later. Cazalot holds a both an MS in Intelligence and Innovation from Universite Aix-Marseille (France) and an MBA from Ecole de Management de Marseille (France).



Moderator

Denzil Mohammed - Director, Public Education Institute, The Immigrant Learning Center, Inc., Malden, MA

Denzil works to build understanding across boundaries utilizing an asset-based approach. He believes immigrants' success is a crucial component of America's economic and social

well-being. As director of the Public Education Institute at The Immigrant Learning Center, Inc. in Malden, MA, he manages specialized online education, a variety of research initiatives, New England's only Immigrant Entrepreneur Awards, and collaborative public events that promote immigrants as economic and social assets to America. On immigration, he has appeared in The Boston Globe and the New England Journal of Higher Education. Denzil is a frequent speaker at education, workforce development and immigrant integration webinars and conferences nationwide.

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

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

Registration: ENET Member - Free; Non-ENET Member – \$10.00

Register at:

<https://www.boston-enet.org/event-2990490/Registration>

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

REFRESHMENTS: PIZZA, SALAD AND SOFT DRINKS

WILL BE SERVED AT THE MEETING.

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

PUBLIC TRANSPORTATION: Kendall Square stop on

the Red Line.

PARKING: There is a public parking lot across the street from Draper. Also, \$10 parking is available after 6 pm at Yellow Garage

https://en.parkopedia.com/parking/garage/kendall_center_yellow_garage/02142/cambridge/ and Blue Garage <https://en.parkopedia.com/parking/garage/>

IEEE Boston Section Social Media Links:

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

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

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

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

Life Members and Nuclear and Plasma Science Society – 4:00PM, Wednesday, 12 December

The New England Lighthouse Storm



On Wednesday, December 12th, John Horrigan will present a lecture about the tragic destruction and the great heroism in the midst of one of the worst storms in New England's history.

On April 16th, 1851, a fierce nor'easter tore into Cape Cod Bay and brought the highest tides ever seen in this region up to that time, easily exceeding the legendary high tides of 1723. That evening, the newly-constructed Minot's Ledge Lighthouse, off the coast of Cohasset, was pounded by gale force winds and torrential rain, which weakened the tower's iron support stanchions and eventually caused the edifice to topple into the boiling surf. The lighthouse keeper (John Bennett) had been in Boston at the time of the storm and had left two assistants, Joseph Wilson and Joseph Antoine, to mind the tower during his absence. At dawn the following day, as Bennett gazed out at the ledge, he could only see bent iron pilings where the lighthouse once stood. It was a tragic yet heroic story, as his two assistants managed to keep the light-

house lamp burning as late as 10:00 PM, and somehow managed to ring the fog bell one last time, before they were swept away in the breakers. Join five-time Emmy Award-winning folklorist and historian John Horrigan as he presents "The New England Lighthouse Storm".

John Horrigan holds five Boston/New England Emmy Awards as creator, host and writer of 'The Folklorist' on Boston television. His historical accounts integrate history, engineering, and the arts. His other job titles include program manager at Analogic; professional sportscaster for the Bruins Alumni and New England Patriots Alumni, and historic researcher and lecturer.

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, 12 December

Functional Electronic Clones & China's plan to Dominate the Semiconductor-Manufacturing Industry

Tom Sharpe - Executive Vice President of SMT Corporation



The first half of the presentation will focus on the relatively recent appearance of cloned electronic components within global supply chains. The entire electronics industry is now facing a much more insidious counterfeit threat than at any time in the past. The existence of cloned electronic components bearing

the markings of major component manufacturers in today's global supply chains has been clearly established within SMT's labs over the past 6 years.

The most worrisome aspect of these "made from scratch" fakes is their ability to easily pass current inspection processes AND electrical testing to the manufacturers data sheet. The presentation will focus on several actual examples of this most concerning advanced counterfeiter capability and some of the cutting-edge processes utilized by SMT as an obsolescence component supplier and testing lab to mitigate this new and growing threat from making it to our OEM, EMS & CM customers.

The 2nd half of the presentation will focus on the current state and future OEM/End-User implications of China's "Home-grown Chips" initiative targeting the semiconductor manufacturing industry over the next 2-5 years. Both of these presentation focal points will be discussed in the context of their predictable future effects on the entire "Hi-Reliability" Electronics Industry.

AUTHOR BIO: Tom Sharpe is Executive Vice President of SMT Corporation which maintains the largest inventory of obsolete & DMS-type electronic components within the U.S. - as well as the largest in-house authentication and electrical testing service capability within the Independent Distribution sector.

Tom is a founding member of the SAE G-19 AS6081 committee which is continuing to develop new inspection and process standards in the fight against counterfeit electronic components in global supply chains. SMT's labs are credited with the initial identification and industry-sharing of several counterfeit processes over the past several years as well as developing the required mitigation inspections to reliably detect these new counterfeiting methods.

In 2011 Tom was requested to provide subject-matter-expert (SME) testimony before the formal Senate Armed Services Committee (SASC) hearings on counterfeit electronic components within DOD supply chains.

In 2012 SMT labs were credited with being the first to identify the newest threat from China - "made from scratch" functional cloned electronic component devices within global supply chains.

Tom's presentations serve to educate all sectors of the electronics industry about the growing dangers of counterfeits in today's market and best practices to reliably detect and mitigate these constantly evolving dangers.

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

Registration: [click here](#)

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".



CALL FOR PAPERS

2019 IEEE International Symposium on Phased Array Systems and Technology

Revolutionary Developments in Phased Arrays



Sponsors

Platinum

Westin Waltham Hotel, Greater Boston, Massachusetts, USA

www.array2019.org

Gold

Silver

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15–18 October 2019

About the Symposium

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



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

Conference Committee

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Pierre Dufilie, MIT LL

Advisors:

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Technical
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The Institute of Electrical and Electronics Engineers, Inc.

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!!!)

- | | |
|--|--|
| <ul style="list-style-type: none"> • Verilog 101: Verilog Foundations • Systems Verilog 101 (SV101) Design Construct • Systems Verilog 102 (SV102) Verification Constructs <ul style="list-style-type: none"> • High Performance Project Management • Introduction to Embedded Linux | <ul style="list-style-type: none"> • Software Development for Medical Device Manufacturers <ul style="list-style-type: none"> • Reliability Engineering for the Business World • Fundamental Mathematical Concepts Relating to Electromagnetics <ul style="list-style-type: none"> • Embedded Linux Optimization • Embedded Linux BSPs and Device Drivers • Design Thinking for Technical Work |
|--|--|
- (Discounts available if register for all three Verilog Courses)

All Courses are being held at the Crowne Plaza Hotel, 15 Middlesex Canal Park Drive, Woburn

For more information on these courses and other local IEEE activity see our website at www.ieeeboston.org, email: ieeebostonsection@gmail.com, or call 781-245-5405

Radar Conference 2019

Boston



Revolutions in Radar

Sponsors

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Silver



About the Conference

22-26 April 2019

Westin Waterfront Hotel
Boston, Massachusetts, USA

www.radarconf19.org

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

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

Organizing Committee

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Website

Andrew Zai

Practical RF PCB Design, Wireless Networks, Products and Telecommunications

(Postponed until spring 2019!)

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/>

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.

Software Development for Medical Device Manufacturers -

An intensive two-day course

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

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

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

OVERVIEW

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

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

WHO SHOULD ATTEND

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

COURSE OUTLINE

• Introduction

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

–FDA Regulations and Guidance Documents for Software

- Standards – ISO 13485, IEC 62304, ISO 14971, EN-14971, IEC 60601, and IEC 62366-1
- All Software is Defective

• Interpreting Design Controls for Software

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

- Design Outputs
- Design Reviews
- Design Verification

• Software Verification Techniques

- Design Validation

• Software Validation Process

- Design Transfer
- Design Changes
- Design History File

• Validation of...

- Software Tools used to develop Medical Device Software
- Software used in Manufacturing
- Software used in Quality Systems

• Risk Management

- Standards and Regulations
- Terms and Concepts
- Risk Management Process
- Risk Management Tools and Techniques

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

Speaker Bio:

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

He received a BSEE from Northeastern University and an MSCS from Rensselaer Polytechnic Institute. He earned certifications from the American Society for

Quality (ASQ) as a Software Quality Engineer (CSQE) and Quality Auditor (CQA). He is a Senior Life member of IEEE and a member of MassMEDIC. He is on the Editorial Review Board for the ASQ Journal Software Quality Professional.

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

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

Payment received by March 19

IEEE Members	\$495
Non-members	\$535

Payment received after March 19

IEEE Members	\$535
Non-members	\$565

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

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;
ieebostonsection@gmail.com**

Last Notice, Please Register Now!!!

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

Last Notice, Please Register Now!!!

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
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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 exLib
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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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)	BootLoader Optimizations
Other Embedded Linux Development Tools	Boot Time Measurements
Library Support, Glibc and Alternatives	Effective Memory and Flash Usage
SDK Deployment and Support	Filesystem Performance Measurement
Debugging	Some Ideas on Performance Measurement
GDB, GDB Server and the GDB Server Debugger	
Other Debug and Test Tools	The Original UNIX Device Driver Model
An Eclipse Remote Debug Example	The fops and file structs
Advanced Debug with printk and syslogd	The inode and dentry structs
System-Level Debug	Major and Minor Numbers
System-Level Debug Tools	Embedding Channel Information
The /proc and sys Filesystems	Deferring Work
Advanced Logging Methods	The /proc Filesystem
KGDB and KDB	Configuring the Device Driver
Crash Dumps	A Simulated Device Driver
Debugging Embedded Linux Systems	Modularization Revisited
Configuring Embedded Linux	The Evolution of a New Driver Model
Config Methods	The Initial Object-Oriented Approach
Config Syntax	Platform Devices and Drivers
Adding Code to the Linux Kernel	A Generic Subsystem Model
Booting Embedded Linux	The Generic Subsystem Model in Detail
Processor Startup	Subsystem Registration
Initial Functions	The Probe and Init Functions
The initcalls	The Show and Store Functions
Using __init Functions	User Access via the /sys Filesystem
NFS Booting	Configuring the New Device Driver
Root File Systems	The udev Linux Application
RAMdisk Booting with initrd	Comparing the Two Driver Models
RAMdisk Booting with initramfs	The Flattened Device Tree (FDT)
initrd vs initramfs	openBoot and its Effect on Embedded Linux
Root File System Development	The Device Tree Script (dts) File
Busybox Development	The Device Tree Compiler (dtc)
Building a RAMdisk for an initrd	The Device Tree Blob (dtb) File
Building a RAMdisk for an initramfs	Building a dtb File
Flash File System Development	Hybrid Device Drivers
	Other fops Functions
Testing and Debug of Embedded Linux BSPs	The Need for ioctl
Kernel Debug and Kernel Probes	Linux Device Driver Subsystems
Kexec and Kdump	Direct Connect Device Drivers
The Linux Test Project (LTP)	Serial/Console Drivers, I2C & SPI
Performance Tuning Embedded Linux BSPs	Real-Time Clocks and Watchdogs
Virtualization	GPIO and the Pinmux
Measuring Embedded Linux BSP Performance	Flash MTDs and Direct Memory Access
Common Considerations	USB, Power and CPU Management
Uncommon Considerations	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/>

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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	New Tracing Methods
KDB and KGDB	SystemTap
Crash Dumps and Post-Mortem Debugging	Ftrace, Tracepoints and Event Tracing
Debugging Embedded Linux Systems	Tracehooks and utrace
Backend Debuggers	Profiling
In-Circuit Emulators	Basic Profiling
Hardware Simulators	gprof and Oprofile
Analyzers	Performance Counters
Requirements Development	LTTng
Performance Requirements	Another DDD Example
Derived Requirements	Manual Profiling
Testability and Traceability	Instrumenting Code
Reviewing Requirements	Output Profiling
Designing for Performance	Timestamping
Design for Test (DFT)	Addressing Performance Problems
Agile Software Design	Types of Performance Problems
Software and Linux Decomposition	Using Performance Tools to Find Areas for
Memory Management	Improvement
CPU and OS Partitioning	Application and System Optimization
Design Reviews	CPU Usage Optimization
Coding for Performance	Memory Usage Optimization
Coding Standards and Consistency	Disk I/O and Filesystem Usage Optimization
Languages, Libraries and Open Source Components	Measuring Embedded Linux Performance
Learning Magic Numbers	Some Ideas on Performance Measurement
Letting Compilers Work For You	Common Considerations
Global, Static and Local Variables	Uncommon Considerations
Code Reviews	Using JTAG Methods
	BootLoader Measurements
Software Testing	Boot Time Measurements
Unit-Level Testing	The Perf Tool
System-Level Testing	Origins of Perf
Code Coverage Tools	The Perf Framework
gcov	Perf Commands and Using Perf
Automated Testing	Listing Events
Some Embedded Linux Test Recommendations	Counting Events
DebugFS	Profiling with Perf
Configuring DebugFS	Static Tracing with Perf
DebugFS Capabilities	Dynamic Tracing with Perf
Advanced Logging	Perf Reporting
LogFS	Performance Tool Assistance
Using Logwatch and Swatch	Recording Commands and Performance
Using syslogd and syslog-ng	System Error Messages and Event Logging
Tracing	Dynamic Probes
ptrace and strace	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

<http://ieeeboston.org/embedded-linux-optimization-tools-techniques-line-course/>

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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 Tiler, 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.

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 contract 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 diverse sections of the IEEE. We have over 20 active chapters and affinity groups.

If you have an expertise that you feel might be of interest to our members, please submit that to our online course proposal form on the section's website (www.ieeeboston.org) and click on the course proposal link (direct course proposal form link is

<http://ieeeboston.org/course-proposals/>. Alternatively, you may contact the IEEE Boston Section office at ieeebostonsection@gmail.com or 781 245 5405.

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

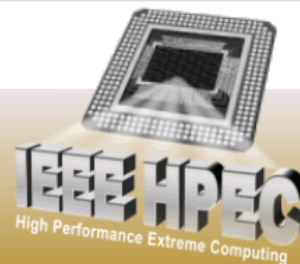
CALL FOR PAPERS



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

Twenty-third Annual HPEC Conference

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



www.ieee-hpec.org

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The IEEE High Performance Extreme Computing Conference (HPEC '19) will be held in the Greater Boston Area, Massachusetts, USA on 24 – 26 September 2019. The HPEC charter is to be the premier conference in the world on the confluence of HPC and Embedded Computing.

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

- | | |
|---|---|
| • Machine Learning | • Data Intensive Computing |
| • Graph Analytics and Network Science | • Digital Front Ends |
| • Advanced Multicore Software Technologies | • Fault-Tolerant Computing |
| • Advanced Processor Architectures | • General Purpose GPU Computing |
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| • Big Data and Distributed Computing | • Interactive and Real-Time Supercomputing |
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| • Computing Technologies for Challenging Form Factors | • Open System Architectures |
| • ASIC and FPGA Advances | • Secure Computing & Anti-Tamper Technologies |
| | • Quantum/Hybrid Computing |
| | • AI Computing |

HPEC accepts two types of submissions:

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

IMPORTANT DATES:

Submission Deadline: **May 17, 2019**

Notification of Acceptance: **July 1, 2019**

Camera Ready Deadline: **August 31, 2019**

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

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