BOSTON

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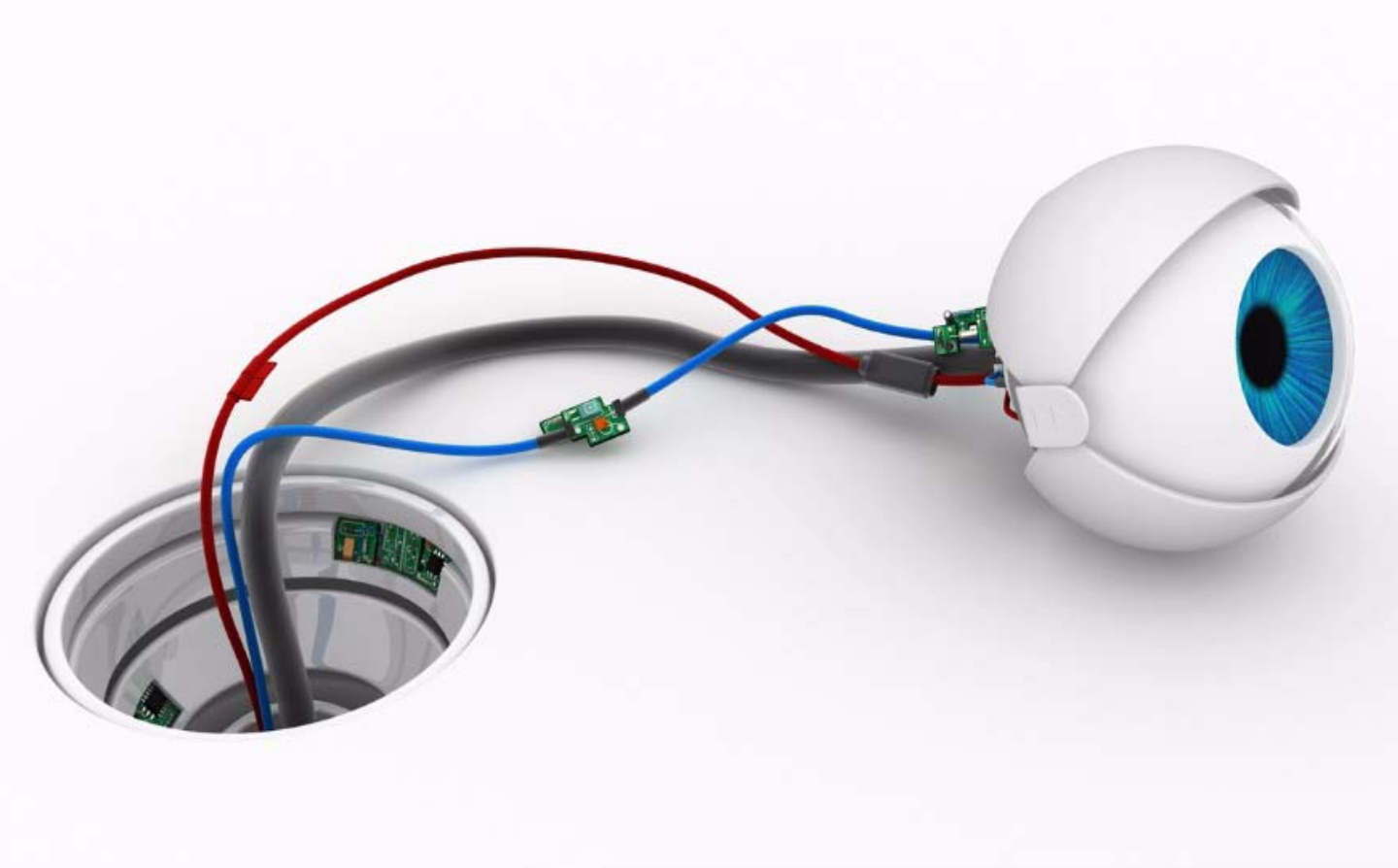

IEEE
Advancing Technology for Humanity

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Whew, what a year!

by Kevin Flavin, Electronic Communications Team Chair

Full year of Trump - good or bad, depending on your political leaning - it's been a year of financial, uh, changes. Are you changing the way you are thinking about your taxes? If you run a company, will this change the way you hire, your compensation levels, or whether you bring your off-shore balance sheet home?

Tesla/SpaceX has announced a pickup truck, and had a few successful launches, most notably his launch this past week (of this writing) of his Falcon 9 over Los Angeles. Our skyline is becoming something out of Star Wars/Star Trek/Trek Wars/etc

Along that line of vehicular motor-vation, we've seen solid advances in self-driving, where some are hoping that smarter cars will reduce the left-lane slow drivers.

Bitcoin! CryptoCurrencies! BlockChain! Have I got your attention? Apparently just saying these words, or changing your company name to include one of them will cause your stock price to jump 100s of percent. I am changing my name to Bitcoin Blockchain later this year in the hopes it will change my own fortune. We'll see if the probate judge will let me.

On a more somber note, Engineers and Scientists that have passed this year include:
Mildred Dresselhaus (http://news.mit.edu/2017/institute-professor-emerita-mildred-dresselhaus-dies-86-0221), "Queen of carbon science" and recipient of Presidential Medal of Freedom and National Medal of Science led US scientific community, promoted women in STEM, passed away at 86.

Joseph Schmidt (https://www.economist.com/news/obituary/21730399-spacesuit-technician-was-101-obituary-joseph-schmitt-died-september-25th), a spacesuit technician, was the last person to see astronauts before they boarded their ships for space.

By the way, 2017 marked the moment when Apple is worth nearly a Trillion Dollars (I thought it was worthwhile to capitalize that), and could buy General Electric with the free cash it has on its balance sheet. Just sayin. Just leaving that out there.

Speaking of large companies buying things, Amazon bought Whole Foods. Have you used the Amazon lockers at Whole Foods yet? I have. Easier than going to the Post Office to return an item. Just another FYI.

Continuing on the company thread: Softbank is soaking up a lot of would-be IPOs with their technology fund. With an economy rolling this strongly, you would expect more IPOs, but times-they-are-a-changin.

Net Neutrality has gone away after less than three (3) years.

Chip companies have been pivoting toward Artificial Intelligence and their customers have been scooping up GPUs for everything from Virtual Reality, Augmented Reality, and Computing Algorithms for Cryptocurrencies.

And Intel turns 50 this July 2018. 50! I feel old.

While technology is screaming along faster and faster, the humans keep failing and blowing things up *cough* Uber *cough*.

What is coming for 2018? The beautiful thing about predictions is that if I'm wrong….meh, it was a prediction! Sort of like New Year's Resolutions, they are weak

commitments of things to come.

1. Quantum Computing hits mainstream enough to have private buyers scoop them up to make bitcoin - the ROI is enormous, and so will the price of the first QuantPuters (I should trademark that…)

2. Facial recognition on a mobile phone. What's that? Already done? Wow, I am good!

3. Driver-less trucks. Remember that movie about old Wolverine? Yeah, those. And trains.

4. The Matrix. No, not the movies. The real things, except it'll be Refrigerators, and Toasters, and Microwaves that are listening to you. Or maybe listening, just listening….and waiting.

What do I want for 2018?

1. For companies to stop leaking my private information out to the Dark Web.

2. And for my printer to connect to my laptop.

3. And a bitcoin. Just one. Bitcoin is trading at $14,125 right now. Is that too much to ask?

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Advertising with the IEEE Boston Section affords you access to a highly educated, highly skilled and valuable consumer. Whether you are looking to reach students with a bright future and active minds, or whether you are reaching households with priorities that may include a family, planning for vacations, retirement, or like-values, the IEEE Boston Section is fortunate to enjoy a consistent relationship.

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

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http://ieeeboston.org/advertise-ieee-boston-section/

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Call for Articles

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

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

Professional development articles should have broad applicability to the engineering community and should not explicitly promote services for which a fee or payment is required. A maximum length of two to three pages would be best.

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

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

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

Submissions should be sent to; ieeebostonsection@gmail.com

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@gamil.com or 781 245 5405.

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

Entrepreneurs' and Consultants' Networks– 6:30PM, Tuesday, 2 January

PRODUCT DEVELOPMENT – Life Science & Tech Startups

No registration fee for CNET members.
Meeting location – Constant Contact, 1601 Trapelo Road, 3rd Floor, Great Room, Waltham, MA.

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

Entrepreneurs' today don't need to build a manufacturing plant to start a business. They need less money to build prototypes, prove that it works, prove there is a market and show a potentially profitable business model before scaling. The road maps have changed but the core has stayed the same. Why will your customers buy it?

Whether you want to sell a new kind of transportation system, a new app or a life saving device, you've got to develop your idea into a product that customers are willing to pay for.

- Do you try to develop the product in house or do you outsource the development?
- How do you fund your product development?
- How do you make sure you're developing the right product for your market?

The panelists have deep experience in developing different types of products in the life sciences and high tech fields. Our discussion will offer guidance in matching your product to your market and practical suggestions for making the most of your development budget. Listen to our speakers share a few stories from their own product development adventures and effective advice for avoiding product development pitfalls.

Agenda:

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

A question and answer session follows the presentation, and panelists will be available afterwards 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 afterwards.

Speakers:
STEVE OWENS, founder of Finish Line PDS (www.finishlinepds.com) has over 30 years of successful product development experience in many different industries and is a sought-after adviser and speaker on the subject. Steve has founded four successful start-ups and holds more than twenty-five patents.

Steve has worked for companies such as Halliburton and Baker Hughes. He has experience in the Internet of Things, M2M, oil and gas, and industrial controls. Steve's insight into the product development process has generated millions of dollars in revenue for start-ups and small businesses. Finish Line PDS provides product and technology development management, mechanical design, and development of electronics, firmware and sensors, as well as design verification testing and other services. Finish Line PDS is a proud sponsor of the Boston ENET. https://twitter.com/Finish-Line_PDS

LYNN BIRCH, Vice President, Product Engineering at Skreens
https://www.skreens.com is senior level leader with 20+ years of experience in the areas of business development, product management, and technical ar-

chitecture and definition with a proven track record of success delivering competitive high technology solutions, products and services. Lynn has recently been working to help bring to market a disruptive technology in display and video delivery technologies that will change the way that content is consumed.

Lynn holds both a BS Electrical Engineering from the University of Rhode Island and a Master's in Business Innovation from Northeastern University D'Amore-McKim School of Business.

Moderator:
ROBERT ADELSON, business and tax attorney, partner at Boston law firm of Engel & Schultz LLP, and Chairman of The Boston Entrepreneurs' Network. Rob has been an attorney for over 30 years specialized in business, tax, stock and options, employment, contracts, financings, trademarks and intellectual property.

Rob began as an associate at major New York City law firms before returning home to Boston in 1985 where he has since been a partner in small and medium sized firms before joining his present firm in 2004. Rob represents entrepreneurs, start-ups and small companies, independent contractors and employees and executives. Rob is a frequent speaker on business law topics and author of numerous articles published in Boston Business Journal, Mass High Tech and other publications. He has been named among the "Top 20 Boston Startup Lawyers" by ChubbyBrain.com, a website that provides tools for entrepreneurs. Rob has been on the ENET Board since 2002 and Chairman since 2009 and is also a Co-Founder and Board member of the 128 Innovation Capital Group (2004 -2015). In 2016, he received the IEEE USA Professional Achievement award for "extreme dedication to the entrepreneurship community." He holds degrees from Boston University, B.A., summa cum laude, Northwestern University (Chicago), J.D., Law Review, and New York University, LL.M. in Taxation.
His website - www.ExecutiveEmploymentAttorney.com

Co-organizer

JASON LASSER, founder AppliedDesign
Intrigued by problems, Jason works with start-ups, entrepreneurs and established companies build brands through the form, function and life cycle of their products; using innovation, passion and discovery to develop beautiful solutions that serve purpose. As founder of Applied Design, a full service design and fabrication consultancy appreciation of art, aesthetics and process continuously pushes the quality of idea and impact of solution to the users, customers and consumer. To learn more and start a dialogue visit www.AppliedDsgn.com

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.

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

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

Reservations: ENET Constant Contact meetings are free to ENET members and $20 for non-members. No reservations are needed for the pre-meeting dinner. To expedite sign-in for the meeting, we ask that everyone -- members as well as non-members -- pre-register for the 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.

IEEE Boston Section Online Courses:

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

Verilog101:Verilog Foundations
Full course description and registration at ,
http://ieeeboston.org/verilog-101-verilog-foundations-online-course/

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

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

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

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

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

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

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

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

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

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

The Tuition Dilemma

Edward E. Altshuler

It is an established fact that both tuition and college debt are on the increase. It has been shown that for the past 18 years, college tuition has tripled, whereas the Consumer Price Index has only increased by about 2.5 times. Politicians, academics and the general public have addressed this issue, however, to the best of my knowledge, a viable solution has yet to surface. I have a first–hand interest in this problem, since my wife and many of my children and grandchildren have experienced the unfair penalty of high college tuitions and loans.

In this presentation, I start by reviewing tuitions at many public institutions throughout the US and Europe, and outline existing levels financial aid. Then, I propose steps toward easing the financial burden on students, and discuss various state programs enacting stages of this proposal.

Edward E. Altshuler received the B.S. degree in physics from Northeastern University, Boston, MA, in 1953, the M.S. degree in physics from Tufts University, Medford, MA, in 1954, and the PhD. degree in applied physics from Harvard University, Cambridge, MA, in 1960.

Before joining Air Force Cambridge Research Labs (AFCRL), Hanscom AFB, MA in 1960, he was employed by Arthur D. Little and Massachusetts Institute of Technology, Cambridge, MA and Sylvania Electric, Waltham, MA. He left AFCRL in 1961 to become Director of Engineering at Gabriel Electronics, Millis, MA but later returned to AFCRL in 1963 as Chief of the Propagation Branch from 1963 - 1982. He was a Lecturer in the Northeastern University Graduate School of Engineering from 1964 - 1991.

Dr. Altshuler was Chairman of the Institute of Electrical and Electronics Engineers (IEEE) Boston Section Antennas and Propagation Society during 1965 - 66 and served as Chairman of the 1968 International IEEE AP – S/ URSI Symposium in Boston. He was Associate Editor of Radio Science from 1976 - 1978 and is a member of Commissions B and F of the International Radio Scientific Union (URSI). He has served on the Air Force Scientific Advisory Board and was Chairman of the NATO Research Study Group on Millimeter Wave Propagation and Target/Background Signatures from 1974 - 1993. He was elected a Fellow of the IEEE in 1984. He was President of the Hanscom Chapter of Sigma Xi during 1989 - 90. He was Chairman of the IEEE Boston Section Fellows and Awards Committee from 1993 - 1994 and Chairman of the IEEE Boston Section from 1995 - 1996. He served on the IEEE Life Members Committee from 2001-2003 and was Chairman of the IEEE Boston Section Life Members Chapter from 1998-2010. He has served on the Antennas and Propagation Society Awards Committee. He received the IEEE Harry Diamond Memorial Award in 1997 and was awarded an IEEE Millennium Medal in 2000. He was selected to be a Fellow of the Air Force Research Laboratory in 2000. Dr. Altshuler has over 150 scientific publications, patents and presentations.

His family has endowed in his name, an award to the author of the best paper published in the IEEE Antennas and Propagation Magazine, an endowment to the Northeastern University Physics Department and an endowment to the Tufts University Physics Department.

The meeting will be held at the Lincoln Lab Main Cafeteria, 244 Wood Street, Lexington, MA at 4:00 PM. Please use the Wood Street Gate. For directions go to http://www.ll.mit.edu/ Refreshments will be served at 3:30 PM, and a video on Big Data will be shown starting at 3:50.

Reliability Society and co-sponsored NE Chapter ESDA – 5:30PM, Wednesday, 10 January

Automation Analysis for ESD Class 0 and CDM

The ESD analysis of automation equipment is complex, not well understood and often done incorrectly. The escalating use of Class 0 (ultra-sensitive) devices and high failure rates has made this analysis critically important. You will learn how to apply advanced ESD event detection test equipment for ESD Class 0, how to more readily identify sources of ESD stress within automation equipment and how to qualify automation equipment for 50 Volt CDM applications.

This presentation will be highly interactive with in-plant photographs, videos and compelling Class 0 case studies. The photographs illustrate the details of appropriate measurements and how to avoid the numerous pitfalls.

Agenda

This meeting will be held on Wednesday, January 10, 2018 at 3 Forbes Road, Lexington, MA.

5:30-6:00 PM: Sign in, refreshments, and personal networking

6:00-6:10 PM: Chapter Chair greetings and announcements

6:10-7:45 PM: Presentation, Ted Dangelmayer, Dangelmayer Associates LLC

7:45-7:55 PM: Q&A session, meeting adjourns

Ted Dangelmayer is the president of Dangelmayer Associates, LLC and has assembled an ESD consulting team consisting of the foremost authorities in virtually all ESD areas of both product design and manufacturing. He received the “Outstanding Contribution” award and the EOS/ESD Association, Inc. “Founders” award. He was president of EOS/ESD Association, Inc., chairman of the ESDA standards committee, and general chairman of the EOS/ESD Symposium. He has published two editions of his book, ESD Program Management, numerous magazine articles, and technical papers. Ted holds three patents and is iNARTE certified. He is currently president of the Northeast local chapter of EOS/ESD Association, Inc., a member of the ESDA education Council, ESDA Marketing Team, Advanced Technologies Team and ESDA Publicity Team. Email: ted@dangelmayer.com

Meeting Location: 3 Forbes Rd, Lexington, Massachusetts, 02421

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”.

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

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

Optimizing Your Organization To Produce Better Designs

Jared M. Spool, co-CEO of Center Centre and founder of UIE

I*nformal reception coordinated by BostonCHI at 6:30 pm Vistaprint, 275 Wyman St., Waltham, MA [Admission is free, but you must register at http://jaredspooljan2018.eventbrite.com/?aff=ieee"]*

Go into any organization and you'll see that it is perfectly optimized to produce the results it's currently getting. If you want your organization to get better results, what do you need to do differently?

This presentation will take a deep dive into aspects of design leadership we rarely talk about: the work required to improve design literacy and fluency within our organization. We'll explore the different stages of UX design maturity and how what the organization needs to improve shifts as it becomes more mature. We'll look into the way teams are staffed and the skills necessary to produce great designs, and we'll look to the latest educational approaches of experience-based learning to see how we can change our work practice to support better on-the-job learning of design skills and knowledge.

Jared M. Spool is a co-founder of Center Centre and the founder of UIE.
If you've ever seen Jared speak about user experience (UX) design, you know that he's probably the most effective and knowledgeable communicator on the subject today. He started working in the field of usability and user experience in 1978, before the terms "usability" and "UX" were ever associated with computers.

While he led UIE, the industry research firm he started in 1988, the field of UX design emerged and Jared helped define what makes UX designers successful all over the world. UIE's world-class research organization produces conferences and workshops all over the world and for companies in every industry.

In 2016, with Dr. Leslie Jensen-Inman, he opened Center Centre, a new school in Chattanooga, TN to create the next generation of industry-ready UX Designers. They created a revolutionary approach to vocational training, infusing Jared's decades of UX experience with Leslie's mastery of experience-based learning methodologies.
You'll also find him as the conference chair and keynote speaker at the annual UI Conference and UX Immersion Conference, and he manages to squeeze in a fair amount of writing time. He is author of the book, Web Usability: A Designer's Guide and co-author of Web Anatomy: Interaction Design Frameworks that Work.

You'll find his writing at uie.com. You can also follow his adventures on the Twitters at @jmspool, where he tweets daily about UX design, design strategy, design education, and the wondrous customer service habits of the airline industry.

This meeting will be held at Vistaprint's facility at 275 Wyman St in Waltham. Park in the garage or the large parking lot in back of the garage and walk around to the main entrance. 275 Wyman St can be reached from the North by taking exit 28 from rt 128/95 makng a left hand turn onto Trapelo Rd, and then another right hand turn onto Smith St (which becomes Wyman St after about 1/2 mile) once you cross Rt 128. From the South, take exit 27A-B from I-95/128 and stay in the exit lane until you get to the Wyman St turn off. Don't take the sharp right onto 3rd Ave and Totten Pond Rd. There'also a shortcut coming from Canbridge on Rt 2. Get off Rt 2 at the Waltham St/Lexington exit, take a left hand turn onto Hayden Ave, then make another left at the traffic light onto Smith St.
We will be taking Jared to dinner at Green Papaya after the talk at about 9pm.

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.

For more information contact Peter Mager,
p.mager at computer.org

Entrepreneurs' Network – Cambridge Meeting, 6:00PM, Tuesday, 16 January

Mentors for Startups

Pivotal Labs, 255 Main St., 6th FL, Cambridge

Launching a successful start-up involves little more than an eager entrepreneur with a great idea… …and a way to transform that idea into a commercially viable offering, extensive of knowledge about corporate and Intellectual property law, product development, commercial real estate, marketing, human resources, pipeline and supply chain management, corporate finance, business strategy, sales and business development, business/ commercial financing, etc. etc. etc…

The good news for eager entrepreneurs, at least the ones with an open mind who are willing to accept advice, is that experienced willing mentors can be found to help catalyze a successful business from that great idea. Mentors are entrepreneurs and executives who have "been there and done that" and are willing to help new startups to succeed. They can be informal contacts or part of an organized entrepreneur support organization. Join us to hear the benefits of mentors and mentoring from the leaders of three of the most effective mentoring organizations in the Greater Boston Area… and a really amazing entrepreneur.

Anna Christo - MassBio, Director of Innovation Services

Anna Christo serves as Director of MassBio's Innovation Services, a suite of programs designed to promote commercialization of innovative technology and create opportunities for a face-to-face interaction around entrepreneurship, capital access and partnering. Anna's responsibilities include management of the MassCONNECT entrepreneur mentoring program and oversight of other Innovation Services programs including the BioEntrepreneur Bootcamp, Pharma Days. Prior to joining MassBio, Anna spent five years at ClearView Healthcare Partners, a life science strategy consulting firm in Newton, MA, where she developed an internal KOL and payer network and oversaw all primary research activities. Anna holds a B.A. in Biology from Lafayette College in Easton, PA. She is passionate about facilitating connections between stakeholders across the life sciences to promote innovation and ultimately improve the lives of patients.

Trish Fleming – North Shore InnoVentures, Director of Mentoring

Trish Fleming ensures that entrepreneurs receive quality resources that help drive company development and entrepreneurial learning. She was previously the Mentor Program Manager for Entrepreneurship for All in Lowell, MA and the Executive Director of the MIT Enterprise Forum of Cambridge. Her 25 years of experience in non-profit management and administration encompass educational, government, and social service organizations in the greater Boston area, and has included fund-raising, sponsorship sales, program development and management, marketing, events planning, volunteer management, strategy, and general administration. She was a mentor for the MIT Venture Mentoring Service, BU Kindle Program, and Building Global Enterprises. She was named a 2008 All-Star by Mass High Tech and served as the co-chair of Mass High Tech's and BBJ's Women to Watch Advisory Committee.

Leila Pirhaji – ReviveMed, Founder and CEO

Founder and CEO at ReviveMed, experienced engineer and entrepreneur with a Ph.D. in Biological Engineering from MIT.

During her PhD at MIT, Leila developed a pioneering machine-learning technology, which translates data from small molecules or metabolites into therapeutic

solutions and was published in Nature Methods. Leila founded ReviveMed Startup Company to commercializes this technology, and enable developing the right therapeutics for the right patients by leveraging machine-learning and metabolomics.

Artur Sousa – MassChallenge, Mentorship Manager
At MassChallenge, "the most startup friendly accelerator on the planet", Artur connects startups with relevant mentors, manages the on boarding of new mentors and tends to optimization of the overall mentoring process. He is also a social entrepreneur, founder of several ventures throughout the years. His mission is to support entrepreneurs and develop ventures that create a positive impact around the world.

United Nations Award Winner & Member of the Royal Academy of Arts & Music in Rio de Janeiro, Brazil. Artur has been part of human rights initiatives, leprosy eradication, theater professor, public speaker and many other adventures that became his reference for community impact and entrepreneurship as a viable path to break the poverty cycle.

Artur has lived/worked in places like Japan, Sweden, Brazil and the United States, the latter being where he decided to call it home.

Moderator
Roger Frechette – NEPAssociates, Principal and Founder
NEPAssociates offers on-demand executive and business advisory services to life sciences enterprises. Roger has been a volunteer with Boston ENET since 2014, and also supports area start-ups as a mentor for MassBio's MassCONNECT and the MTTC's Platform Program.

Previously, Roger was Co-Founder of MaxThera, an antibacterial drug discovery company sold to Biota Holdings Limited. Prior to starting MaxThera, he was Project Director at Paratek Pharmaceuticals (Boston), where he led the teams culminating in IND filing for omadacycline (NDA 2018), a new class of antibiotic. Previously, he was Associate Director of Chemistry at RiboGene (Hayward, CA). He began his career as a chemist at the R.W. Johnson Pharmaceutical Research Institute (J&J, Raritan, NJ).

Roger was a Post-Doctoral Fellow at Yale University, earned his PhD in Organic Chemistry from Wesleyan University and his BA in Chemistry from College of the Holy Cross.

Agenda:
6:00 -7:00 pm - Networking
7:00 -7:10 pm - Announcements
7:10 -7:25 pm - E Minute - Up to 3 Startup companies presentations
7:25 -8:15 pm - 3 or 4 expert speakers on the night's topic
8:15 -8:30 pm - Q & A
8:30 -8:45 pm - Networking including meeting speakers

Refreshments: Pizza, chips & soft drinks

Reservations: Free to ENET members and $10 for non-members. Members & non-members, pre-register for the meeting online, until midnight the day before the meeting. If you cannot pre-register, you are welcome to register at the door.

Parking: The nearest parking garage is at One Broadway. The fee is $10 after 5pm, you need to be out by 10pm. Details at: https://www.parkme.com/lot/115647/one-broadway-garage-cambridge-ma

Software Development for Medical Device Manufacturers -

An intensive two-day course

Time & Date: **8:30AM - 4:30PM, Wednesday & Thursday, April 11 & 12, 2018 (14 hours of instruction!)**

Location: **Hilton Hotel, 2 Forbes 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 Friday, March 23, 2018

Payment received by March 19	
IEEE Members	**$495**
Non-members	**$535**
Payment received after March 19	
IEEE Members	**$535**
Non-members	**$565**

http://ieeeboston.org/event/software-development-for-medical-device-manufacturers/

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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

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

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

Registration Fee: 350

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

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

Course Objectives

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

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

Course Schedule

Getting Started with Embedded Linux

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

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

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

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

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

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

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

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

Registration fee: $250

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

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

Course Objectives

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

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

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

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

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

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

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

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

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

- Improving CPU Performance

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

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

Some Final Recommendations

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 Tilera, Embedded Planet, Wind River Systems, Lockheed Sanders, Stratus Computer and Apollo Computer. RTETC, LLC is a provider of Eclipse-based development tools, training and consulting for the embedded systems market.

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

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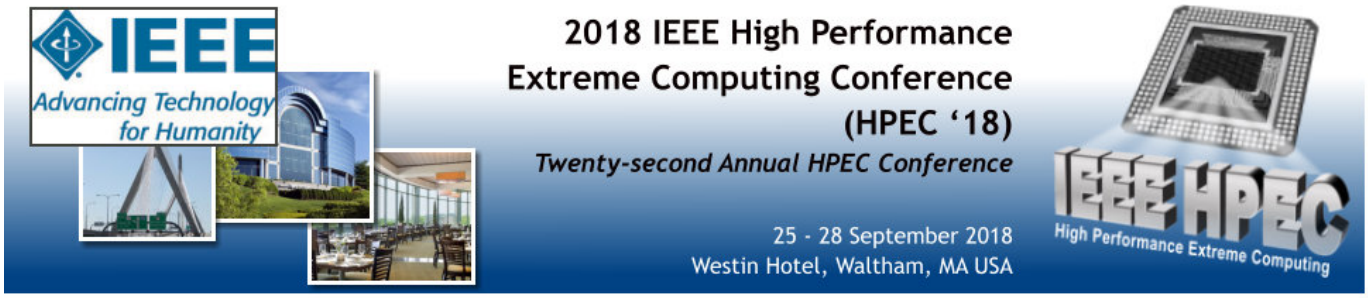

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The IEEE High Performance Extreme Computing Conference (HPEC '18) will be held in the Greater Boston Area, Massachusetts, USA on 25 – 28 September 2018. The HPEC charter is to be the premier conference in the world on the confluence of HPC and Embedded 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
- Graph Analytics and Network Science
- Advanced Multicore Software Technologies
- Advanced Processor Architectures
- Automated Design Tools
- Big Data and Distributed Computing
- Big Data Meets Big Compute
- Case Studies and Benchmarking of Applications
- Cloud HPEC
- Computing Technologies for Challenging Form Factors
- ASIC and FPGA Advances
- Data Intensive Computing
- Digital Front Ends
- Fault-Tolerant Computing • Embedded Cloud Computing
- General Purpose GPU Computing
- High Performance Data Analysis
- Interactive and Real-Time Supercomputing
- Mapping and Scheduling of Parallel and Real-Time Applications
- New Application Frontiers
- Open System Architectures
- Secure Computing & Anti-Tamper Technologies

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 18, 2018**
Notification of Acceptance: **July 1, 2018**
Camera Ready Deadline: **August 1, 2018**

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. 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. 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. 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. Full paper submissions should use the approved IEEE templates. The highest scoring submissions will be published by IEEE in the official HPEC proceedings available on IEEE eXplore. All other accepted submissions are published on ieee-hpec.org.