

BOSTON



THE REFLECTOR

ISSUE #12
DECEMBER 2017

NEW ONLINE COURSE -
EMBEDDED LINUX BSP
AND DEVICE DRIVERS

P.18

INDUSTRY
APPLICATIONS
SOCIETY CHAPTER
MEETING

P.4

YOU ARE
INVITED TO
SUBMIT AN
ARTICLE

P.5

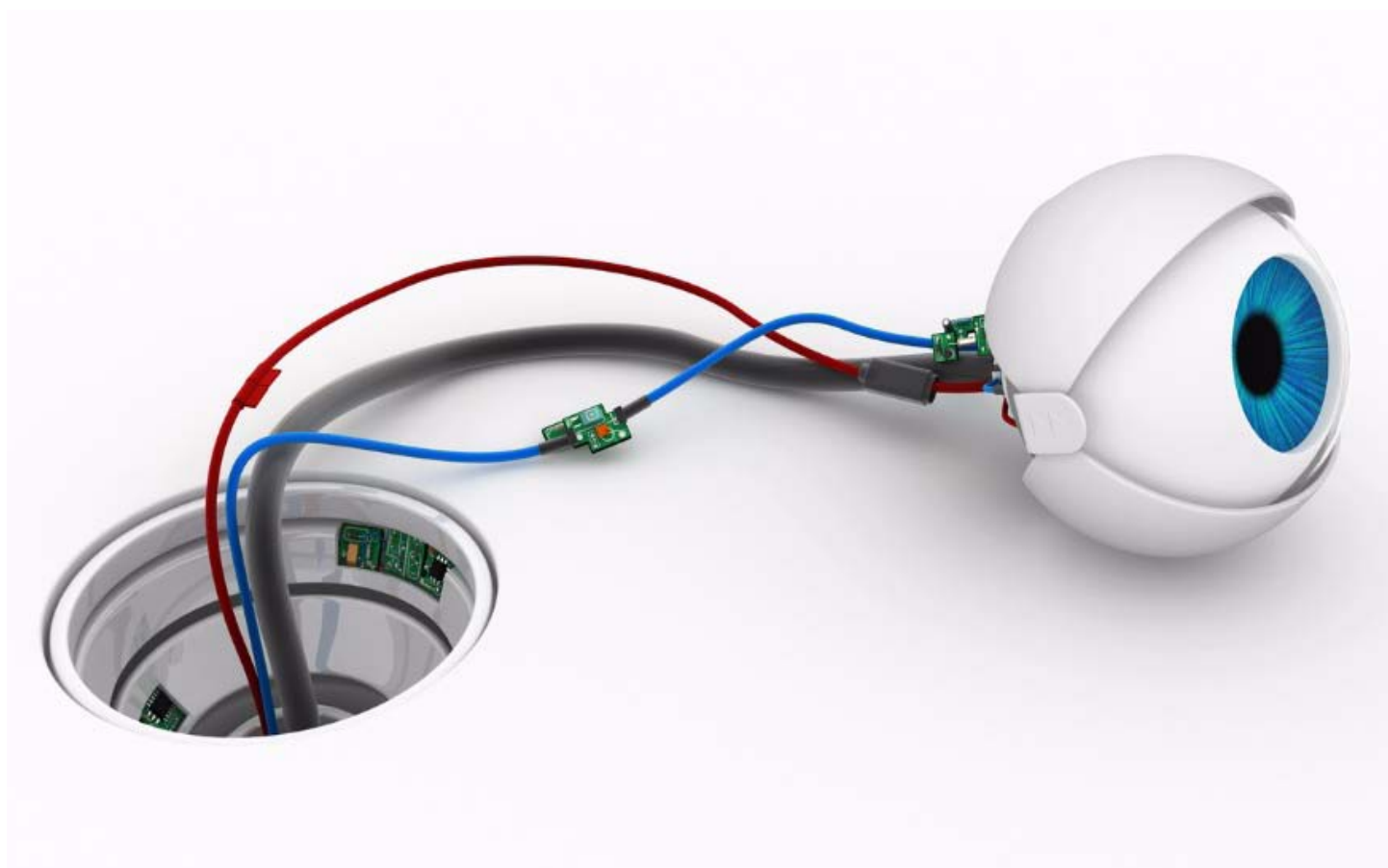


TABLE OF CONTENTS

Editorial: "Happy New Year!", Greg Walson, 2018 IEEE Boston Section Chair	Page 3	Device Drivers <i>(online course)</i>	Page 18
Industry Applications Society	Page 4	Embedded Linux Optimization: Tools and Techniques <i>(online course)</i>	Page 21
Education and Signal Processing Societies	Page 4	Software Development for Medical Device Manufacturers <i>(online course)</i>	Page 24
Call for Articles	Page 5	Fundamental Mathematics Concepts Relating to Electromagnetics <i>(online course)</i>	Page 25
Entrepreneurs' Network	Page 6	Reliability Engineering for the Business World <i>(online course)</i>	Page 26
IEEE Boston Section Online Course Listing	Page 8	Introduction to Embedded Linux <i>(online course)</i>	Page 27
Computer Society.....	Page 9	Practical RF PCB Design: Wireless Networks, Products and Telecommunications	Page 29
Nuclear and Plasma Science Society	Page 10	Call for Course Speakers and Organizers	Page 30
Women in Engineering	Page 10	2018 IEEE High Performance Extreme Computing Conference (HPEC)	Page 31
Reliability Society	Page 11	Advanced Embedded Linux Optimization	Page 32
Photonics, and Nuclear and Plasma Sciences Societies	Page 12	Writing Agile User Story and Acceptance Test Requirements	Page 35
Life Members	Page 13	Risk Management Methods for Test Projects	Page 37
Determining and Communicating Project Value Return on Investment (ROI)	Page 14	Developing Reusable Test Designs	Page 39
Making You a Leader- Fast Track!	Page 16		
Embedded Linux Board Support Packages and			



Happy New Year!

Greg Walson, 2018 IEEE Boston Section Chair

Each year the incoming Chair uses this Editorial space to reflect on the year before and set their goals for the new year. In spite of having served on the Executive Committee in one function or another for almost 10 years, I have had a hard time finding something inspiring to say that hasn't been said before. My wife often asks me why I continue to volunteer for the Boston Section, and I'm sometimes at a loss to explain it to her.

Having reflected on the matter, I think it comes down to community. For me the IEEE represents a set of communities. We have online communities that discuss current technology. We have communities of people who regularly attend the same Technical Society meetings. And we have the many communities of volunteers that give of their time to keep the Section and its various Societies operating.

For those of us with a technical bent, the IEEE is often the only community outside work where we can be assured of interacting with others like us. In

this era where facts are disregarded if they aren't convenient to an argument, having a community of people who discover and use facts for their living is more important than ever.

It has been said before, but it bears repeating: the IEEE is what you make of it. If you simply use a corporate membership to access technical standards, then you will not feel a sense of community attached to the IEEE. Attending Society meetings and conferences produces a greater level of connection to the community. But volunteering provides the greatest connection.

We all make time for the things that are important to us. I hope that the IEEE and the Boston Section are important to you. If they aren't, then please tell us what we can do to improve. Or better yet, come lend a hand, and help us make the Section better.

Happy New Year!

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>

Education, and Signal Processing Societies— 11:30AM, Monday, 4 December

Current Research Opportunities

WHEN: Monday, December 4th from 11:30 am to 1:00 pm – Lunch provided

WHERE: Science and Engineering Complex, Main Atrium, 200 College Avenue, Medford, MA 02155

REGISTER: https://tufts.qualtrics.com/jfe/form/SV_aasNfC6BRe4Gvdj (space is limited)

The School of Engineering invites IEEE members to meet representatives from MITRE on Monday, December 4th from 11:30 am to 1:00 pm. Dr. Karen Panetta, Dean of Graduate Education for the School of Engineering, will be hosting a lunch with leaders from MITRE to discuss research and other opportunities. Following presentations from MITRE employ-

ees, participants will have the opportunity to speak one-on-one with company representatives and exchange information.

We encourage students to bring copies of their resumes and be prepared to discuss their research interests.

MITRE is a not-for-profit company that operates multiple federally funded research and development centers. MITRE provides innovative, practical solutions for some of our nation's most critical challenges in defense and intelligence, aviation, civil systems, homeland security, the judiciary, healthcare, and cybersecurity. MITRE has two principal locations in Bedford, Massachusetts and McLean, Virginia.

Industry Applications Society – 6:00PM, Tuesday, 5 December

Applying Probabilistic Risk Assessment to Mission Critical Power System Design

Speaker: Neal Dowling Senior Engineer, MTechnology Inc.



I will begin by examining the definition of “risk”: the “risk” associated with an event is a function of the likelihood and the consequences of that event. After a brief discussion of “consequences”, I will dive into how to assess “likelihood”. There will be a brief discussion of IEEE Standards that are useful in risk assessment. I

will work through a simple but meaningful real-world example. To conclude, I will provide links to some resources for further study, and answer questions about risk assessment.

Neal Dowling is Senior Engineer at MTechnology, Inc. MTechnology has performed PRA studies for clients worldwide, including data center designers, electric

utilities, financial services firms, hospitals, medical facilities, owner/operators of mission critical facilities, and manufacturers serving the 7x24 uptime industry. Neal is a Senior Member of the IEEE and Vice Chair of the IEEE 3006 Working Group. A graduate of the Massachusetts Institute of Technology (SB 1974, SM 1979), he also has an extensive background in medical device development

Location: Bertucci's Kitchen & Bar, Medford 4054 Mystic Valley Parkway, Medford, MA 02155. Refreshments start at 6:00PM . Talk commences at 6:30PM

Free and Open to the Public. RSVP is appreciated. If you have any questions, please contact Ozgur Cosar (765-543-9172)

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

Advertise with us!!!

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.

The IEEE Boston Section provides education, career enhancement, and training programs throughout the year. Our members, and consumers, are looking for valuable connections with companies that provide outstanding products. For qualified advertisers, the IEEE Boston Section advertising options are very flexible. Through our affiliate, we will even help you design, develop, and host your ads for maximum efficiency. A few important features of the IEEE Boston Section

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

IEEE Boston Section Rate Card

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

IEEE Boston Media Kit

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

Contact Kevin Flavin or 978-733-0003 for more information on rates for Print and Online Advertising

Entrepreneurs' Network – 6:30PM, Tuesday, 5 December

IP Protection and Legal Issues for Early Stage Companies

Meeting Location – Microsoft Technology Center, 5 Wayside Road, Burlington, MA

This meeting is co-sponsored by IEEE Technology and Engineering Management Society, Boston Chapter.

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

The legal environment is constantly changing because of new laws and evolving interpretations of existing laws and regulations. Founders and executives of early stage companies have to address numerous legal questions in this changing environment; for instance:

- How to use provisional, utility, and design patents, trademarks, and other IP protections
- How copyrights, and trade secrets can be used to protect intellectual property and build value for investors and employees
- Where to incorporate, how to apportion founders equity and granting employee stock options, restricted stock and other equities
- How employer/employee agreements can benefit both investors, founders, and employees. Employee agreements may include terms of employment, compensation including benefits and independent contractor agreements.

Our panel of legal experts will address these fundamental issues that early stage companies must consider during their earliest days in order to lay a strong legal foundation for success.

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.

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, development, transactions, 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 to 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.

Moderator and Co-Organizer:

Bob Weber, Managing Director,
Patent Kinetics, LLC

Robert Weber is a successful intellectual property professional, inventor, serial entrepreneur, management consultant, and senior executive. 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 and a number of foreign counterparts 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 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.

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 premeeting 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.




University of New Hampshire

ONLINE GRADUATE CERTIFICATES



Ubiquitous Computing



Wireless Communication Systems

Learn More

online.unh.edu

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/>

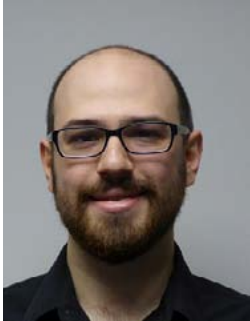
Reliability Engineering for the Business World

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

Computer and Geoscience & Remote Sensing Societies and GBC/ACM – 7:00PM, Thursday, 7 December

Probabilistic Programming

Theo Giannakopoulos, BAE Systems



In this talk I will present a rapidly maturing approach to machine learning and data science called probabilistic programming. Probabilistic programming languages enable the use of machine learning by programmers and domain specialists without experience in the creation of specialized machine learning algorithms. However, the

combination of probability and program semantics makes reasoning about probabilistic programs challenging, even for probabilistic programming language implementers. I will outline an approach to reasoning about probabilistic programs using techniques from traditional programming language theory.

Theo Giannakopoulos is a Principal Research Engineer at BAE Systems. He led the development of the Tempest programming language for BAE's SAFE project on the DARPA CRASH program and was the Principal Investigator for BAE's Open Probabilistic Programming

Platform project for the DARPA PPAML program. Prior to joining BAE Systems, he developed secure back-office systems for financial and e-commerce companies. He received his Master's degree in Computer Science at Worcester Polytechnic Institute (WPI) as part of the Applied Logic and Security group under the supervision of Prof. Daniel Dougherty, researching languages for the formal specification of security policies and policy combinators.

This joint meeting of the Boston Chapters of the IEEE Computer and GRSS Societies 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.

Advertise with us!!!

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.

The IEEE Boston Section provides education, career enhancement, and training programs throughout the year. Our members, and consumers, are looking for valuable connections with companies that provide outstanding products. For qualified advertisers, the IEEE Boston Section advertising options are very flexible. Through our affiliate, we will even help you design, develop, and host your ads for maximum efficiency. A few important features of the IEEE Boston Section

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

IEEE Boston Section Rate Card

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

IEEE Boston Media Kit

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

Contact Kevin Flavin or 978-733-0003 for more information on rates for Print and Online Advertising

Nuclear and Plasma Science Society and Boston University IEEE HKN– 5:00PM, Thursday, 7 December

Parallel Processing of Compressed Graphs with Ligra+

Speaker: Katie Lewis, MIT

Graph algorithms span many applications from biological network to social network analysis. With the continuous growth in data, compression has become increasingly important for reducing the space and cost of large-scale graph analytics. In this talk, I will give an overview of several integer compression techniques, such as StreamVbyte, currently used in the literature. I will also discuss how to apply these techniques towards compressing graphs and speeding up algorithms in the graph processing framework, Ligra+.

Katie Lewis is a graduate student conducting research in Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT. Her research

with Professor Julian Shun focuses on the theory and implementation of parallel graph processing frameworks and algorithms. In particular, her current work incorporates integer compression techniques into the graph processing framework Ligra+ to reduce the space and computation requirements of large-scale graph processing. When Katie Lewis studied at Boston University for a BS in Computer Engineering, she served as President of BU IEEE/IEEE-HKN. She is elected as a student governor to the board of IEEE HKN for 2018.”

Meeting Location: 5:00 - 6:30 PM. Boston University, Room EPC 207, 750 Commonwealth Avenue, Boston, MA 02215.

Women in Engineering – 1:00PM, Saturday, 16 December

Holiday Lunch

Women in Engineering will have its annual Holiday Lunch on Saturday, December 16.

Meeting Location: Bertucci's, 5 Cambridge Park Drive, Cambridge, MA 02140.

Reliability Society – 5:30PM, Wednesday, 13 December

Trends and Prospective in Risk and Reliability Engineering Research

Mohammad Pourgol-Mohammad, Ph.D.



This is the IEEE Boston Reliability chapter December Annual Past Chairs Dinner Meeting. IEEE members & non-members are welcome, and the meeting and food are free of charge, but registration is required in advance, so we can finalize food and drink arrangements.

This meeting is limited to 40 members and guests. You **MUST** be registered to attend. Please Register by COB Thursday, December 7th so we can finalize the arrangements!

This talk will highlight current and promising directions in the fields of Reliability Engineering and Risk Assessment. Leading topics such as research on the fundamental sciences that underpin risk and reliability technologies, challenges in reliability of ultra-complex systems of interacting hardware and software, utilization and processing of large data and machine learning algorithms, advances in system-level prognostics and health monitoring, and new approaches to integrate physics of failure and traditional reliability assessment methods.

Mohammad Pourgol-Mohammad, Ph.D. of ASQ RRD

Dr. Mohammad Pourgol-Mohammad is a safety/reliability analyst in multidisciplinary systems analysis and an Associate Professor of Reliability Engineering with Sahand University of Technology (SUT), Tabriz-Iran. He received his Ph.D in Reliability Engineering from University of Maryland (UMD), and holds one M.Sc

degree in Nuclear Engineering and another in Reliability Engineering from UMD. His undergraduate degree was in Electrical Engineering. Dr Pourgol-Mohammad has more than 15 year of work experience including research and teaching in safety applications and reliability engineering at various institutions including FM Global, Goodman Manufacturing, UMD, Massachusetts Institute of Technology (MIT), International Atomic Energy Agency (IAEA), University of Zagreb-Croatia, USNRC and INEL. He is a senior member of ASQ, ASME, IEEE (2008-2010) and ANS and member of several technical committees and a registered Professional Engineer (PE) in Nuclear Engineering in States of Maryland and Massachusetts. He is a certified reliability engineer (ASQ CRE). He has authored more than 80 papers and reports on his research. His efforts have been appreciated with several awards and recognition.

Email: mpourgol@gmail.com

This meeting will be held on Wednesday, November 8, 2017 at 3 Forbes Road, Lexington, MA.

5:30-6:00: Sign In & Personal Networking

6:00-6:45: Catered dinner, refreshments, dessert

6:45-7:00: Greetings, Election Results, Year in review
Guest Presenter Introduction

7:00-8:00 Dr. Mohammad Pourgol-Mohammad - Associate Professor of Reliability Engineering SUT, Tabriz-Iran

8:00-8:15 Q&A session, meeting adjourns

Meeting Location: 3 Forbes Rd, Lexington, Massachusetts

Photonics Society and co-sponsoring Nuclear & Plasma Science Society— 6:30PM, Thursday, 14 December

High-Resolution Retinal Imaging – Visualizing Cellular Structures In The Living Eye

Dr. Mircea Mujat, Physical Sciences Inc., Andover, MA



Scanning laser ophthalmoscopy (SLO) and optical coherence tomography (OCT) provide information on cellular and sub-cellular structures in the living eye when enhanced with adaptive optics (AO) capabilities. AO enhances transverse resolution and confocal sectioning capabilities by detecting and correcting ocular aberrations in real-time and has become a valuable tool for vision re-

searchers to explore the structural and functional aspects of vision and its disruption by disease. While AO has yet to fully transition from research lab to clinic, OCT is now a standard diagnostic procedure for glaucoma, macular holes, macula edema, retinal detachments, and other retinal pathologies. Simultaneous use of the two complementary imaging modalities provides a powerful comprehensive modality to investigate the eye.

AO systems use a wave-front sensor to sense ocular aberrations that arise primarily from the cornea, crystalline lens, and tear film, and correct them using a deformable mirror in a closed-loop manner. AO has recently achieved success in a range of applications in ophthalmology in which the building blocks of retinal microstructures such as cone photoreceptors, rods, RPE cells, blood cells, and microvasculature need to be identified, counted, and mapped properly. In this presentation we will review the state-of-the-art capabilities in high-resolution retinal imaging. PSI designed, developed, and tested a number of compact platforms combining the power of AO with SLO or line-scanning technology (LSO), and OCT for human and animal eye imaging. Our compact, simplified research instruments can be used by ophthalmologists, optometrists, and vision scientists and will facilitate the introduction of this technology and the development of new techniques to detect and treat retinal diseases.

Although AO-enhanced confocal SLO enables high-resolution imaging of the eye fundus, the capillaries are essentially transparent and, in standard, bright-field AO imaging can be difficult to visualize, except for the specular glint from blood cells coursing through them or the shadow they cast on deeper layers. Recently, it was shown that by using a larger, offset pinhole in the AO detection unit, images

that capture multiply scattered light (as opposed to direct backscatter) can reveal the tiny retinal vasculature network of the human retina with unprecedented clarity. Offset aperture/split detector/quad simultaneous imaging modalities will also be presented as the most recent developments in high-resolution retinal imaging.

Mircea Mujat obtained his Ph.D. in Optics in 2004 under the supervision of Prof. Aristide Dogariu at the School of Optics/CREOL, University of Central Florida. As a graduate student, he developed theoretical models and experimental techniques for polarimetric characterization of random electromagnetic fields, and for analyzing the signature of various random media. Between 2004 and 2007 Mircea joined Harvard Medical School and Wellman Center for Photomedicine - MGH as a Research Fellow, working with Prof. Johannes de Boer on ophthalmic investigations using OCT. He then joined the Biomedical Optics Group at PSI. His research interests at PSI are in ophthalmic imaging, medical instrumentation, adaptive optics, optical coherence tomography, and polarization imaging. Mircea is a member of the OSA, SPIE and ARVO.

This meeting begins at 6:30 PM Thursday, December 14th, 2017 and will be located 3 Forbes Road, Lexington, MA, 02420. Note this is a satellite location ~1.5mi away from MIT Lincoln Laboratory. The meeting is free and open to the public. All are welcome. Prior to the seminar there will be social time and networking from 6:30 – 7:00PM. Dinner will also be provided. The seminar will begin at 7:00PM. For more information contact Ajay Garg, IEEE Photonics Society Boston Chapter chair at ajay.sinclair.garg@ieee.org, or visit the IEEE Photonics Society Boston Chapter website at www.bostonphotonics.org.

Directions to Forbes Rd Lincoln Laboratory: (from interstate I-95/Route 128)

- Take Exit 30B onto Marrett Rd in Lexington – Merge into left lane
- Make the first Left onto Forbes Rd.
- Proceed straight through the small rotary and enter the parking lot.
- The entrance is by the flags.

Life Members Affinity Group - 4:00PM, Wednesday, 13 December

A Little Bit More About Big Data

Jim Issak

Big Data just keeps getting bigger, and it may be that we have gone past a tipping point on applications.

What if you could cross connect thousands of data points on every person in the U.S.?

What if you could run human medical/psychological tests on thousands or millions of volunteers without any "human subject review committee"?

What if you could target custom ads at each individual, knowing their preferences, purchasing history, and personality traits?

What if examining a few pictures of a person's face you would have a high probability of accurately associating them with a capital offense?

What if connecting the gun purchasing database into other data stores could identify highly likely suicide or violent offenders?

All but the last one of these potential applications is "so last year." It is time to be aware of the uses, and potential abuses of big data, and consider what it

means for our future.

Jim Isaak is past president of the IEEE Computer Society and past Vice President of the IEEE Society on Social Implications of Technology. Jim also is the primary@ blogger for "SocietyAndTechnology.org" (aka IEEE SSIT.org). Jim has been contemplating data since it was little, and last year's take on these issues does not reflect what the bouncing baby is now doing.

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.

For other information, contact Lori Jeromin 781-981-4152.

Advertise with us!!!

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.

The IEEE Boston Section provides education, career enhancement, and training programs throughout the year. Our members, and consumers, are looking for valuable connections with companies that provide outstanding products. For qualified advertisers, the IEEE Boston Section advertising options are very flexible. Through our affiliate, we will even help you design, develop, and host your ads for maximum efficiency. A few important features of the IEEE Boston Section

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

IEEE Boston Section Rate Card

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

IEEE Boston Media Kit

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

Contact Kevin Flavin or 978-733-0003 for more information on rates for Print and Online Advertising

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

Determining and Communicating Project Value Return on Investment (ROI)

ROI Value Modeling™ for Decision Making

Communicate Right, Reliable, and Responsible REAL ROI Business Cases

Date & Time: Wednesday, December 12; 8:30AM - 5:00PM (7.5 hours of instruction!)

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

Speaker: Robin Goldsmith, President, GoPro Management

Companies are demanding reliable financial measures of proposed projects' value. Yet, project managers often don't know how to identify, calculate, or communicate a project's REAL ROI™ (Return on Investment). Traditional ROI calculations increasingly are being criticized for telling only part of the necessary story. The difficulty afflicts all types of projects but often is greatest in areas like IT, where benefits may seem intangible and frequent overruns impact estimates' credibility. This interactive workshop reveals 22 pitfalls that render common ROI determinations meaningless and shows instead how to identify full-story key effects on revenue and expense variables, reliably quantify tangible and intangible costs and benefits, and convincingly communicate the business value of project investments. Exercises enhance learning by allowing participants to practice applying practical techniques to a real case.

PARTICIPANTS WILL LEARN:

- * The financial information that business decision makers need and demand.
- * ROI and related calculations, strengths, weaknesses, and common pitfalls.

* Using ROI Value Modeling™ and Problem Pyramid™ to fully identify relevant costs and benefits.

* Quantifying intangibles, risk, flexibility, and opportunity.

* Professionally presenting credible business value measurements so people pay attention.

WHO SHOULD ATTEND: This course has been designed for business, systems, and project managers as well as analysts, implementers, users, and others who must know the return on project investments.

OUTLINE

WHAT MONEY HAS TO DO WITH IT

Project Manager role with regard to ROI
Situations demanding ROI, their issues
Difficulty of making convincing arguments
Linking ROI to the business case
Value Modeling™ Relationship Diagram
Investment vs. expense
Justification vs. objective analysis
Meanings of "It costs too much"
Total Cost of Ownership (TCO)
Factors other than cost to be considered

Costs and benefits, revenues vs. expenses
 Return on Investment (ROI) calculations
 Net present value, discounted cash flow
 Payback period, annualized return
 Internal rate of return (IRR), hurdle rate
 'Telling the story' not just ROI calculations
 Failing to quantify 'intangibles' and risk
 Scenario approach to showing benefits
 Mistakenly thinking ROI does not apply

DETERMINING MEANINGFUL BENEFITS

Why it's important to find the benefits first
 Treacy's model of 5 revenue categories
 Problem Pyramid™ to find requirements
 Decision variable clarification chain
 Putting a dollar value on intangibles
 Opportunity, innovation, and flexibility
 Mandates, project with no apparent benefits

ESTIMATING CREDIBLE COSTS

Problem Pyramid™ ties costs to value
 Basing costs on implementation of design
 Business case framework
 Basic formula for estimating costs
 Main causes of poor estimates
 Top-down vs. bottom-up techniques
 Risks that afflict ROI calculations
 Three measurable ways to address risks
 Best-, worst-, most-likely-case scenarios
 Sources of parameter sizing assumptions
 Defining a reasonable scenario for success
 Getting reliable cost and revenue amounts

REPORTING AND MONITORING

Single vs. multiple scenario presentation
 Applying apples vs. apples, when you can't
 Scenario assumptions and parameters
 No change vs. proposed scenarios' ROIs

Measuring intangibles' monetary effects
 Continual, step-wise, and one-time changes
 Percentage-likelihood impact adjustments
 Presenting with spreadsheets
 ROI Value Dashboard™ modeling tool
 Caution about commercial ROI calculators
 Using value modeling to improve decisions
 Dashboard and scorecard-type notification
 Capturing, calibrating with project actuals
 Adjusting appropriately during project

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
 Wednesday, December 6 , 2017**

Payment received by Nov. 29

IEEE Members	\$220
Non-members	\$245

Payment received after Nov. 29

IEEE Members	\$245
Non-members	\$265

<http://ieeeboston.org/determining-communicating-project-value-investment-roi>

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

Making You a Leader - Fast Track

Become the Leader You Want and Need

Date & Time: Monday, December 11; 8:30AM - 5:00PM (7.5 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

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 4, 2017**

Payment received by Nov. 27

IEEE Members	\$220
Non-members	\$245

Payment received after Nov. 27

IEEE Members	\$245
Non-members	\$265

<http://ieeeboston.org/making-leader-fast-track-become-leader-want-need/>



Join the Elite | IEEE Global Engineers

Join/Renew



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



**New
Online
Course**

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/>

Advertise with us!!!

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.

The IEEE Boston Section provides education, career enhancement, and training programs throughout the year. Our members, and consumers, are looking for valuable connections with companies that provide outstanding products. For qualified advertisers, the IEEE Boston Section advertising options are very flexible. Through our affiliate, we will even help you design, develop, and host your ads for maximum efficiency. A few important features of the IEEE Boston Section

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

IEEE Boston Section Rate Card

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

IEEE Boston Media Kit

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

Contact Kevin Flavin or 978-733-0003 for more information on rates for Print and Online Advertising

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

**New
Online
Course**

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/>

IEEE Boston Section Social Media Links:

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

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

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

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

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

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

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

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

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

Module 1

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

Module 2

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

Module 3:

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

- Design Reviews

Module 4:

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

Speaker Bio:

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

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

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

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

Fundamental Mathematics Concepts

Relating to Electromagnetics (*Online Edition*)

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

Registration Fee: 150

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

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

Course chapters

1. Vector Basics
2. Dot Product

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

Instructor's Bio:

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

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

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

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

Registration Fee: 320

Course Description

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

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

Course Outline

Basics – Measurements
Business Model
Design Model (HW and SW)

HALT/RDT/Predictions
Manufacturing Model
Early Life Failures
Wear Out and Mid Life Crisis
Advanced Reliability

Course Objective

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

Instructor's Bio

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

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

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

Introduction to Embedded Linux

(Online Edition)

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

Course Summary:

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

Who Should Attend:

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

Course Objectives:

To provide a basic understanding of the Linux OS and the Eclipse IDE framework.

To gain an understanding of the complexities of Embedded Linux Distributions and their use in embedded systems.

To give students confidence to apply these concepts to their next Embedded Linux project

Hardware and Software Requirements

The student should have a working Linux desktop environment either directly installed or in a virtualization environment. The desktop Linux should have the GNU compiler and binary utilities (binutils) already installed. A working Eclipse C/C++ instal-

lation 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 Tlera, 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.

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

Practical RF PCB Design: Wireless Networks, Products and Telecommunications

Date & Time: Thursday & Friday, December 14 & 15; 9AM - 4:30PM
(13 hours of instruction!)

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.

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
Monday, December 4, 2017**

Payment received by November 29

IEEE Members \$405

Non-members \$435

Payment received after November 29

IEEE Members \$435

Non-members \$455

<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.

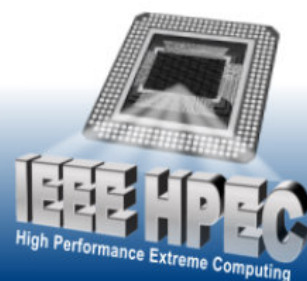
CALL FOR PAPERS



2018 IEEE High Performance Extreme Computing Conference (HPEC '18)

Twenty-second Annual HPEC Conference

25 - 28 September 2018
Westin Hotel, Waltham, MA USA



www.ieee-hpec.org

Committees

Chairman & SIAM Liaison

Dr. Jeremy Kepner
Fellow, MIT Lincoln Laboratory

Senior Advisory Board Chair

Mr. Robert Bond
CTO, MIT Lincoln Laboratory

Senior Advisory Board

Prof. Anant Agarwal
MIT CSAIL

Prof. Nadya Bliss
Arizona State University

Dr. Richard Games
Chief Engineer, MITRE
Intelligence Center

Mr. John Goodhue
Director, MGHPC

Dr. Bernadette Johnson
Chief Scientist, DIUX

Dr. Richard Linderman
ASDR&E

Mr. David Martinez
Associate Division Head
MIT Lincoln Laboratory

Dr. John Reynders
CIO Moderna

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

Publicity Co-Chairs

Dr. Albert Reuther
MIT Lincoln Laboratory
Mr. Dan Campbell
GTRI

CFP Co-Chairs

Dr. Patrick Dreher
MIT
Dr. Franz Franchetti
CMU

Publications Chair

Prof. Miriam Leeser
Northeastern University

Administrative Contacts

Mr. Robert Alongi
IEEE Boston Section

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.

Advanced Embedded Linux Optimization

Time & Date: 6 - 9PM, Mondays, Jan. 8, 15, 22 & 29, 2018 (12 hours of instruction!)

Location: Woburn, MA area near to Rt. 95/128

Speaker: Mike McCullough, RTETC, LLC

Course Summary - This 4-day technical training 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.

Course Schedule Day 1

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

Course Schedule Day 2

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

Course Schedule Day 3

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

Course Schedule Day 4Improving 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 theCompiler

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

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.

Decision (Run/Cancel) Date for this Course is Thursday, December 28, 2017

Payment received by December 26**IEEE Members \$395****Non-members \$415****Payment received after December 26****IEEE Members \$415****Non-members \$435**

<http://ieeeboston.org/advanced-embedded-linux-optimization-2>

IEEE Boston Section Social Media Links:**Twitter:** <https://twitter.com/ieeeboston>**Facebook:** <https://www.facebook.com/IEEEBoston>**YouTube:** <https://www.youtube.com/user/IEEEBostonSection>**Google+:** <https://plus.google.com/107894868975229024384/>**LinkedIn:** <https://www.linkedin.com/groups/IEEE-Boston-Section-3763694/about>

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

Writing Agile User Story and Acceptance Test Requirements -

Cut Creep Overruns, Disappointment, and Embarrassment

Date & Time: Tuesday, December 12; 8:30AM - 5:00PM (7.5 hours of instruction!)

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

Speaker: Robin Goldsmith, President, GoPro Management

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

**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

WRITING MORE SUITABLE USER STORIES

Problem Pyramid™ tool to get on track
 Exercise: Using the Problem Pyramid™
 Exercise: Business Requirement
 User Stories
 Issues identifying requirements
 Product owner and business analyst roles
 Project team participation
 Dictating vs. discovering
 Data gathering and analysis
 Planning an effective interview
 Controlling with suitable questions
 Then a miracle occurs...

AND USER STORY ACCEPTANCE TESTS

Missed and unclear criteria
 Turning criteria into tests, issues
 How many tests are really needed
 Test design techniques
 Checklists and guidelines
 Decision trees, decision tables
 Boundary testing
 Testing is main means to control risk

Defects and new user stories
 Testing that user story focus misses
 Reactive vs. proactive risk analysis
 Given, when, then format

Exercise: Write User Story Acceptance Criteria

Exercise: Design their Tests

Exercise: Review Your User Stories/Tests

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 5, 2017**

Payment received by Nov. 28

IEEE Members \$220

Non-members \$245

Payment received after Nov. 28

IEEE Members \$245

Non-members \$265

<http://ieeeboston.org/writing-agile-user-story-acceptance-test-requirements-2>



Join the Elite | IEEE Global Engineers

Join/Renew



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

Risk Management Methods for Test Projects

Make Sure the Most Important Testing Is Done in Limited Available Time

Date & Time: Thursday, December 14; 8:30AM - 5:00PM (7.5 hours of instruction!)

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

Speaker: Robin Goldsmith, President, GoPro Management

Testing is our primary means of reducing risks related to systems and software. All testing is risk-based in that there are more potential tests than we have time and resources to run, so we choose those that address higher risks. The difficulty is adequately identifying the potential risks, for which a number of structured techniques are described. Risk management involves obtaining, directing, and controlling resources for continuously planning, strategizing, identifying, analyzing, prioritizing, preventing, responding to, mitigating, monitoring, controlling, and reporting risk. Key types of risks and identification approaches are distinguished. Powerful Proactive Testing™ techniques are demonstrated that enhance conventional reactive testing risk analysis to enable testing higher risks not only more but earlier. Exercises aid learning by allowing participants to practice applying practical methods to realistic examples.

Participants will learn:

- The elements of risk and risk response, and their relation to software development and testing.
- Importance of distinguishing business, management, functional, and technical risk causes and effects.
- Alternative methods for identifying, analyzing, classifying, and prioritizing the several types of risks.
- Proactive Testing™ methods that enhance conventional reactive testing risk identification, response.
- Monitoring, evaluating, adjusting, and reporting on risk activities, findings, and results.

WHO SHOULD ATTEND: This course has been designed for analysts, designers, programmers, testers, auditors, users, and managers who rely on, plan, oversee, and/or carry out testing of software products.

1 NATURE AND IMPORTANCE OF RISK

Murphy's Law; O'Brien's Law
 Relation of risk to software and testing
 Classical risk management
 Impact and probability risk elements
 Classical risk mitigation, contingency plans
 Costs, ease of detecting, controlling vs. harm
 Quantifying qualitative risk, tricks and traps
 Types, classifications of risks
 Threats, vulnerabilities, triggers
 Risk identification analysis methods
 Business, functional, and operational risks
 Direct and indirect forms of injury
 Management and technical risks
 Effects vs. causes risk identification
 Monitoring, controlling, reporting risks

2 PROJECT MANAGEMENT RISKS

Most frequently encountered risks
 Changing requirements and scope creep
 Lack of management support, priorities
 Typically unrecognized interrelationships
 Features/quality, resources, schedule risks
 Software risks—or just poor management
 Sizing implications for software QA/testing
 Traditional checklists for project managers
 Evaluating risk factor checklists usefulness
 Software risk taxonomy
 Monitoring and managing risk as a project

3 CONVENTIONAL RISK ANALYSIS

Testing riskier features, components more
 Costs, additional testing resources vs. fixed
 System, development practices checklists
 Design analysis vs. prioritizing test cases
 Common subjective risk judgment methods
 Rating vs. ranking, setting objective criteria
 Reporting, gaining agreement on risks

Differentiating user and technical views
 Risk analysis in test designs and test cases
 Risks of not testing some things
 Metrics to monitor effectiveness, efficiency
 Anticipating and measuring operational risks
 Risk management roles and responsibilities
 Reporting risk status, expected and actual
 Categorizing actuals, improving over time

4 PROACTIVE RISK-BASED TESTING

Why typical risk-based testing is reactive
 Proactive Testing™ Life Cycle
 Structured model of test planning
 Multiple levels, points of risk analysis
 Prioritization demands knowing the choices
 Project-level proactive risk analysis
 Identifying overlooked project-specific risks
 Refocusing on tests that reduce the key risks
 Letting testing drive development
 Gaining user, manager, developer support
 Identifying and analyzing lower-level risks

**Decision (Run/Cancel) Date for this Courses is
 Thursday, December 7, 2017**

Payment received by Nov. 30

IEEE Members \$220

Non-members \$245

Payment received after Nov. 30

IEEE Members \$245

Non-members \$265

<http://ieeeboston.org/risk-management-methods-test-projects/>

IEEE Boston Section Social Media Links:

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

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

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

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

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

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

Developing Reusable Test Designs

Be an Instant Expert--Run More, and More Thorough, Tests in Less Time**Date & Time:** Friday, December 15; 8:30AM - 5:00PM (7.5 hours of instruction!)**Location:** Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn, MA

Would you like to be an instant testing expert, able to start testing effectively in new situations without delay? And would you like to spend more of your time running tests and less of your time creating the tests? Reusable test designs are a little-known but powerful test planning/design tool that make it possible for you to run more effective test cases in less time. This interactive seminar workshop shows you how to apply a systematic structured Proactive Testing™ approach that first enables you to design much more thorough tests than traditional methods. Then, you'll discover how to convert your test designs into reusable test designs that you can apply instantly in new situations. You'll develop several reusable test designs in class and be ready to add more to your toolkit back on the job. Exercises enhance learning by allowing participants to practice applying practical techniques to an actual case.

Participants will learn:

- How test designs fit into the overall test planning structure and provide special advantages
- Systematic reliably repeatable methods for identifying test designs to test a given system.
- Checklists and guidelines that enable you to spot the conditions traditional methods overlook.
- Converting your project-specific test designs into reusable test designs you can use for other systems.
- Applying reusable test designs to jumpstart your testing with instant expertise and effectiveness.
- Quickly and reliably selecting the subset of test cases suitable for scale and risk.

WHO SHOULD ATTEND: This course has been designed for testers, managers, analysts, designers, programmers, auditors, and users who plan, oversee, and/or carry out testing of software products.

PROACTIVE TEST DESIGN BENEFITS

Proactive vs traditional reactive testing
 Proactive Testing™ Life Cycle advantages
 IEEE Standard for Test Documentation
 Often-overlooked key to proper prioritizing
 Systematic drill-down strategy
 Master and detailed test plans
 Test design specifications
 Test case specifications
 How taking time to structure saves time
 Structuring to make test sets manageable
 Facilitating reconstruction of test data
 Taking off the blinders to allow selectivity
 Re-using instead of rebuilding test designs
 Instant expertise for testing new situations

IDENTIFYING NEEDED TEST DESIGNS

Functional (black box) testing
 Three-level approach to functional testing
 Keys for thoroughness
 Breaking down to manageable pieces
 Functionality Matrix technique
 Use case perspective
 Technical software actions
 Test design specifications that are needed

DESIGNING TESTS MORE THOROUGHLY

How designing adds thoroughness
 Traditional test design still misses a lot
 Focused brainstorming for a better start
 Checklists and guidelines to fill the gaps

Tests based on data formats
 Coverage of data and process models
 Decision trees and tables
 Concerns common to all types of testing
 Equivalence classes and partitioning
 Ranges and boundary testing
 GUI and navigation issues
 Often-overlooked other dimensions to test
 Formal/informal test design specifications
 Extracting the reusable elements
 Enhancing with system-specific tests
 Link to driving effective automated tests

Other essential test case component
 Finding and creating test data
 Test script and matrix formats
 Simple and sophisticated automation

**Decision (Run/Cancel) Date for this Courses is
 Friday, December 8, 2017**

Payment received by Dec. 1

IEEE Members \$220

Non-members \$245

Payment received after Dec. 1

IEEE Members \$245

Non-members \$265

SPECIFYING (REUSABLE) TEST CASES

Translating test designs into test cases
 Selecting scaled subset based on risk
 Reusable test case specifications

<http://ieeeboston.org/developing-reusable-test-designs/>

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.