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CHAPTER
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How Time Flies

by Fausto Molinet, Chair, Publications Committee

Year: 1991 ... Situation: The Cold War is over ... Result: Defense dependent companies begin re-organizing ... "Unforeseen" Consequence: Engineers, previously safely employed, are losing jobs.

At the time, it looked like a pretty dire situation for engineers, but a new and extremely vibrant era was about to begin that would revolutionize our economy and lives. We didn't know it for sure then, but we did suspect, it would be led by technology and driven by engineers.

Enter the IEEE Boston Entrepreneurs' Network, not the only and not the first group dedicated to helping entrepreneurs understand how to take their talents and make a success of a business. But it was one of the better organized and one of even fewer who have held on to their original vision and mission.

When it was conceived, it was decided that there was no shortage of talent and ideas, but the engineers and technologists were ill equipped by education and experience to understand and use all the tools they needed to turn them into successful businesses.

ENet, as it's now generally known, would provide some basic education in the marketing, financial and management skills any entrepreneur must have. It wouldn't talk about technology, just the business side. It wouldn't provide lectures by academics, but have successful and sometimes not so successful entrepreneurs, tell their stories. Investors would discuss what they were looking for

and practicing intellectual property experts would provide guidance.

A not so obvious approach included networking as a strong element of the programs. Because no one can really do it alone, that would bring many like-minded individuals together, often creating opportunities to team up for success.

ENet sought people from outside of IEEE to be most of its organizers and speakers. After all it was addressing a need which companies and schools hadn't provided enough of to the engineers. They gave a perspective which was necessary to achieve the goal of educating the new entrepreneurs.

Now its 26 years later and where is ENet? Well it's grown from a 9 event a year to 20. Its attendance has held steady at about 60-100 per meeting and it has expanded beyond the 128/95 corridor to include the newly revitalized Cambridge entrepreneurial community. ENet has won two IEEE-USA awards for professional development activities and most importantly has educated a generation of entrepreneurs who are now leading successful ventures.

The Boston Section is proud of this achievement and how it has benefited members of all its societies and their chapters as well as many non-IEEE members who have benefitted from the programs. If you have never attended one of ENet's meetings you should. Who knows, your idea may be the next big thing.



The Institute of Electrical and Electronic Engineers, Inc.

Spring 2017 Professional Development and Education Program

www.ieeeboston.org

Phased-Array and Adaptive-Array Fundamentals and Their Recent Advances

Dates and Time: Ten Monday Evenings,
Feb. 27, March 6, 13, 20, 27, April 3, 10, 24, May 1, 15
(Snow/make-up dates May 22, June 5, 12
6:00PM - 9:00PM

MITRE Corporation, Bedford, MA

Introduction to Embedded Linux

Dates and Time: Mondays, March 20, 27, April 3, 10
6:00PM - 9:00PM

More Digital Signal Processing (DSP) for Wireless Communications

Dates and Time: Wednesdays, March 22, 29, and
April 5, 12, 26; 6:00PM - 9:00PM

Software Development for Medical Device

Manufacturers: An intensive Two-day Workshop

Dates and Time: Wednesday, April 5 and Thursday,
April 6; 8:30AM - 4:30PM

Embedded Linux BSPs and Device Drivers

Dates and Time: Wednesdays, April 12, 19, 26
and May 3; 6:00PM - 9:00PM

QA and Testing in DevOps Automation

Date and Time: Thursday, April 20
8:00AM - 5:00PM

Advanced Embedded Linux Optimization

Dates and Time: Wednesdays, May 10, 17, 24 and 31
6:00PM - 9:00PM

Practical Antenna Design for Wireless Products

Dates and Time: Thursday, June 1 and Friday, June 2
9:00AM - 4:30PM

Making You A Leader Fast Track

Date and Time: Monday, May 22; 8:30AM - 5:00PM

Writing Agile User Story and Acceptance Test Requirements

Date and Time: Tuesday, May 23; 8:30AM - 5:00PM

Determining and Communicating Project Value Return on Investment (ROI)

Date and Time: Wednesday, May 24; 8:30AM - 5:00PM

Proactive User Acceptance Testing - Confident Competence

Date and Time: Thursday, May 25; 8:30AM - 5:00PM

Online Courses

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

- Verilog 101: Verilog Foundations
 - Systems Verilog 101 (SV101) Design Construct
 - Systems Verilog 102 (SV102) Verification Constructs
 - High Performance Project Management
- (Discounts available if register for all three Verilog Courses)

- Software Development for Medical Device Manufacturers
 - Reliability Engineering for the Business World
- Fundamental Mathematical Concepts Relating to Electromagnetics
 - Introduction to Embedded Linux

See our new online platform for these four new online courses!!!

All Courses are being held at the Crowne Plaza Hotel, 15 Middlesex Canal Park Road, Woburn unless otherwise noted. For more information on these courses and other local IEEE activity see our website at www.ieeeboston.org, email: ieeebostonsection@gmail.com, or call 781-245-5405

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 NEW Online course

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

Software Development for Medical Device Manufacturers NEW Online course

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

Fundamental Mathematics Concepts Relating to Electromagnetics NEW Online course

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

Reliability Engineering for the Business World NEW Online course

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

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

NDAs and Essential Contracts for Early Stage Companies

Meeting Location – Constant Contact, 3rd Floor Great Room, 1601 Trapelo Road, Waltham, MA.

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

Meeting Description: Are contracts, and the lawyers who draft them, expensive time sinks, or are they essential tools for early stage companies? Boston ENET will endeavor to make the case that contracts, from Non-Disclosure Agreements (NDAs) to Employee Agreements to Acquisition Agreements, really are essential tools for all companies, including early stage ones.

Contracts set the stage for expectations and behaviors - defining who will do what, how and when.

Join us for a lively discussion with panelists who have 'been there and done that' who will share their insights on contracts as invaluable tools for charting the path to success from the seed of an idea for a startup to successful, high growth corporation.

Speaker: Janice Bourque, Managing Director, Life Sciences, Hercules Technology Growth Capital

Janice Bourque is Managing Director of Life Sciences for Hercules Capital, a premier specialty finance company providing debt and equity to venture capital and private equity backed, and small cap public life science companies at all stages of development with \$5.9

billion committed to over 350 life science, technology and renewable energy companies. Deals include BIND Bioscience, Brickell, Cempra Pharmaceuticals, Concert Pharmaceutical, Cranford Pharmaceuticals, Dance Pharmaceuticals, deCode Genetics, Gamma Medica, Glori Energy, Medrobotics, Metuchen Pharmaceuticals, Ninepoint Medical and Pulmatrix.



Previously, Ms. Bourque provided strategic corporate investor fundraising for Commons Capital and Oxford Bioscience Partners for innovative healthcare investments for emerging and developing countries and was Senior Vice President, Group Head-Life Sciences for Comerica Bank. While at Comerica, notable deals included deals that led to several M&A exits including Hypnion/Eli Lilly; Adnexus/Bristol Meyers Squibb; and Morphotek/Eisai Pharmaceuticals.

Ms. Bourque was President/CEO of the Massachusetts Biotechnology Council (MBC) which was at the forefront of the biotechnology revolution as the first biotechnology association in the world. Ms Bourque held senior managerial positions at Cambridge Medical Technology Corporation and Coopers & Lybrand Emerging Technology Group.

Ms. Bourque is on several boards: Poxel Inc, The Village Bank, Commodore Builders, Forsyth Institute, Emeritus Director of the MIT Koch Institute for Integrative Cancer Research Springboard Enterprises Life Science Council and is a member of Women on Corporate Boards and the Women's Forum. She is also active in Newton and serves as co-president of the Crystal Lake Conservancy and Board member of The Hyde Community Center. Ms. Bourque is a trustee for a privately developed community home for differently-abled young working women and men. She was named one of Boston Magazine's 100 most influential women and Newton Living Magazine's 10 most influential women. Ms. Bourque received her MBA degree in finance and accounting and her BS degree in veterinary science from the University of New Hampshire.



Speaker: John Grayson, Founder, President, Genuine
John Grayson, President of Genuine,

helps leading brands drive innovation and growth in today's digital economy. Since 2005, John has driven the agency's growth from a small startup into one of the nation's top emerging digital agencies. In 2014, Genuine was acquired by IPG, one of the world's largest groups of advertising agencies and marketing services companies.

Prior to Genuine, John spent two decades as an entrepreneur in roles focused on business growth and emerging technologies. Most recently, he was co-founder of Realinterface Expert Systems, a Maryland based start-up which served the Pharmaceutical and First Responder markets with a patented, dynamic decision tool. Realinterface was acquired in 2005 in a successful exit for its investors. Throughout his career, John has established a strong track record of producing results, driving growth and developing new markets. John received his MBA from Babson College and a B.S. in John Grayson, President of Genuine, helps leading brands drive innovation and growth in today's digital economy. Since 2005, John has driven the agency's growth from a small startup into one of the nation's top emerging digital agencies. In 2014, Genuine was acquired by IPG, one of the world's largest groups of advertising agencies and marketing services companies.

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Speaker: Monique Yoakim-Turk, Partner, Technology development Fund, Boston Children's Hospital
Monique joined the Technology Inno-



vation and Development Office of Boston Children's Hospital in 2000. In 2009, Monique launched the BCH Technology Development Fund (TDF)-an academic investment fund -and has since led the fund through eight funding cycles. For TDF, she designed and implemented evaluation processes, formed an advisory board of industry leaders in product development, and established and managed collaborations with development partners and CROs. Since 2009, BCH has committed \$7.8M to TDF generating \$26M of follow-on funding, 7 startups which collectively raised \$80M in seed funding and 10 licenses.

In her previous role as Director of Pediatric Initiatives, she led development of tools and processes to advance clinical and research innovations for the pediatric market. Prior to that and as Senior Licensing Manager, Monique handled technologies in the therapeutic, diagnostic, and medical device arenas, closed significant deals in licensing and sponsored research, and established creative collaborations with industry partners.

Prior to Boston Children's, Monique was a post-doctoral fellow at the Beth Israel Deaconess Medical Center in the laboratory of Dr. Benjamin Neel, where she studied the regulation of cytokine receptors by the tyrosine phosphatase SHP1. She holds a Ph.D. in Biochemistry from the Tufts University, Sackler School of Graduate Biomedical Sciences. In the laboratory of Dr. Brian Schaffhausen, her doctoral thesis focused on the regulation of the PI3-Kinase by Polyomavirus middle T antigen and the proto-oncogene c-src. Monique has authored and co-authored 9 peer reviewed publications. She also holds a B.S. and an M.S. in Biology from the University of Massachusetts.



Speaker: Ryan Dietz, Senior Licensing Manager, Technology and Innovation Development Office, Boston Children's Hospital

Ryan has more than 15 years of experience in multiple facets of technology development, collaboration building and company formation. Ryan joined

Technology & Innovation Development Office at Boston Children's in 2012 and is responsible for managing the intellectual property and agreement transactions for the Programs in Cellular and Molecular Medicine and the

Vascular Biology Program. Prior to joining TIDO, Ryan was the Director of the Office of Technology Development for the Immune Disease Institute, Inc., which became the Program in Cellular and Molecular Medicine through a merger with Boston Children's Hospital.

While at IDI, Ryan oversaw all aspects of technology management and licensing within a productive and highly regarded research organization. He established a five year discovery alliance with a multi-national pharma partner serving as architect, negotiator and alliance manager. Ryan has also supported several start-up company formations by producing business models and supporting the founders of several well-known start-up companies.

Ryan has a J.D. from Suffolk University Law School and was a founder and managing editor of the Journal of High Technology Law.



Moderator: Roger Frechette, Co-Founder and Principal of New England PharmAssociates

Roger Frechette is Co-Founder and Principal of New England PharmAssociates, a consultancy offering on-demand executive and business advisory services to life sciences enterprises. Dr. Frechette has been a

volunteer with Boston ENET since 2014, and supports area start-ups as a mentor for MassBio's MassCONNECT Program and the MTTC's Platform Program. His consulting work has led to roles as the US East Coast Ambassador for Medicon Valley Alliance, a life sciences cluster organization based in Copenhagen, and as a Co-Founder of Frontiera Therapeutics, a startup developing therapeutics for vascular leaks. New England PharmAssociates was an early sponsor for the North Shore InnoVentures biotech incubator, where Dr Frechette served as a mentor and advisor to the Incubator management team. Previously, Dr. Frechette was Co-Founder of MaxThera, an antibacterial drug discovery company. MaxThera was sold in 2010 to Biota Holdings Limited, a Melbourne Australia anti-infectives

company. Prior to starting MaxThera, Dr. Frechette was a drug discovery and life-sciences consultant following his role as Project Director at Paratek Pharmaceuticals (Boston). At Paratek he led the team that discovered PTK0796 (currently in Phase III clinical trials) with strategic partner Glaxo-Wellcome, and the pre-clinical development program that was carried out with a multinational team of consultants and contractors.

Previously, he was Associate Director of Chemistry at RiboGene (Hayward, CA), where he built the chemistry department and managed two drug discovery programs in collaboration with strategic partner Dainippon Pharmaceuticals. He began his career as a medicinal chemist at the R.W. Johnson Pharmaceutical Research Institute (J&J, Raritan, NJ). In his spare time, he serves of steering committees for well-regarded Boston area conferences, including the annual Massachusetts Life Sciences Innovation Day and MassBio's Signature event the Annual CRO/CMO Symposium. Dr. Frechette was a Post-Doctoral Fellow at Yale University, earned his PhD in Organic Chemistry from Wesleyan University and his BA in Chemistry from College of the Holy Cross.

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

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

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

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

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

Geoscience and Remote Sensing, Aerospace and Electronic Systems, Computer, Microwave Theory and Techniques, Robotics and Automation Societies- 11:00AM, Wednesday, 3 May

Machine Learning Applications for Earth Observation

Prof. David J. Lary, Hanson Center for Space Sciences <https://davidlary.info>



Machine learning has already proved immensely useful in a wide variety of applications in science, business, health care and engineering. Machine learning allows us to learn by example, and to give our data a voice. It is particularly useful for those applications for which we do not have a complete theory, yet which are of

significance. Machine learning is an automated implementation of the scientific method, following the same process of generating, testing and discarding or refining hypotheses. Machine learning has found many applications in remote sensing. These applications range from retrieval algorithms to bias correction, from code acceleration to detection of disease in crops, from classification of pelagic habitats, to rock type classification. As a broad subfield of artificial intelligence, machine learning is concerned with algorithms and techniques that allow computers to 'learn' by example.

The major focus of machine learning is to extract information from data automatically by computational and statistical methods. Over the last decade there has been considerable progress in developing a machine learning methodology for a variety of Earth Science applications involving trace gases, retrievals, aerosol products, land surface products, vegetation indices, and most recently, ocean applications. We will review some examples of how machine learning has already been useful for remote sensing and some likely future applications with the hope that this will promote active collaboration.

David received a First-Class Double Honors B.Sc. in Physics and Chemistry from King's College London with the Sambrooke Exhibition Prize in Natural Science, and a Ph.D. in Photochemical Computer Modeling of Atmospheric Chemistry from the University of Cam-

bridge. The thread running through all the research is physics in service of society through the use of data driven insights using observation and automation to facilitate discovery, with a focus in the area of human health and the health of infrastructure, smart and resilient cities and infrastructure, and global sustainable development. A key part of this is the analysis of massive data sets (BigData) using machine learning and high performance computing, and IoT devices for smart decision making. David held positions at Cambridge University from 1991-2001, including being a faculty member and receiving a Royal Society University Research Fellowship. In 2000 the chief scientific adviser to the British Prime Minister recommended David to be appointed as a Cambridge University lecturer in Chemical Informatics in the world's first department of Chemical Informatics. In 2001 David was invited to join NASA for his work on data assimilation as the first distinguished Goddard fellow in Earth Science and stayed at NASA till 2010, receiving six NASA awards for his research and technology development. While at NASA he worked in several offices including the Data Assimilation Office, the Atmospheric Chemistry and Dynamics Branch, the Science Integration and Visualization Office, and the NASA Goddard Earth Sciences Data and Information Services Center. In 2010 David joined the Hanson Center for Space Science. He is about to deploy a network of airborne allergen sensors across Chattanooga, TN, for a smart city asthma and allergy early warning system. David founded two companies, Machine Data Learning and Data Driven Decisions. Data Driven Decisions LLC is a consulting company founded to provide predictive data analytics for train track health.

Meeting Location: MIT CSAIL Stata Center, Building 32, 32 Vassar Street, Cambridge MA.

Please RSVP Please RSVP for this no-cost event: bit.ly/CSAILLectureIEEEMay2017

Photonics Society – 6:30PM, Thursday, 11 May

Biologically Inspired Soft and Fluid Optical Materials

Prof. Mathias Kolle, Massachusetts Institute of Technology



A curious look at biological photonic systems reveals a myriad of versatile approaches for the creation of multifunctional, hierarchically structured, dynamic bio-inspired materials. Here, we present a choice of materials that employ bio-inspired photonic architectures, implemented in soft, and fluid materials, with tunable and stimuli-responsive behavior.

The first part of this presentation will be focused on elastic, mechano-sensitive, color-tunable bio-inspired photonic fibers, which mimic the photonic structures found in a tropical plant's blue seed coat. The fibers consist of an elastomeric multi-layer cladding, rolled onto a stretchable core. Their reflection color can be tuned reversibly by applying an axial strain or a lateral compression. This effect persists even after several thousand deformation cycles. Potential applications for mechano-responsive, color-tunable photonic fibers include the optical sensing of mechanical deformations and stress distributions in medical and civil engineering applications, solvent vapor analyzers, dynamic textiles, and components for fiber-optic signal processing.

In the second part, we explore the use of emulsions for the creation of liquid compound micro-lenses with dynamically tunable focal lengths, inspired by the architectures found in the retina of nocturnal animals. We employ bi-phase emulsion droplets in responsive micro-lenses that can be reconfigured to focus or scatter light, and to form images. We provide evidence of the micro-lenses' functionality for two potential applications – integral micro-scale imaging devices and light field display technology – thereby demonstrating both the fundamental characteristics and the promising opportunities for fluid-based dynamic refractive micro-scale compound lenses.

Mathias' research focuses on unique optical sensing, communication and energy conversion mechanisms in nature and the development of bio-inspired, adaptive and actively tunable micro-optical devices. Through experimentation and optical modeling, and by employing a diversity of manufacturing principles, his group is developing novel optical technologies. He joined the faculty of MIT as an Assistant Professor in 2013. Prior to that, Mathias held a Feodor Lynen research fellowship of the Alexander von Humboldt - Foundation for postdoctoral studies at the School of Engineering and Applied Sciences of Harvard University, where his research was focused on bio-inspired photonics, bio-imaging and optical spectroscopy. He earned his degree in physics from the Saarland University in Germany and the University of Lorraine (formerly Henri Poincaré University) in France in 2006. Mathias then continued his graduate studies at the University of Cambridge in the UK at the Cavendish Laboratories, where he received his Ph.D. in 2010.

This meeting begins at 6:30 PM Thursday, May 11th, 2017 and will be located 3 Forbes Road (an MIT Lincoln Laboratory facility), Lexington, MA, 02420. 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 Boston Photonics Society Chapter chair at ajay.garg@ll.mit.edu, or visit the IEEE Boston Photonics Society 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 on your right, by the flags.

Computer Society and GBC/ACM – 7:00PM, Thursday, 11 May

Engineering Complex Behaviors in Biological Organisms

Jake Beal



Engineering biological cells to perform computations has a broad range of important potential applications, including precision medical therapies, biosynthesis process control, and environmental sensing. Recent years have seen the development of a profusion of synthetic biology tools, largely falling into two categories: high-level “design”

tools aimed at mapping from organism specifications to nucleic acid sequences implementing those specifications, and low-level “build and test” tools aimed at faster, cheaper, and more reliable fabrication of those sequences and assays of their behavior in engineered biological organisms. Between the two families, however, there is a major gap: we still largely lack the predictive models and component characterization data required to effectively determine which of the many possible candidate sequences considered in the design phase are the most likely to produce useful results when built and tested.

Recently, however, significant advances have been made against three key engineering obstacles: development of fast high-precision characterization methods based on calibrated flow cytometry, construction of combinatorial libraries of high-performance synthetic regulatory devices, and derivation of methods capable of high-precision prediction of new biological computational systems from models of their component regulatory devices. Such enabling developments are, in turn, likely to allow high-level tools to break the design barrier and support rapid development of transformative biological applications.

Dr. Jacob Beal is a scientist at BBN Technologies and a research affiliate of MIT and the University of Iowa. His

research interests focus on analyzing and engineering complex aggregates, such as engineered and natural cells, genetic regulatory networks, sensor networks, and robot swarms.

This joint meeting of the Boston Chapter of the IEEE Computer and GBC/ACM will be held in MIT Room E51-315. E51 is the Tang Center on the corner of Wadsworth and Amherst Sts and Memorial Dr.; it’s mostly used by the Sloan School. You can see it on this map of the MIT campus. Room 325 is on the 3rd floor.

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.

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Consumer Electronics Society – 6:00PM, Monday, 15 May

Visions for the Consumer Electronics Future

One might argue that Consumer Electronics began in Boston with the work of Alexander Graham Bell in the development of the telephone for which he received a patent in 1876. Who would have had the vision at that time what was in store for CE over the next 141 years? Who has the vision to sense what may be there for CE over the next 141 years, or even the next 10-20? This program will be presented by Student Members of the MIT IEEE Chapter on their ideas for technologies, products and futures for Consumer Electronics. Their thoughts will receive comments from a Panel drawn from the Boston IEEE CESoc Chapter and MIT Faculty, and from the audience.

Presenters include:

Ali Finkelstein is a recent graduate of and current candidate for a Masters of Engineering at MIT. As an undergraduate, she studied Computer Science and Electrical Engineering with a minor in comparative media studies. Over her summers, she interned at DIRECTV and Toast and worked as an undergraduate researcher in the MIT Computer Science and Artificial Intelligence Laboratory and the MIT Media Lab. Ali is driven by innovation and has knowledge in security, databases, and systems. But really, she considers herself a “jack of all trades,” as she is always striving to learn new skills and new topics. Off the computer, Ali’s main passion is on the water. A coxswain for over nine years, she has competed in iconic races like the Henley Royal Regatta and Head of the Charles. She also loves makeup artistry, videography, and baking.

Title: Auto 500: The Race For Autonomous Vehicles

The topic of autonomous cars has been popping up in the news with increasing frequency over the past few years, mostly discussing their development

and testing. But what about the future? Within 5 years, self-driving vehicles will be available. Within 10 years, they’ll be standard in every vehicle.

With all new technology, there are positives and negatives that come with their increased adaptation into everyday life. This talk will discuss the future of self-driving cars and the implications, how it will impact everyday life, and the labor industry

David Gomez is senior in 6-1 (Electrical Engineering) at MIT. His focus and interests revolve around how we can use embedded and connected devices to improve the experience delivered by consumer electronics products. David has interned at Ford, Sonos, and Fitbit. He will be returning to Fitbit full time after graduation this summer. His dream is to make technology that integrates seamlessly into our lives to allow people to spend more time doing what they love and less time screaming at boxes full of circuits.

Title: Designing High Reliability Products for the Connected World

The current state of the consumer electronics market rewards unreliable, flashy products packed with new features that don’t work. In the long term, consumers would rather have products that always work and integrate seamlessly into their lives. The problem is that unless you are making a premium products, it is likely cost prohibitive to incorporate both the high tech features needed to make a products stand out in the market AND the meticulous design needed to make a reliable product. This problem can be solved by incorporating the latest advancements in connected devices (essentially products with programmable micro controllers, sensors, and internet connections) to design products with features that wow customers while also increasing reliability and ease of use.

Additional presenters will be added to the program as paper selections continue.

Program:

6:00PM - Food, soft drinks

6:45PM - Greetings from MIT IEEE Chapter & BosCESoc

7:00PM - Presentations

8:00PM - Q&A

Summations from Chapter Chairs:

Wei Low, MIT IEEE Student Chapter

L. Dennis Shapiro, Boston CESoc

8:00PM Adjourn

Contact: Registration required including your name and company/affiliation/school to:

BosCESoc@gmail.com

IEEE membership is not a requirement.

Meeting Location; MIT, 50 Vassar Street, Cambridge, MA 02139 – MIT EECS Grier Room, Building 34, Room 401

Directions:

Enter Building 34 at the front entrance of 50 Vassar Street.

Once inside the lobby, turn left and proceed through the double glass doors to the elevator bank.

Take the elevators to the 4th floor; exit straight ahead. The Grier Rooms are directly ahead of you to the left, in the glass corridor.

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Reliability Society - 5:30PM, Wednesday, 17 May

Assessment of Copper Bond Wire for Use in Long Term Military Applications

Aaron Lecomte -- Raytheon - Integrated Defense Systems



For years semiconductor manufacturers have used gold wire to connect the semiconductor die to the lead frames and external pins. However, rising gold prices are driving manufacturers towards less expensive alternative materials such as copper for use in high volume commercial plastic package devices. Military standards

such as MIL-STD-883 do not define requirements for copper bond wire and therefore manufacturers are using qualification and process monitoring developed for gold wire to qualify the copper bond wire technology. Although copper bond wire designs are moving forward for commercial applications, there are concerns with quality and reliability for use of copper bond wire in high reliability military electronics with long mission life.

This presentation will review findings from the destructive physical analysis (DPA) testing performed on a number of standard commercial plastic encapsulated microcircuits (PEMs). We will focus on the die ball bond and lead frame crescent bond metallurgical structures, mechanical bond strength, wire composition, and manufacturing bonding process workmanship & overall quality.

Based on the DPA findings, potential risks will be defined along with recommendations to the qualification program of PEMs with copper bond wire for use in harsh environments and long term high reliability military programs.

Aaron Lecomte of Raytheon Integrated Defense Systems: Aaron Lecomte is an Electrical Engineer in the Materials Engineering group in Andover, Massachusetts. He has experience with failure analysis, reliability analysis, CCA design, and analog/digital/RF design and testing. He is responsible for the quality and process flow of Destructive Physical Analysis (DPA) for the Reliability Analysis Lab. Since coming on board with the DPA program, Aaron has improved the procedures to increase integrity of the program, streamline tasks, and reduce overall cycle time. Aaron is a certified Six-Sigma specialist, holds a BS in Electrical Engineering from the University of New Hampshire, and is currently in pursuit of an MS in Electrical Engineering from the University of Arizona.

Agenda

5:30-6:00 - Sign In, Networking, Light Dinner & Refreshments

6:00-6:10 - Chapter Chair Greetings & Announcements

6:10-8:00 - Aaron Lecomte, Raytheon Integrated Defense Systems

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

Registration:

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

Meeting Location: MACOM Hale Street Building, 121 Hale St, Lowell, Massachusetts



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Microwave Theory and Techniques Society joint meeting with NH Section - 6:00PM, Wednesday, 17 May

Smart RFIC: Millimeter-wave Gigabit Transceivers with Digitally-enabled Built-in Self-calibration and Auto-switching Functions

Tian-Wei Huang - National Taiwan University



In our daily life, we have smart phones, smart TVs, or even auto-pilot smart cars in the future. In our engineer careers, we have smart antenna, smart baseband chips, but we still need auto-calibration smart RFICs. Especially for millimeter-wave RFICs with giga-hertz bandwidth, the narrow-band baseband calibration cannot compensate the broadband AM/AM or AM/

PM non-ideal properties.

For future multi-band multi-standard radio, auto-band-switching is an essential function to optimize RF performance and to simplify the system control interface. A Miller-divider-type frequency sensor can be used to detect the frequency of input signal and perform auto-band-switching inside RFIC without any system control bits. For parametric sensitive 3rd-order nonlinearity, we need parametric-insensitive calibration methods to compensate the non-ideal behavior within RFIC. For millimeter-wave phase array system, the phase error comes from not only phase shifters but also other functional blocks, like variable gain amplifier (VGA), during phase shifting and gain compensation. We need a phase-error calibration method to compensate the phase error from all RFIC blocks.

To optimize system EVM performance, IQ modulator/demodulator are the key components to compensate IQ mismatch at RF frequency, which is also the enabling technology for gigabit high-QAM wireless links. The load-insensitive indicator is used to evaluate different IQ topologies. For IQ self-calibration at RF fre-

quency, the phase compensation has more design challenges than the amplitude calibration, so composite right/left-handed transmission line, switching capacitor array, and phase shifters have been proposed in the IQ phase calibration. All above built-in self-calibration and auto-switching functions are innovated to pave the road to the next-generation millimeter-wave 5G mobile smart RFIC.

6:00PM – Networking

6:30PM – 7:30PM – Technical Presentation

Meeting Location: Nashua Country Club

ANSYS Healthcare Innovation Conference May 10, 2017 10 AM - 4 PM (EDT)



ANSYS, setting the industry standard in CM&S (computer modeling & simulation), enables you to identify problems early in the design cycle when there is more flexibility to make changes.

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at LabCentral, Cambridge, MA

Biogen J&J DePuy Amgen
Phenomix Granta Design

Networking Reception
immediately following

Register Now!

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

Engage with Clients Emotionally to Gain New and Follow-on Work

Jim Poage

There is an old marketing saying that people buy on emotion and then justify the purchase rationally. This idea applies, as well, to technical consulting work where we are all, in a sense, continually selling our work and ideas —pitching to perspective clients, providing ideas and interim results to impress clients during a project, and presenting output to persuade clients of its value. If you design the content of your work and communicate your work in a way that energizes clients, they are more likely to adopt what you propose, follow up with you, remember you, and hire you. Energizing is effective because energy overrides inhibitions that block action, and energy spreads and propels the popularity of what you do.

This talk is about how to energize clients and audiences emotionally as well as rationally. We do not usually think of engaging audiences emotionally when considering technical consulting work, but it can be done effectively. Feeling trust for you, finding you pleasant to work with, and feeling energized by your insights and recommendations are emotional aspects of successful consulting. Some techniques to be covered are: structuring your work and your writing/presentations to tell a story of how your results will provide value, creating an experience of what it will be like when clients use your findings, using memorable examples, being concrete in the way you explain your work so clients can visualize it in their context, and using humor related to your topic to enliven your audience. Examples of using these techniques in consulting will be discussed, including: marketing to potential clients, designing the content of your work, designing the overall structure for reports and presentations, writing the content, creating tables and figures, informally discussing your work with clients, and interacting with clients.

Jim Poage, PhD, has spoken to various groups and conferences, been interviewed in podcasts, published articles in business and technical journals and in online

publications, and conducted webinars about putting an emotional pull into communications and products to energize others. Jim is co-author, with his daughter Jennifer Poage who works in fashion design, of *Flair: Design Your Daily Work, Products, and Services to Energize Your Customers, Colleagues, and Audiences* (Maven House Press, 2016). *Flair* shows how to make your products and everyday work draw in customers, colleagues, and audiences so that they follow up, adopt, and/or buy. Jim founded JLP Performance Consulting in 2003 to help organizations integrate technology and humans to work together effectively within an organization. His consulting has expanded to coach organizations and individuals on how to create an emotional draw with customers and audiences.

At JLP Performance Consulting, Jim Poage views the applicable aspects of technology, processes, managers, workers, customers, suppliers, organizational structure and culture, and external influences as parts of a holistic system working together to achieve end-value efficiently. Reflecting the content of his book, *Flair*, this approach accounts for both the emotional and rational aspects of organizational productivity, output, and communications.

Jim's clients include, among others, BAE Systems, Kopin, L-3 Communications, Engility, Saab Sensis, NASA, FAA, Georgia Institute of Technology, and San Jose State University. Much of this work was on future concepts for Air Traffic Control. Jim holds a Ph.D. in applied mathematics from Harvard University and an M.S. and B.S. in electrical engineering from Stanford University. See www.jimpoage.com for more information about *Flair* and Jim's work.

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

The Consultants Network meeting starts at 6:30 PM. The meeting will take place at Constant Contact, Reservoir Place - 1601 Trapelo Road, Waltham, MA 02451. A no host, PRE-MEETING DINNER will take place at 5:15 PM (sharp) at Bertucci's, 475 Winter Street, Waltham, MA 02451 (exit 27B, Rte 128).

Driving Directions

To Bertucci's:: Follow I-95/route 128 to Winter St in Waltham. Take exit 27B from I-95/Route 128. Turn left on Wyman S, then left on Winter St. Bertucci's is the 1st right after crossing the bridge over I 95/Route128.

To Constant Contact: Follow I-95/route 128 to Trapelo Rd in North Waltham, Waltham. Take exit 28 from I 95/route 128. Constant Contact is the 1st right after crossing the bridge over I 95/Route128.

Consultants' Network meetings generally take place on the fourth Tuesday of each month, but are not held during the summer months. Check the Consultants Network website for meeting details and last-minute information.

For more information, e-mail or chairman@boston-consult.com

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

Power and Energy Society – 6:00PM, Tuesday, 23 May

2017 Annual Banquet – Come and join us for an evening of fun and networking!!!

Bringing the Changing Energy Landscape to Life

Featuring: Buffet style dinner, cash bar and live music by “Jazz in the Air”

Speaker: Rudolph (Rudy) Wynter, President & COO-FERC Regulated Business and New Energy Solutions, National Grid

Time: Pre-dinner drinks at 6:00PM, program commences at 6.30PM

Location: Holiday Inn Boston- Brookline
1200 Beacon Street
Brookline, MA 02446

Registration Details:

Price: \$35 per person or \$270 per table of eight. \$10 per student

On line Registration: <https://www.eventbrite.com/e/ieee-pes-boston-chapter-annualdinner-tickets-32858048307>

*A small convenience fee will apply to online ticket transactions.

Checks are also acceptable. Please make the check payable to IEEE PES Boston Chapter and mail it to:

Babak Enayati
40 Sylvan Rd.
Waltham, MA 02451

Registration Closing Date and Time: 6PM on Sunday May 21, 2017

Visit IEEE PES Boston Chapter’s website for details!
<http://www.ieeepestboston.org/>

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Electromagnetic Compatibility Society – 6:00PM, Wednesday, 31 May

Electromagnetic Environmental Effects in the Military

Mr. Kris Hatashita



Military electromagnetic compatibility (EMC) is a matter of life and death as modern war-fighters rely on the safe, secure and reliable functioning of their devices. Military EMC includes aspects of electronic interoperability that are seldom or never considered in the commercial realm. This talk presents technical details of EMC consideration

in tactical and strategic military operations. The topics discussed include hazards of electromagnetic radiation to ordnance (HERO), electromagnetic data security (EMSEC), counter improvised explosive device (CIED) EMC issues and includes first-hand experiences of work done in the Afghan theatre.

Biography: Kris Hatashita has been an EMC professional for thirty years and has worked for industry and government organizations as an EMC subject matter expert. His list of clients includes General Dynamics Canada, The Royal Canadian Mounted Police, Lockheed Martin Canada, The Canadian Parliament and The Communication Security Establishment Canada.

Kris was on the EMCS Board of Directors in 2014-2015 and the General Chair of the EMC Symposium in Ottawa in 2016.

Currently, Kris is an IEEE Distinguished Lecturer, a lecturer at the Canadian Forces School of Communication

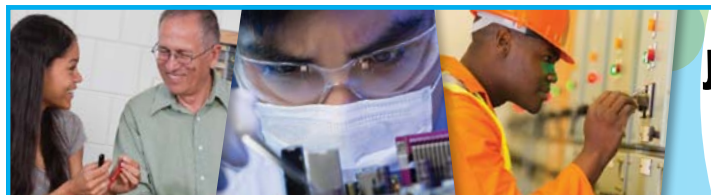
and Electronics at the Royal Military College in Kingston and a consultant to the Canadian Department of National Defense for the Army Communications Group

Meeting Details: The meeting of the EMC Society will be held on Wednesday, May 31, 2017 at Bose Corp., 100 The Mountain Road, Framingham, MA. The technical presentation will commence at 7:00PM following a social hour at 6:00 PM. Food is provided.

DIRECTIONS TO BOSE CORPORATE HEADQUARTERS: The address is: 100 The Mountain Road, Framingham, MA, 01701

From Mass Pike (I-90); Take Exit 12 (Route 9 West) toward Worcester. Keep left at the fork on the ramp and get on Route 9 West. At the first set of lights take a right onto California Ave. (sign reads "Framingham Technology Park"). Go straight, over the railroad tracks, and through the next set of lights. The road curves around to a stop sign at the foot of the mountain. Take a left onto the Mountain Road and follow it to the next stop sign at the top of the mountain. The tall glass building before you is the Bose Corporate Center. Take a right at the stop sign, drive past the front of the Corporate Center and then Park.

For more information, please contact Mike Royer at Michael_Royer@bose.com



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2017 IEEE WIE USA EAST FORUM Call for Participation

November 30 – December 2, 2017 Baltimore, MD



Presentation Topics

- Mentoring the next generation of female leaders
- Strategies for increasing equity in power and decision making
- Women as leaders in education, industry, and government
- Development: communication skills in written and spoken word, effective dialog
- Cross-cultural aspects of leadership
- What it takes to be a great leader - qualities that all successful leaders share
- Shaping the future by female leaders
- Training vs inherent skills: can leadership be learned?
- Work-Life balance: family systems traditions and changes
- Leadership development for women: overcoming stereotypes
- The design, implementation, and evaluation of leadership from a structural perspective
- Helping girls and young women become leaders - motivating to empower, empowering to motivate
- Exploring the attrition gap - why do women leave the engineering field and what can be done to prevent it

Not a WIE member?

Our active community of female and male engineers is involved in career building, networking, and community outreach.

Join Now

Submission Deadline

Presentation topic abstract suitable for program (up to 150 words), and extended abstract for evaluation (up to 2 pages) due 24 July 2017.

For more information, visit:

<http://sites.ieee.org/wie-forum-usa-east/calls-for-participation/>



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2017 IEEE MIT Undergraduate Research Technology Conference



Nov 3 - 5, 2017 | Massachusetts Institute of Technology (MIT), Cambridge MA, USA



Call for Submissions

Submission Deadline: June 30th, 2017

Envisioning a technical conference targeted towards undergraduate students all over the globe, the MIT IEEE Student Branch in 2015 inaugurated the IEEE MIT Undergraduate Research Technology Conference. This year we are organizing it again with the goal to make the conference a venue where undergraduate students can meet to present, discuss, and develop solutions advancing technology for humanity. Participants can attend a rich program with renowned speakers, technical sessions, a student design competition, exhibits, networking, and social activities, presenting a great opportunity for students to interact with leading industry experts.

The conference theme is "Meet Innovative Technology", and the six fields of focus are:

1. Machine Learning / Artificial Intelligence (AI)
2. Biological and Biomedical Engineering and Technology (BioEECS)
3. Robotics and Automation Technology
4. Systems and Networking
5. Embedded Technologies
6. Innovative Technologies and Others

Authors may submit content in the form of a technical paper, poster, or lightning talk.

All submissions must be written in English. Paper submissions must be no longer than 4 pages, single-spaced, with a minimum font of 10 point, and submissions may include figures, illustrations, and graphs. Abstract submissions for the poster and lightning talk are limited to 500 words.

All submissions will be peer-reviewed. Submissions are online, with a deadline of June 30th, 2017. Notification of acceptance will be sent via email by August 4th, 2017.

Please join the mailing list (MIT-Conference@ieee.org) for more information and updates on submission, the technical program, registration, and accommodation.

A conference proceeding of all the accepted papers that have been presented at the conference may be published and included in the IEEE Xplore journal. Electronic and online media containing all accepted submissions will be distributed to all registered attendees.

Meet Innovative Technology

Sponsored by MIT IEEE Student Branch and IEEE Boston Section

<http://ieee.scripts.mit.edu/conference>



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



**New
Online
Course**

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

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*)



**New
Online
Course**

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

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!!

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 – Part I

(Online Edition)



**New
Online
Course**

Course Summary:

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

Who Should Attend:

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

Course Objectives:

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

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

useful for completion of lab exercises. Lab solutions are also provided with the course. An Embedded Linux target hardware platform is useful but not absolutely required for this course.

Additional Reference Materials

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

Course Downloadable Content:

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

The Basics

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

Getting Started

Kernel Source Code
Building the Kernel
Embedded Linux Kernels
Linux 2.6

Basic Kernel Capabilities

Process and Threads Management

Signals and System Calls
 Synchronization, IPC and Error Handling
 Timing and Timers
 Memory Management and Paging
 The I/O Subsystem: A Tale of Two Models
 Modularization

Debugging

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

An Eclipse Debug Example

Other Debug and Test Tools

Other System-Level Debug Approaches

Process & Threads Management

What are Processes and Threads?
 Virtual Memory Mapping
 Creating and Managing Processes and Threads
 Thread-Specific Data (TSD) POSIX
 The Native POSIX Threading Library (NPTL)
 Kernel Threads

Signals

System Calls

Scheduling

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

Synchronization

Via Global Data
 Via Semaphores, Files and Signals

Inter-Process Communications (IPC)

Message Queues
 Semaphores Revisited
 Shared Memory
 Pipes, FIFOs and Futexes
 Remote Procedure Calls
 Networking

Error Handling

errno and perror
 strerror and strerror_r
 oops, panics and Segmentation Faults

Timing

How Linux Tells Time
 Kernel, POSIX and Interval Timers
 High-Resolution Timers (HRTs)

Memory Management and Paging

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

Modularization

Creating a Module and Module Loading
 Dependency Issues
 In Embedded Systems

Shared Libraries

A Shared Library Example
 Static and Dynamic Libraries

The I/O Subsystem: A Tale of Two Models

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

Embedded Linux Trends

Development, Monitoring and Testing

Some Final Recommendations

Lecturer:

Mike McCullough is President and CEO of RTETC, LLC. Mike has a BS in Computer Engineering and an MS in Systems Engineering from Boston University. A 20-year electronics veteran, he has held various positions at 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.

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**2017 IEEE High Performance
Extreme Computing Conference
(HPEC '17)**
Twenty-first Annual HPEC Conference

12 - 14 September 2017
Westin Hotel, Waltham, MA USA

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High Performance Extreme Computing

www.ieee-hpec.org

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The IEEE High Performance Extreme Computing Conference (HPEC '17) will be held in the Greater Boston Area, Massachusetts, USA on 12 – 14 September 2017. 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:

- Advanced Multicore Software Technologies
- Case Studies and Benchmarking of Applications
- Automated Design Tools
- Mapping and Scheduling of Parallel and Real-Time Applications
- Computing Technologies for Challenging Form Factors
- ASIC and FPGA Advances
- Open System Architectures
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- Secure Computing & Anti-Tamper Technologies
- New Application Frontiers
- High Performance Data Analysis
- Cloud HPEC
- Big Data Meets Big Compute

HPEC accepts two types of submissions:

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

IMPORTANT DATES:

Submission Deadline: **May 19, 2017**

Notification of Acceptance: **June 16, 2017**

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 must use the approved IEEE templates. Full paper submissions with the highest peer review ratings will be published by IEEE in the official HPEC proceedings available on IEEE eXplore. All other accepted submissions and extended abstracts are published on ieee-hpec.org. Vendors are encouraged to sign up for vendor booths. This will allow vendors to present their HPEC technologies in an interactive atmosphere suitable for product demonstration and promotion.

We welcome input (hpec@ieee-hpec.org) on tutorials, invited talks, special sessions, peer reviewed presentations, and vendor demos. Instructions for submitting will be posted on the conference web site shortly.

Practical Antenna Design for Wireless Products

An intensive Two-day Workshop

Time & Date: 9AM - 4:30PM, Thursday & Friday, June 1 & 2

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

Speakers: Henry Lau, Lexiwave Technology

INTRODUCTION

To stay competitive in today's fast evolving business environment, faster time to market is necessary for wireless communication products. Playing a critical role in determining the communication range of products, RF design, particularly the antenna design, becomes crucial to the success of the introduction of new wireless products. Competence in advanced antenna designs can definitely strengthen the competitive edge of RF product design or manufacturing companies.

COURSE OBJECTIVES

This 2-day course aims to provide participants with technical insights on the vital aspects of antenna design from a practical and industrial perspective. It covers the fundamental antenna concepts and definitions, specifications and performance of different types of commonly-used and advanced antennas in RF products. Simulation tools will be introduced and discussed. Practical implementation strategies in RF products for optimum antenna performance will also be presented.

WHO SHOULD ATTEND

Antenna designers, RF designers, wireless product designers, field application engineers, business development engineers and managers, design managers, and related professionals.

OUTLINE

Day 1 (1 June)

Fundamental Concepts

1. Antenna Fundamental

- * Basic types of Antenna
- * Dipole, Monopole, helical, loop, printed PCB
- * Radiation Mechanism
- * Source of radiation
- * Characteristics of radiation

2. Specification and Performance

- * Radiation pattern
- * Antenna efficiency, aperture
- * Impedance and circuit matching
- * Directivity, gain
- * Friis Transmission Equation

3. Antenna Elements

- * Dipole antenna
- * Monopole antenna
- * Multi-band antenna
- * Miniature chip type antenna
- * Loop antenna

Day 2 (2 June)

Advanced Antenna Elements

4. Miniature antenna for portable electronics

- * Patch, inverted-L, inverted-F
- * Meandered line, multi-band

5. CAD Design and Simulation

- * CAD tools

- * Design strategies
- * Limitations
- * Case studies

Practical implementation strategies

6. How to design good antennas

- * Understand the requirements
- * Selection of antenna type, size and geometry
- * Location and placement

7. Team work with product designers, electronic engineers and mechanical engineers

- * Why it matters
- * Case studies on designing good antennas

EXPERTISE

Henry Lau received his M.Sc. and MBA degrees from UK and USA respectively. He has more than 26 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.

**Decision (Run/Cancel) Date for this Course is
Monday, May 22, 2017**

Payment received by May 17

IEEE Members	\$405
Non-members	\$435

Payment received after May 17

IEEE Members	\$435
Non-members	\$455

<http://ieeeboston.org/practical-antenna-design-wireless-products/>

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Simulink Model based FPGA Digital Design and Digital Signal Processing

Time & Date: **Course postponed until fall 2017**

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

Speakers: Cherif Chibane, Rick Rosson; MIT Lincoln Laboratory

Description:

Over the last 30 years, applications for Field Programmable Gate Array (FPGA) designs have increased exponentially. FPGA's have moved from just digital designs to other areas such as embedded controllers, Digital Signal Processing, communication systems, and configurable computing. This has made exposure to and mastery of FPGA design crucially important for many people in industry and academia.

This course provides a detailed overview of FPGA technologies, a top-down design workflow, modeling and simulation, standard design tools, and applications. Using a mixture of theory and hands-on laboratories, the course provides students what they need to know in modeling, simulation, design, verification, and implementation of multi-disciplinary applications targeting FPGA's. This course provides plenty of hands-on lab exercises to reinforce the key concepts. While the material covered in this class targets Xilinx devices, it can be easily used for others devices such as ALTERA and other FPGA devices.

Presenters:

This course will be jointly presented by Cherif Chibane and Rick Rosson of MIL Lincoln laboratory. Their combined and complementary expertise will greatly benefit attendees from industry and academia.

Cherif Chibane is currently with MIT Lincoln laboratory as a research staff. He was one of the early adopters of FPGA's for configurable computing. Prior to MIT-LL, he was part of the BAE Systems team that pioneered the use FPGA's for Software Denied Radio (SDR). He has more than 25 years in the design of advanced configurable computing using FPGA's for DSP, digital logic, and embedded designs.

Rick Rosson is a senior modeling and simulation engineer at MIT Lincoln Laboratory. Prior to joining MIT-LL, Rick served as a senior applications engineer at MathWorks for 9 years, with a focus on digital signal processing, statistical signal processing, embedded systems design, modeling and simulation, and data analysis and visualization. Rick holds a Master of Science in Electrical Engineering from Boston University and a Master of Science in Management from the MIT Sloan School of Management.

Agenda

Session #1

- Course Overview
- Model based benefits in today's FPGA designs.
- Simulink/Matlab Overview
- Simulink Examples

Session #2

- FPGA Technologies Overview
- Xilinx ISE Overview
- Fixed point Vs floating point overview
- HDL/FPGA Examples

Session #3

- Preparing Simulink models for HDL code generation
- Generating HDL code from Simulink
- Verifying the generated code
- Code Generation Examples

Session #4

- Modeling Signal Processing and Communications Systems in Simulink®
- Signal Processing Examples
- Implementing Signal Processing Systems on FPGA's

Session #5

- Advanced Topics using FPGA's
- End-To-End Design and Verification
- End-To-End Design Example
- Course Summary

Call for Course Speakers/Organizers

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

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

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

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

<http://ieeeboston.org/course-proposals/> .

Alternatively, you may contact the IEEE Boston Section office at ieeebostonsection@gmail.com or 781 245 5405.

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

Call for 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

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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!!!!

Advanced Embedded Linux Optimization

Time & Date: 6 - 9PM, Wednesdays, May 10, 17, 24, 31

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

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

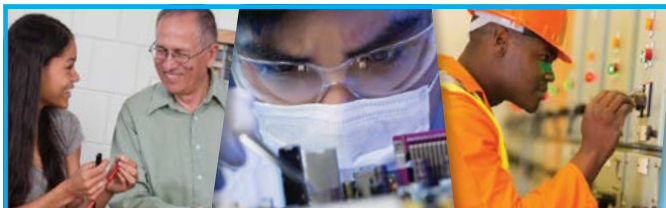
Some Final Recommendations

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 Courses is
Monday, May 1, 2017**

Payment received by April 28**IEEE Members \$395****Non-members \$415****Payment received after April 28****IEEE Members \$415****Non-members \$435**

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



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

Determining and Communicating Project Value Return on Investment (ROI)

ROI Value Modeling™ for Decision Making

Date & Time: Wednesday, May 24; 8:30AM - 5:00PM

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
 Monday, May 15, 2017**

Payment received by May 9

IEEE Members	\$220
Non-members	\$245

Payment received after May 9

IEEE Members	\$245
Non-members	\$265

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

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

Making You a Leader - Fast Track

Date & Time: Monday, May 22; 8:30AM - 5:00PM

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

Speaker: Robin Goldsmith, President, GoPro Management

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

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

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

PARTICIPANTS WILL LEARN:

- Leadership characteristics and practices that are essential for project and personal success.
- Differences between management and leadership, how they conflict, and why leaders are so rare.
- Behaviors leaders use to influence others, up and down, to want to do what the leader wants them to do

- Special techniques personal development clinics use to change lifetime learning and make leaders.
- How to employ those special techniques in a follow-on mini-clinic to develop the leadership skills they need to make their projects successful.

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

LEADERSHIP CHARACTERISTICS & ROLE

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

TEAMS AND LEADERSHIP

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

INSPIRING AND MOTIVATING

Gaining commitment to project success
Communicating that influences others
Addressing negativism and groupthink
Conscious and unconscious messages
Greatest management principle

Hierarchy of needs effects on projects
 Hygiene factors vs. motivators
 Helping project players get their rewards
 Influencing up and down without authority
 Inspiring the extra efforts projects need
 Energizing the project team

SHARED VISIONS

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

WHERE AND HOW LEADERS ARE MADE

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

SETTING AND ACCOMPLISHING GOALS

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

DEFINING THE FOLLOW-ON PROGRAM

Clarifying project leadership objectives
 Breaking into prioritized subgoals
 Establishing rewarding daily achievements
 Special techniques to change habits

CARRYING OUT THE MINI-CLINIC

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

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

**Decision (Run/Cancel) Date for this Courses is
 Friday, May 12, 2017**

Payment received by May 8

IEEE Members	\$220
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Payment received after May 8

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<http://ieeeboston.org/making-leader-fast-track-2/>

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April 25 - 26, 2017
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*(The technical program, conference
registration is now online)*

2017 IEEE International Midwest
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August 6 - 9, 2017
www.MWSCAS2017.org
*(Call for Papers Deadline,
March 10, 2017)*

2017 IEEE High Performance Extreme
Computing Conference HPEC ‘17
September 12 - 14, 2017
www.ieee-hpec.org
Submission deadline is
May 19, 2017

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

Proactive user Acceptance Testing™ -- Confident Competence

The Testing Users need to be Confident the Software they Depend on Works

Date & Time: Thursday, May 25; 8:30AM - 5:00PM

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

Speaker: Robin Goldsmith, President, GoPro Management

Projects aren't complete until users/customers are sure the systems they depend on actually meet business requirements, work properly, and truly help them do their jobs efficiently and effectively. However, users seldom are confident or comfortable testing system acceptability. Project Managers and Testing professionals need to know how to guide and facilitate effective acceptance testing without usurping the user's primary role. This intensive interactive seminar shows what users need to know to confidently make the best use of their time planning and conducting acceptance tests that catch more defects at the traditional tail-end of development, while also contributing in appropriate ways to reducing the number of errors that get through the development process for them to catch in UAT. Exercises give practice using practical methods and techniques.

PARTICIPANTS WILL LEARN:

- * Appropriate testing roles for users, developers, and professional testers; and what each shouldn't test.
- * How Proactive Testin™ throughout the life cycle reduces the number of errors left to find in UAT.
- * Key testing concepts, techniques, and strategies that facilitate adaptation to your situation.

* Systematically expanding acceptance criteria to an acceptance test plan, test designs, and test cases.

* Supplementing with requirements-based tests, use cases, and high-level structural white box tests.* Techniques for obtaining/capturing test data and carrying out acceptance tests.

WHO SHOULD ATTEND: This course has been designed for business managers and system users responsible for conducting user acceptance testing of systems they must depend on, as well as for system and project managers, analysts, developers, quality/testing professionals, and auditors.

ROLE OF USER ACCEPTANCE TESTING

Why users may resist involvement
 Making users confident about testing
 Objectives, types, and scope of testing
 Acceptance testing as user's self-defense
 Why technical tests don't catch all the errors
 Essential elements of effective testing
 CAT-Scan Approach™ to find more errors
 Proactive Testing™ Life Cycle model
 Separate technical and acceptance test paths
 Place of UAT in overall test structure
 Making sure important tests are done first
 Developer/tester/user test responsibilities

DEFINING ACCEPTANCE CRITERIA

Defining acceptance test strategy up-front
 Source and role of acceptance criteria
 5 elements criteria should address
 Functionality the user must demonstrate
 How much, how often user must test
 Determining system quality
 Who should carry out acceptance tests
 How acceptance tests should be performed
 Added benefit, revealing requirements errors

DESIGNING ACCEPTANCE TEST PLANS

Expanding the acceptance criteria
 Allocating criteria to system design
 Refining the design to catch oversights
 Checklist of common problems to test
 Equivalence classes and boundary values
 Making quality factors (attributes) testable
 Structural testing applicable to users
 GUI features that always need to be tested
 Defining requirements-based tests
 Constructing use cases
 Cautions about use case pitfalls
 One- and two-column use case formats
 Turning use cases into tests
 Consolidating tests into efficient test scripts

CARRYING OUT ACCEPTANCE TESTS

Differentiating test cases and test data
 Traps that destroy value of acceptance tests
 Warning about conversions
 Documentation, training, Help tests
 Configuration, installation, localization

Security, backup, recovery tests
 Suitability of automating acceptance testing
 Performance, stress, load testing
 Issues on creating test conditions, data
 Capturing results, determining correctness
 User's defect tracking and metrics

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, May 16, 2017**

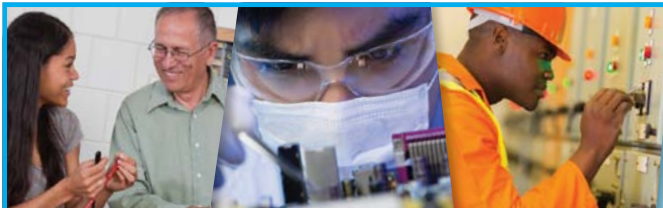
Payment received by May 11

IEEE Members	\$220
Non-members	\$245

Payment received after May 11

IEEE Members	\$245
Non-members	\$265

<http://ieeeboston.org/proactive-user-acceptance-testing-confident-competence/>



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

Writing Agile User Story and Acceptance Test Requirements

Date & Time: Tuesday, May 23; 8:30AM - 5:00PM

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
 Exercise: Write Needed User Stories
 Exercise: Define their Acceptance Criteria
 Exercise: Review Your User Stories/Criteria

**REQUIREMENTS ARE REQUIREMENTS—
OR MAYBE NOT**

User stories are backlog items, features
 Chicken and egg relation to use cases
 Issues and inconsistencies
 Business vs. product/system requirements
 “Levels Model” of requirements
 Other mistaken presumptions
 Requirements overview
 Where user stories should fit, do fit instead
 Conversation conundrum

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
 Friday, May 12, 2017**

Payment received by May 8

IEEE Members	\$220
Non-members	\$245

Payment received after May 8

IEEE Members	\$245
Non-members	\$265

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



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Patenting Outside of the U.S.

Date & Time: 6 – 9PM, Monday, June 19

Location: Tufts University, Halligan Hall, Room TBD., 161 College Ave, Medford, MA

Speaker: Christine Kuta, Kuta Intellectual Property Law, LLC

Course Overview: Most countries in the world have a patent office where one can apply for protection of inventive ideas. There is, however, no global patent that provides rights everywhere. Operating in the global economy, though, requires some patent protection beyond the U.S. borders. Therefore, understanding the systems and strategies for determining how and where to apply for protection outside the U.S. is critical for operating in the global economy. This class will provide information about systems and strategies for obtaining patent protection outside the U.S.

Description: The class will provide an overview of the laws and requirements, and explain the procedures in obtaining foreign patent rights. International treaties such as the Patent Cooperation Treaty (PCT) will be discussed. The PCT enables the applicant to begin the patent process in most of the world's countries simultaneously. The European Union (EU) unitary patent, the first multinational patent, and unified patent court will also be discussed. The EU unitary patent and the unified court have been in development for a number of years and is about to launch despite delays caused by Brexit. Foreign filing rights are easy to lose and costs can be difficult to contain, however, the class will also provide some strategies for effective foreign filing in spite of the difficulties.

Target Audience: Engineers in large and small companies with new ideas, inventors, entrepreneurs seeking to develop a patent strategy, anyone interested in learning about patents and how to obtain a patent outside the U.S.

Benefits of attending: Understanding the process and requirements for obtaining a foreign patent; information about how to leverage U.S. patents rights in the foreign application process; understanding the procedures in order to make effective business decisions and contain costs. Course will include handouts including a list of resources.

Course outline:

- I. Patents
 - A. Quick overview of what patents protect and why patent protection should be pursued.
 - B. High level view of process
 - C. Foreign filing license
- II. Foreign patents
 - A. Basis for foreign patent protection
 - B. Representation
 - C. Differences in the process as compared to U.S.
 - i. Patent eligibility
 - ii. Inventorship
 - iii. Patent Types
 - iv. Process
 - v. Fees
- III. International applications – i.e., starting the foreign application process in many countries at once
 - A. Patent Cooperation Treaty
 - B. Regional applications
- IV. The Unitary Patent and Unified Patent Court -- new developments in the Old World
 - A. What it is and how it works

B. Proposed dates of implementation
C. Filing options

V. Protection strategies

VI. A few words about enforcement

Christine Kuta is an Intellectual Property lawyer. Her practice includes Intellectual Property strategy, portfolio development and management, and patent and trademark prosecution, search and opinions. Ms. Kuta counsels clients in a wide variety of technical areas including computer systems and software applications, medical devices, lighting systems, optics, materials and manufacturing processes, complex data management systems, electronics, energy management sys-

tems and energy storage including fuel cells, mechanical devices and consumer products including clothing and accessories.

**Decision (Run/Cancel) Date for this Courses is
Minday, June 5, 2017**

Payment received by May 29

IEEE Members \$50

Non-members \$60

Payment received after May 29

IEEE Members \$60

Non-members \$70

<http://ieeeboston.org/patenting-outside-u-s-spring-2017/>

ANSYS Healthcare Innovation Conference

May 10, 2017 10 AM - 4 PM (EDT)



ANSYS, setting the industry standard in CM&S (computer modeling & simulation), enables you to identify problems early in the design cycle when there is more flexibility to make changes.

Join ANSYS at LabCentral, a first-of-its-kind shared laboratory space designed as a launchpad for high-potential life-sciences and biotech startups, for a full day of presentations from customers and ANSYS technical experts on key topics affecting the healthcare industry, including:

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Phenomyx Granta Design

Networking Reception
immediately following

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