BOSTON

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# IEEE Boston Section Online Courses:

**Verilog101:Verilog Foundations** CLASS DESCRIPTION: Verilog is IEEE standard 1364. It is a Hardware Description Language that is the corner stone of much of the simulation world. Verilog Foundations is a comprehensive introduction to the IEEE 1364 (Verilog). The Verilog Foundations class has a slightly different approach to learning Verilog than other methods. There is a lecture section for each main topic. This presents a basic foundation for the language. What makes Verilog Foundations exciting is the emphasis on labs/examples. There are nearly 100 labs/examples giving comprehensive "how to" examples of most Verilog language constructs. There are working solutions for each lab and the students can use the lab database for developing their own models later. The class is also self paced. All the work can be done independently by the engineers, at their own computer, and at their own pace.
**(Register at http://www.ieeeboston.org) and click on course title**

**System Verilog 101: Design Constructs** CLASS DESCRIPTION: SytemVerilog is an extensive set of language constructs to the IEEE 1364-2001 standard. It's meant to aid in the creation and verification of models. There are two parts to the language extension. The first part covered by this class, is new design constructs. The second part of SystemVerilog is verification constructs, covered by SystemVerilog102. There are over 100 labs/examples giving comprehensive "how to" examples of most SystemVerilog language constructs. There are working solutions for each lab and the students can use the lab database for developing their own models later. The class is also self paced. All the work can be done independently by the engineers, at their own computer, and at their own pace. There are self-grading quizzes for each chapter that allow the student to see if he/she is learning the material. The goals of this course are to make you familiar with the new part of the language. Students taking SystremVerilog101 will have a 90-day access to it. The lab database you will be able to download and is yours to keep. **(Register at http://www.ieeeboston.org) and click on course title**

**System Verilog 102: Verification Constructs** CLASS DESCRIPTION:SytemVerilog is an extensive set of language constructs to the IEEE 1364-2001 standard. It's meant to aid in the creation and verification of models. There are two parts to the language extension. The first part covered by SV101, is new design constructs. SV102, this class, covers verification constructs. SystemVerilog102, like all CBE classes, is lab based. There are over 30 verification labs/examples giving comprehensive "how to" examples of most SystemVerilog verification language constructs. There are working solutions for each lab and the students can use the lab database for developing their own assertions later. The class is also self paced. All the work can be done independently by the engineers, at their own computer, and at their own pace. **(Register at http://www.ieeeboston.org) and click on course title**

**Introduction to Embedded Linux Part I** CLASS DESCRIPTION: 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.

**High Performance Project Managment** CLASS DESCRIPTION: This12 hour course(broken into short 10 to 20 minute independent modules) provides the project methodology, concepts, and techniques that ensure successful completion (on time, on budget, with the quality required) of projects, large and small. Participants learn the steps to take before, during, and at the end of a project to hone planning and execution to a strategically built process that delivers project success when used. Additionally, the course provides the interpersonal and leadership techniques to ensure everyone involved with the project whether a team member, organization member, or outside of the organization commits to the success of the project—voluntarily—and provides the support and assistance to ensure its success. In addition to learning how to master the technical skills that have evolved over thousands of years of project implementation and practice, the course provides the advanced team building, leadership, and interpersonal skills that ensure the technical skills can be used, they way they are designed to be used, resulting in a process that delivers the on time, on or under budget, with the quality required completed project consistently.

# Wow! Old School - New School

by Fausto Molinet, Publications Committee Chair, Boston Section

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

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

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

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

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

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

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

*Women In Engineering – 6:00PM, Tuesday, 1 November*

# "Advocating for Yourself" - A Workshop for Women

**Advocating for yourself in the workplace: How to talk to your boss/co-workers about what you need**

You are not alone! Many women have had the experience of being the only woman in a male-dominated organization. We'll provide a short interactive workshop where we'll share what we know and what we've seen, and invite you to role-play in a safe environment those conversations you need to have with your boss/co-worker(s) to keep your sanity and get what you deserve! Think you can help another woman engineer navigate this terrain? Need help yourself? This workshop is for you!

Bryn Dews

Bryn has 30+ years of experience as a business and systems analyst with a BBA in Management from U-Mass Amherst and an MS in Computer Information Systems from Boston University. The poster child for the winding career path, going from Banking to User-Centered Design in Software Development; from HR to Corporate IT and back. Throughout that journey, she has stayed tethered to her Career Anchor (from Edgar H. Schein's tool): Pure Challenge. The bigger, more complicated the problem, the more appealing it is! Particularly if it involves learning new domains, technologies or cultures. For all but 6 years of her career, Bryn has been responsible for teams of people, as a direct supervisor or a project leader and is a recognized champion for Women's Professional Development at MITRE. She is passionate about STEM outreach, coaching, and mentoring kids including her own.

**Meeting Location: MITRE, 202 Burlington Road, Bedford, MA 01730. Building M. Room 1M306**
**To assist us in planning this meeting, please pre-register at**
**http://www.ieeeboston.org/Register/.**

*Entrepreneurs' Network – 6:30PM, Tuesday, 1 November*

# It's not about you.
# Multichannel Marketing for your Prospects

*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.*

For many startups and small businesses, marketing is a challenge because of their limited resources, whether it's time, money or talent. Yet, they are faced with an ever growing choice of digital marketing channels: web sites, PR, social media, search, pay-per-click, events, and email, in addition to traditional media such newspapers, TV, and radio.

In the past, businesses promoted themselves and their products and services by pushing advertisements and promotions to their audiences on traditional media. Many of today's buyers are more likely to gather information, such as user stories, research, white papers and other content on the web long before they ever contact vendors. Thus, marketing communication is not as much about you (the business). It's about providing more information than promotion, which prospects (your target audience) are looking for and educating them.

This session will bring together experts with digital marketing, content marketing, and journalism backgrounds in tech and health sciences to discuss questions such as:

1. How startups with tight resources determine their marketing communication priorities?
2. How content marketing works, how to create content for marketing, and how to measure success?
3. What gets a journalist interested in covering your story and how a reporter would like to be contacted?

Come learn from our panelists about content marketing and how to make it work for your business. This event is not to be missed!

Speakers: Dale Bertrand, Founder, Chimaera Labs, www.chimaeralabs.com/contact-us/

Dale Bertrand is an entrepreneur and marketing expert. He is the owner of Chimaera Labs, a digital marketing agency that specializes in search, pay per click advertising, content marketing, and email automation. Prior to founding Chimaera Labs, Dale served in web development and marketing roles at GrabCAD.com and Pixability. He earned Bachelor's and Master's degrees in Electrical Engineering at Brown University.

Speaker: Michael Gerard, Advisor, degology
Michael Gerard is a data-driven marketing executive who is an advisor at degology. He was chief marketing officer at Curata, where he led demand generation initiatives at the content marketing and curation software company.

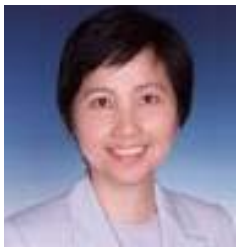
For almost 10 years, Michael was Vice President in IDC's Executive Advisory Practice where he led a staff of consultants and researchers who delivered benchmarks, best practices, and consulting services to marketers and sales leaders at companies such as HP, IBM, Intel, and Citrix. He also held sales and marketing positions at companies such as Millipore

and Keenan Software. Michael earned his MBA at MIT's Sloan School of Management.

Speaker: Ameeta Soni, CMO, https://www.linkedin.com/in/ameetasoni

Ameeta has been working with technology startups in many roles - marketer, founder, consultant, board member, and advisor. She co-founded fitness app provider FitTrace, and served as Chief Marketing Officer of PlatformQ Health, a digital media company focused on the healthcare market and VFA, a SaaS provider acquired by a private-equity backed company. Ameeta chaired the MIT Enterprise Forum of Cambridge and is a mentor at Techstars and LearnLaunch accelerators. She is also a Charter Member of TiE Boston and former Overseer of the Boston Museum of Science. Ameeta is a frequent blogger and speaker on marketing, digital, and strategic partnerships. She received her MBA from the University of Chicago.

Speaker: Robert Weisman, Business Reporter, Boston Globe, www.bostonglobe.com
Robert Weisman has been a business reporter and editor for The Boston Globe since 2000. He began covering the technology industry but moved to healthcare and life sciences industries seven years ago. Prior to the Globe, Weisman was a business reporter and editor for the Hartford Courant and the Seattle Times. He is a graduate of Boston University's College of Communication.



Moderator: Millie Kwan, Founder, CEC Business Solutions
Millie Kwan is a digital marketing consultant with more than 20 years in IT development, management, education, and research. She is the founder and owner of CEC Business Solutions, a company which provides digital marketing services to small and medium-sized businesses. Prior to starting her own company, Millie taught at Babson College, ESSEC Business School in Paris, and the University of Hong Kong. She has also led library automation projects at University of Rhode Island and the HELIN Library Consortium. Millie received a Doctor of Business Administration degree from Boston University and MS in Computer Science from Washington University in St Louis. She is a Vice-Chair of Boston ENET.

**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 at: 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.**

MIT IEEE Student Branch & IEEE Boston Section Present

NOVEMEBER 4-6 | STATA CENTER & BUILDING 34

# MEET INNOVATIVE TECHNOLOGY

MIT IEEE UNDERGRADUATE RESEARCH TECHNOLOGY CONFERENCE

ieee.scripts.mit.edu/conference

## Nov 4-6

**Focus technical tracks:**

1. Machine Learning, Cloud Computing
2. Biological and Biomedical Engineering and Technology
3. Robotics and Automation Technology
4. Comunications and Security
5. Wearable Technology
6. Innovative Technologies X-Track

KEYNOTE SPEECHES

RESEARCH PRESENTATIONS

NETWORKING OPPORTUNITIES

## REGISTER TODAY

ieee.scripts.mit.edu/conference

Questions? Email conference chairs
ieee-ucc-chairs@mit.edu

*Reliability Society – 5:30PM, Wednesday, 9 November*

# Obtaining a US Patent

William R. Tonti Ph.D. / MBA, Fellow of the IEEE, IEEE Distinguished Lecturer and
Sr. Director, IEEE Future Directions

The ingredients that are necessary and sufficient for granting a US patent are the intersection of new, useful, and non-obvious elements of enablement. This intersection is used by experts skilled in the art to examine the patent specification and its claims. As an inventor you must describe why this application is not anticipated by the prior art. The analysis of prior art when viewed as a unique element or in combination therein cannot read against the claims that arise as a result of the proposed invention.

This talk will analyze USPA 5,798,553 “Trench Isolated FET Devices, and the Method for their manufacture”. The application describes a fundamental industry problem, and a proposed solution. A description of how this problem statement was introduced into the technical community through IEEE publication is also shown. Fundamental electrical engineering principles are used to both analyze and solve the problem. A semiconductor process solution using standard techniques is shown to satisfy the conditions of new, useful, and non-obvious, and leads to the claims this patent now protects.

Dr. Tonti holds a BSEE from Northeastern University, an MSEE and a Ph.D. from the University of Vermont, and an MBA from St. Michael’s College. He retired from IBM in 2009 after 30+ years of service, working as the lead semiconductor technologist for a large part of his career. Dr. Tonti holds in excess of 290 issued patents, and has been recognized as an IBM Master Inventor. He was honored by having his 250th patent issue transcribed into the U.S. Congressional Record. Dr. Tonti is a Fellow of the IEEE a past IEEE Reliability Society President, a recipient of the IEEE Reliability Engineer of the Year award, and the IEEE 3rd Millennium Medal. Dr. Tonti joined IEEE in 2009 as the Director of IEEE Future Directions where he works alongside staff and volunteers to incubate new technologies within the IEEE.

Agenda:
5:30-6:00 Sign In, Networking, Light Dinner & Refreshments
6:00-6:10 Chapter Chair Greetings & Announcements
6:10-8:00 William R. Tonti Ph.D./MBA, Fellow of the IEEE
8:00-8:15 Q&A session, meeting adjourns

**To assist us in planning this meeting, please pre-register at http://www.ieeeboston.org/Register/.**

*Power & Energy Society – 6:00PM, Wednesday, 9 November*

# Standard for Interconnecting Distributed Energy Resources with Electric Power Systems

Babak Enayati, Lead Engineer, National Grid and Vice Chair of the IEEE 1547

**Refreshments start at 6:00PM, talk commences at 6:30PM**

This technical meeting will introduce the IEEE 1547 "Standard for Interconnecting Distributed Energy Resources with Electric Power Systems". Due to the increasing amount of Distributed Energy Resources (DERs) interconnections with the Electric Power System, the IEEE 1547 standard is going through a major revision to address some of the technical issues associated with high penetration of DERs. The participants will learn about the status of the standard revision and the recent proposed draft changes to the standard i.e. voltage regulation, response to abnormal system conditions (including voltage and frequency ride through), power quality, etc. The participants will also learn about the utility concerns/solutions to adopt the revised IEEE 1547 standard

Babak Enayati received his PhD in Electrical Engineering from Clarkson University, Potsdam, NY in 2009. He is currently a Lead Research Development and Demonstration Engineer at National Grid, Waltham, MA and chair of the Massachusetts Technical Standards Review Group (MA TSRG). Over the past ten years Babak has also worked on Distributed Generation interconnection, power system protection, control of microgrids, modeling and aging analysis of electrical asynchronous machines, optimization of electrical drives, multi-generation power system dynamics analysis, and control of switched reluctance motors. He joined IEEE in 2006 and currently is Senior Member, IEEE and the IEEE PES Boston Chapter Chair. Babak is the Vice Chair of the IEEE 1547, Standard for Interconnecting Distributed Resources with Electric Power Systems.

**Meeting Location: National Grid, 40 Sylvan Road, Waltham, MA 02451 (Rooms: Valley A&B) Free and Open to the Public. Visit the IEEE PES Chapter website for further details – http://www.ieeepesboston.org/**

**To assist us in planning this meeting, please pre-register at http://www.ieeeboston.org/Register/.**

## Locally held IEEE Conferences

**2017 IEEE International Symposium on Technolgies for Homeland Security**
**April 25 - 26, 2017**
**www.ieee-hst.org**
***(Note new paper submission schedule: Submission deadline is November 1, 2016***

**2017 IEEE Hogh performance Extreme Computing Conference HPEC '17**
**September 12 - 14, 2017**
**www.ieee-hpec.org**
**Submission deadline is May 19, 2017**

*Photonics, and Aerospace and Electronic Systems Societies – 6:00PM, Thursday, 10 November*

# Where Imperfections Lead to Opportunity: Photonic Defect-Based Devices SiC

Evelyn L. Hu - Harvard University

If “form defines function”, our usual assumption may be that a “perfect form” is needed to allow “perfect functioning” of a device, where the function may relate to precision sensing, or the storing or transmission of information. However, there has been much recent excitement associated with defects in crystalline semiconductors such as diamond and SiC. These defects combine optical emission at a variety of wavelengths, distinctively coupled to long spin coherence times. Thus, such defects can provide a wealth of new opportunities for compact, integrable photonic sources as well as serve as promising candidates for quantum information applications.

This talk will focus on our use of nanobeam photonic crystal cavities, fabricated from 4H-SiC, and which achieved an 80-fold optical enhancement of a “Si-vacancy, V1” transition with emission at about 860 nanometers. The high quality factors of our cavities (Q ~5000) allowed separate, tuned resonant enhancement of a related V1’ transition which differ from V1 by only 3 nanometers in wavelength. The combination of high quality optical cavities, tuned to the breadth of defects and hence optical transitions in SiC, can not only produce precision, tuned optical enhancement, but also serve as an exceptional means of studying the defect formation and migration, as well as details of their local atomic environment.

Evelyn Hu is the Tarr-Coyne Professor of Applied Physics and Electrical Engineering at the John A. Paulson School of Engineering and Applied Sciences at Harvard. Prior to Harvard, she was a faculty member at UCSB, in the Departments of Materials, and of Electrical and Computer Engineering. While at UCSB, she also served as the founding Scientific co-Director of the California NanoSystems Institute, a joint initiative between UCSB and UCLA. Before joining UCSB, she worked at Bell Labs in both Holmdel and Murray Hill. She is a member of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, and the Academica Sinica of Taiwan. She is a recipient of an NSF Distinguished Teaching Fellow award, an AAAS Lifetime Mentor Award, and holds honorary Doctorates from the University of Glasgow, Heriot-Watt University, Hong Kong University of Science and Technology, and the University of Notre Dame.

**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.**

**To assist us in planning this meeting, please pre-register at http://www.ieeeboston.org/Register/.**


# 60th IEEE International Midwest Symposium on Circuits and Systems

Boston, MA, USA | August 6th-9th, 2017
www.mwscas2017.org

Tufts University · DRAPER · IEEE · CAS

## CALL FOR PAPERS IEEE INTERNATIONAL MWSCAS 2017

The IEEE International Midwest Symposium on Circuits and Systems is the oldest Circuits and Systems Symposium sponsored by IEEE. The 60th edition will be held on the campus of Tufts University, Boston, MA, USA, August 6 - 9, 2017. MWSCAS 2017 will include oral and poster sessions, student paper contest, tutorials given by experts in circuits and systems topics, and special sessions. Topics include, but are not limited to:

**Track 1. Analog Circuits and Systems I**
- 1.1 Analog Circuits
- 1.2 Analog Systems
- 1.3 Biomedical Electronics
- 1.4 Bioengineering Systems and Bio Chips
- 1.5 Other Analog Circuits and Systems

**Track 2. Analog Circuits and Systems II**
- 2.1 Linear Analog Systems
- 2.2 Non-linear Analog Systems
- 2.3 System Architectures
- 2.4 Neuromorphic Systems

**Track 3. Digital Circuits and Systems I**
- 3.1 Digital Integrated Circuits
- 3.2 System On a Chip (SOC) and Network on a Chip (NOC)

**Track 4. Digital Circuits and Systems II**
- 4.1 Digital Filters
- 4.2 Hardware-Software Co-Design
- 4.3 Other Digital Circuits and Systems

**Track 5. Communications Circuits and Systems**
- 5.1 Communications Circuits, Computers and Applications
- 5.2 Communications Systems and Control
- 5.3 Information Theory, Coding and Security
- 5.4 Communications Theory
- 5.5 Other Communications Circuits and Systems

**Track 6. RF and Wireless Circuits and Systems**
- 6.1 RF Front-End Circuits
- 6.2 Mixed-Signal RF and Analog and Baseline Circuits
- 6.3 Wireless Mobile Circuits and Systems and Connectivity
- 6.4 VCO's and Frequency Multipliers, PLL's and Synthesizers
- 6.5 Other RR and Wireless Circuits and Systems

**Track 7. Sensor Circuits and Systems**
- 7.1 Technologies for Smart Sensors
- 7.2 Sensor Fusion
- 7.3 Control Systems
- 7.4 Mechatronics and Robotics
- 7.5 Other Sensor Circuits and Systems

**Track 8. Converter Circuits and Systems**
- 8.1 Analog to Digital Converters
- 8.2 Digital to Analog Converters
- 8.3 DC-DC Converters
- 8.4 Other Converter Circuits and Systems

**Track 9. Signal and Image Processing**
- 9.1 Analog and Mixed Signal Processing
- 9.2 Digital Signal Processing
- 9.3 Signal Processing Theory and Methods
- 9.4 Image, Video and Multi-Dimensional Signal Processing
- 9.5 Other Signal and Image Processing

**Track 10. Hardware Design**
- 10.1 Processor and Memory Design
- 10.2 MEMS/NEMS
- 10.3 Nano-Electronics and Technology
- 10.4 Optics and Photonics
- 10.5 Power Management, Power Harvesting and Power Electronics
- 10.6 Photovoltaic Devices/Panels and Energy Harvesting

**Track 11. Hardware Security**
- 11.1 Hardware Authentication and Physically Unclonable Functions (PUFs)
- 11.2 Trusted Microelectronics
- 11.3 Hardware Anti-Tamper
- 11.4 Architectural System Security
- 11.5 Other Hardware Security

Prospective authors are invited to submit a full paper (4 pages) describing original work. Only electronic submissions will be accepted. Papers should include title, abstract, and topic category from the list above in standard IEEE two-column format for consideration as lecture or poster. Both formats have the same value, and presentation method will be chosen for suitability. All submissions should be made electronically through the MWSCAS 2017 web site (http://www.mwscas2017.org). Students are encouraged to participate in the best student paper award contest. Accepted papers will be published in the conference proceedings subject to advance registration of at least one of the authors.

### IMPORTANT DATES

March 18: Tutorial and Special Session proposals deadline
March 18: Regular and Student paper submission deadline
April 1: Special session and invited paper submission deadline
April 29: Notice of acceptance
May 20: Final camera-ready paper deadline

www.mwscas2017.org

**General Co-Chairs**
Michael A. Soderstrand
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Davis, CA, USA

Antonio de la Serna
Draper Laboratory
Cambridge, MA, USA

**Technical Program Co-Chairs**
Valencia Joyner Koomson
Tufts University
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Sherif Michael
Naval Postgraduate School
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**Special Sessions Co-Chairs**
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Troy, NY, USA

Samson Mil'shtein
U. Mass, Lowell
Lowell, MA, USA

Neeraj Magotra
Western New England U.
Springfield, MA, USA

*Computational Intelligence Society - 6:00PM, Monday, 14 November*

# Smart Data Lakes: Architecture & Technologies

Sean Martin - Founder & CTO Cambridge Semantics Inc.

Smart Data Lakes are a new technology formulation establishing what analysts are calling Modern Business Intelligence & Analytics or Insight Platforms. They inherit attributes from the traditional data warehousing world like the ability to support rich multi-dimensional models, sophisticated querying and formal data governance at vast data scales, as well as ideas made popular by the more recent Big Data family of technologies, including late provision of schema or data models, the separation of data storage from data analytics processing, enterprise data catalogs, logical data warehousing, and an entirely different approach to availability & redundancy.

To this blend they add OLAP against unstructured sources combined with structured data, all of which is described using W3C open data standards in the form of semantic representations & ontologies to form immense Enterprise Knowledge Graphs. Hybrid Cloud computing techniques are used to automated and orchestrate the necessary commodity computing infrastructure required to support on demand analytics of these graphs at unprecedented scales. With such a platform, business end users can far more easily than was previously practical, navigate all available data to achieve self-service discovery & exploration, sophisticated answer set filtering and extraction, as well as ad hoc dashboard style analytics against context rich information using automated query generation.

This talk will cover the architecture & technologies of the Smart Data Lake and compare elements of these to those that preceded it.

Bio: Having been on the leading edge of Internet technology innovation since the early nineties, Sean's greatest strength has been the identification and pioneering of next generation software & networking technologies and techniques. Prior to founding Cambridge Semantics, he spent fifteen years with IBM Corporation. Whilst still at IBM Sean became increasingly interested in the practical application of semantic technology standards to enterprise software and data. He realized that Semantic Technologies, Enterprise Knowledge Graphs and Smart Data not only offered fresh approaches to solving data integration, application development and communication problems that he had previously found extremely difficult, but they also presented the opportunity to pioneer Big Data solutions that have never before been attempted. His move from IBM to found Cambridge Semantics in 2007 is a huge vote of confidence that the time for Smart Data has arrived. He has written numerous patents and has authored a number of peer reviewed Life Sciences journal articles.

**Food will be provided for this event**
**Meeting Location: 442 Dana Research Center, Northeastern University**

**To assist us in planning this meeting, please pre-register at**
**http://www.ieeeboston.org/Register/.**

*Consultants' Network– 7:00PM, Monday, November 14*

# Election of Officers for 2017

Dear C-Net Members,

We are approaching the end of the year and so must elect officers for 2017. On November 14, 7:00 PM an election will be held at the Yangtze River restaurant in Lexington. The declared candidates are

| | |
|---|---|
| Chairman: | Heinz Bachmann |
| Vice-Chairman: | Frederick Beihold |
| Treasurer: | Clive Bolton |
| Secretary: | Charlie Sweet |

The election will be followed by a Chinese buffet dinner where you can socialize with your fellow consultants. This will be our last event of 2016. Note, though, that on October 25, 7:00 PM, Norman Daoust will present *Seven Tips for Technical Presenters*. This will be a joint meeting with the IEEE Women in Engineering.

Hope to see you there.
Heinz Bachmann
Chairman
Boston Section, IEEE Consultant's Network

*Entrepreneurs' Network – Cambridge/Boston Meeting - 6:00PM, Tuesday, 15 November*

# Seed and Angel Financing for Life Science Companies

*Meeting location – Boston / Cambridge Meeting Venue To Be Announced - For venue updates, visit www.boston-enet.org*

Raising early stage capital is a significant challenge for life sciences companies. The added hurdles are due to the complex science involved and to the rigorous proof of efficacy needed for government approval. To discover methods of raising capital from friends, family and angel sources join us on November 15th. We will hear from panelists who have successfully raised early stage funds as well as from those who have funded such investments. In addition, we will explore the legal and accounting frameworks which are used to facilitate the required investment pooling in a legally efficient fashion.

In addition to our speakers, you will network with other life sciences focused entrepreneurs. You will participate in the life sciences entrepreneurial ecosphere which is transforming the Boston business scene.

**Moderator:** Dr. Nathalie Goletiani, MD, Founder and CEO, POWERFEM Therapeutics

Dr. Goletiani is the Founder and Chief Executive Officer of POWERFEM Therapeutics, a company devoted to novel, networked treatment methods for the care of those suffering from substance abuse and mental illness. Her extensive clinical research into the hormonal effects of nicotine, opioid and cocaine use lead her to new concepts and mechanisms in understanding and treating psychiatric disorders, in particular, disorders experienced by underserved female populations.

At Harvard's McLean Hospital, she was charged with rebuilding and responsible for all the operations of Clinical Research Program, including simultaneously running multiple clinical trials. Based on her patented work, she founded POWERFEM Therapeutics, an independent company devoted to creating new treatments and healthcare solutions. POWERFEM incorporates novel disease concepts and treatments to design cost-effective, integrated mental and substance abuse care solutions across multiple provider networks.

Dr. Goletiani has received numerous national and international awards including most recently the Harvard Livingston Award for the investigation of complex underlying mechanisms in the neurobiology of women. She also received a Harvard University Zinberg Fellowship specifically to support her research on alcohol and drug use disorders. Her research provides a valuable basis for psychotherapeutic public policy decision making on issues of substance abuse and the integrated treatment of mental illness. She has extensively published the results of her research in peer reviewed journals.

Nathalie completed basic and clinic fellowships at the Harvard School of Public Health and at Harvard Medical School. In addition, she has been trained at and conducted medical research at Tbilisi State Medical University, University of Amsterdam and King's College in London.

**Where: A convenient Cambridge or Boston venue is now being arranged.**

**Admission: General admission is $10. Free to ENET members. Free Pizza and soft drinks will be served. Advanced registration is requested but not necessary.**

**For more information and updates, visit www.boston-enet.org**

*Computer Society and GBC/ACM – 7:00PM, Thursday, 17 November*

# The Future of Synthetic Biology

George Church - Director of the Center for Computational Genetics and Professor of Genetics at Harvard Medical School. Professor of Health Sciences and Technology at Harvard and MIT. Associate member of the Broad Institute

George Church is Professor of Genetics at Harvard Medical School, Professor of Health Sciences and Technology at Harvard and MIT, an associate member of the Broad Institute, and Director of the Center for Computational Genetics. He graduated from Duke University with degrees in Chemistry and Zoology, co-authoring research on 3D-software & RNA structure with Sung-Hou Kim. His PhD from Harvard (with Wally Gilbert) included the first direct genomic sequencing method in 1984. He helped initiate the Human Genome Project while working Biogen Inc. and as Monsanto Life Sciences Research Fellow at UCSF with Gail Martin. He invented broadly-applied concepts of molecular multiplexing and tags, homologous recombination methods, and array DNA synthesizers. Technology transfer of his work on automated sequencing & related software to Genome Therapeutics Corp. resulted in the first commercial genome sequence (the human pathogen, H. pylori, 1994). He has served in advisory roles for 12 journals (including

Nature Molecular Systems Biology) and 5 granting agencies. Innovations in DNA reading & writing & allele replacement in cells lead to current research & commercialization in human genomics (Complete Genomics, PersonalGenomes.org, 23andme, Knome) & synthetic biology (SynBERC, Joule, LS9) & new ethics/security strategies. See http://en.wikipedia.org/wiki/George_Church and http://arep.med.harvard.edu/gmc/ for more details.

George is also the co-author of «Regenesis: How Synthetic Biology Will Reinvent Nature and Ourselves». More information is online at http://www.amazon.com/dp/0465021751 .

**This joint meeting of the Boston Chapter of the IEEE Computer Society and GBC/ACM will be held in the Broad Institute Auditorium (MIT building NE-30). The Broad Institute is at 415 Main St between Vassar and Ames streets. You can see it on a map at this location. The auditorium is on the ground floor near the entrance.**

**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.**

**Meeting Location: Broad Institute Auditorium, 415 Main St, Cambridge**

**For more information contact Peter Mager (p.mager at computer.org)**

**To assist us in planning this meeting, please pre-register at http://www.ieeeboston.org/Register/.**

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IEEE Boston Section

*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
- Data Intensive Computing
- Big Data and Distributed Computing
- Interactive and Real-Time Supercomputing
- Graph Analytics and Network Science
- Fault-Tolerant Computing
- Embedded Cloud Computing
- Digital Front Ends
- General Purpose GPU Computing
- Advanced Processor Architectures
- 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 RF PCB Design: Wireless Networks, Products and Telecommunications

**Date & Time:** **Thursday & Friday, December 15 & 16; 9AM - 4:30PM**

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

**Speaker:** **Henry Lau, Lexiwave Technology**

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

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

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

**OUTLINE**

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

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

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

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

*5. Case studies*

**Expertise:**

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

**Decision (Run/Cancel) Date for this Courses is Friday, December 9, 2016**

**Payment received by December 5**
**IEEE Members $405**
**Non-members $435**

**Payment received after December 5**
**IEEE Members $435**
**Non-members $455**

**http://ieeeboston.org/practical-RF-PCB-Design/**

***LAST NOTICE BEFORE COURSE BEGINS, PLEASE REGISTER NOW!!***

# Making You a Leader - Fast Track

**Date & Time:** **Wednesday, November 30; 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, November 18, 2016**

**Payment received by November 11**
**IEEE Members $220**
**Non-members $245**

**Payment received after November 11**
**IEEE Members $245**
**Non-members $265**

**http://ieeeboston.org/making-leader-fast-track/**

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# Defining and Writing Business Requirements

**Date & Time:** **Monday & Tuesday, December 5 & 6; 8:30AM - 5:00PM**

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

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

Discovering and documenting business requirements for projects always has been the weakest link in systems development. Up to 67 percent of maintenance and 40 percent of development is wasted rework and creep attributable to inadequately defined business requirements. Too often projects proceed based on something other than what the business people really need; and traditional methodologies commonly focus mainly on the format for writing requirements. This interactive workshop also emphasizes how to discover content, why to build it and what it must do to produce value for the customer/user. Using a real case, participants practice discovering, understanding, and writing clear and complete business/user requirements that can cut creep, speed project delivery, reduce maintenance, and delight customers

Participants will learn:
Avoiding creep--role and importance of defining business requirements accurately and completely.
Distinctions between the user's (business) requirements and the system's (design) requirements.
How to gather data, spot the important things, and interpret them meaningfully.
Using the Problem Pyramid™ tool to define clearly problems, causes, and real requirements.
Formats for analyzing, documenting, and communicating business requirements.
Techniques and automated tools to manage requirements changes and traceability.

WHO SHOULD ATTEND: This course has been designed for systems and business managers, project leaders, analysts, programmer analysts, quality/testing professionals, auditors, and others responsible for assuring business requirements are defined adequately.

REQUIREMENTS ROLE AND IMPORTANCE
Sources and economics of system errors
How requirements produce value
Business vs. system requirements
Survey on improving requirements quality
Software packages and outsourcing
How we do it now vs. what we should do

DISCOVERING "REAL" REQUIREMENTS
Do users really not know what they want?
How the "real" requirements may differ
Aligning strategy, management, operations
Technology requirements vs. design
Problem Pyramid™ tool to get on track
Understanding the business needs/purposes
Horizontal processes and vertical silos
Customer-focused business processes
Who should do it: business or systems?
Joint Application Development (JAD) limits
Management/supervisor vs. worker views

DATA GATHERING AND ANALYSIS
Surveys and questionnaires

Research and existing documentation
Observing/participating in operations
Prototyping and proofs of concept
Planning an effective interview
Controlling with suitable questions
FORMATS TO AID UNDERSTANDING
Business rules, structured English
E-R, data flow,flow, organization diagrams
Data models, process maps
performance, volume, frequency statistics
Sample forms, reports, screens menus

DOCUMENTATION FORMATS
IEEE standard for software requirements
Use cases, strengths and warnings
7 guidelines for documenting requirements
Requirements vs. implementation scope
Iterating to avoid analysis paralysis
Conceptual system design solutions
Detailing for clarity, clarifying quality

GETTING MORE CLEAR AND COMPLETE
Stakeholders and Quality Dimensions
Addressing relevant quality factor levels
Standards, guidelines, and conventions
Detailing Engineered Deliverable Quality
Simulation and prototyping
Defining acceptance criteria

MANAGING THE REQUIREMENTS
Supporting, controlling, tracing changes
Automated requirements management tools
Measuring the “proof of the pudding”

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, November 18, 2016**

**Payment received by November 11**
**IEEE Members $415**
**Non-members $430**

**Payment received after November 11**
**IEEE Members $430**
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**http://ieeeboston.org/defining-writing-business-requirements/**

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***LAST NOTICE BEFORE COURSE BEGINS, PLEASE REGISTER NOW!!***

# Credibly Managing Agile and Other Projects

## Skills, Approaches and Methods Needed to Make any Project Succeed!

**Date & Time:** **Monday & Tuesday, November 28 & 29; 8:30AM - 5:00PM**

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

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

Despite claims to the contrary, even Agile projects need to be managed in order to succeed. That doesn't—and never did—mean the project manager dictates every little action; but every project must know what to do, how to do it, what it takes, and how to make sure it gets done well. Agile methods help but are not sufficient and can create challenges.

This intensive interactive seminar workshop shows how to manage projects to deliver the results their customers want, on time and in budget. This course helps improve project teams' credibility by better knowing what they're doing so they deliver as promised. Each section of the course shows how to make sure that an additional Critical Success Factor is present and addresses both Agile and other project formats. Case study exercises provide practice applying the techniques and learning how to avoid common pitfalls.

Participants who attend this course may also want to attend "Making You a Leader."

* How lack of credibility often unknowingly affects project success and ways to earn credibility.
* Recognizing and avoiding common, often overlooked pitfalls to on-time, in-budget, quality projects.
* Using Agile and other development life cycles to jumpstart projects confidently and quickly.
* Defining scope so it doesn't creep and building essential transitions to the workplan for achieving it.
* Methods for reliably estimating the time, effort, costs, and resources required.
* Controlling risks and balancing conflicts in the real world of both task and resource constraints.
* Tools and techniques to catch and correct problems early so project promises are kept.

WHO SHOULD ATTEND: This course has been designed for business and development specialists, product owners, scrum masters, managers, analysts, and other project participants.

CRITICAL PROJECT SUCCESS FACTORS
Importance of credibility to project success
Characteristics of successful projects
- Factors that really cause projects to fail
- Agile's view, why no project manager
- Superworker to supervisor to superfluous
- Establishing credibility, managing by facts
- Overcoming Parkinson's Law
- Projects succeed/fail in the first 15 minutes

PROJECT LIFE CYCLE
- Mapping project management/development
- Why we get impossible deadlines/budgets
- Traditional and iterative, Agile models
- Project management deliverables
- System development deliverables
- Proactive Testing□ developer's advantage

ANALYST/DESIGNER ROLE
- Establishing achievable project scope
- Internal & external customers/stakeholders
- Strategic and management alignment
- Identifying project risks
- Requirements, design, user stories, ATDD
- Make vs. buy
- JAD, facilitation, and customer partnering

High-level conceptual design roadmap

ESTIMATING TIME, EFFORT, RESOURCES
- Understanding causes of poor estimates
- Applying multiple estimating strategies
- Work breakdown structure, controlling risk
- Measuring deliverables, function points
- User story sizing, backlog grooming
- PERT and weighted averages risk reduction
- Cost/benefit analysis and communication

SCHEDULING TO MEET DEADLINES
- Productive time scheduling practicalities
- Time management techniques
- Dependency networking and CPM
- Coordinating multiple projects/resources
- Sprints, releases, strengths and issues
- Managing resource-constrained projects
- Working within Brooks' Law
- Negotiating commitments and resources

CONTROLLING PROJECT COMPLETIONS
- Monitoring against budget and schedule
- Time boxing, burn down charts
- Earned value measure of completion
- Assuring quality and preventing errors
- Automated tools, Kanban boards
- Reporting to stakeholders, management
- Key to advancement

**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 pro-

**Decision (Run/Cancel) Date for this Courses is Friday, November 18, 2016**

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**http://ieeeboston.org/managing-agile-projects-skills-approaches-methods/**

# IEEE Boston Section goes Online!!!'

**The IEEE Boston Section is in the process of creating an comprehensive online course presence. We are working to populate our online course offerings with several courses. Our time line is to have the online curriculum operational by September 2017.**

**• Intro to Embedded Linux • Linux Optimization • Making you a Leader • DSP for Wireless Comm**

**• Forensics • S/W for Medical Devices • Verilog • Project Management • Linux Android**

**Please check our website, e-reflector and this Digital Reflector for details moving forward**

***LAST NOTICE BEFORE COURSE BEGINS, PLEASE REGISTER NOW!!***

# Introduction to Embedded Linux

**Time & Date:** 6 - 9PM; Thursdays, Nov. 10, 17, Wednesdays, Nov. 30, Dec. 7

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

**Speaker:** Mike McCullough, RTETC, LLC

**Overview** - This 4 day course introduces the Linux Operating System and 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 of the course covers testing, booting and configuring of Embedded Linux systems 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 understand the complexities of Embedded Linux Distributions in embedded systems.
• To learn how to configure, boot and test Embedded Linux distributions and applications running on Embedded Linux target systems.
• To give students the 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
• 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

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

**OUTLINE**

*Course Schedule Day 1*

The Basics
Linux Terminology, History and Versioning

The Linux Community: Desktop & Embedded
Linux and the GPL
Linux References (Books and Online)
Getting Started
Building the Kernel Source Code
Embedded Linux Kernels
Linux 2.6 and 3.x
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, GDB Server and the GDB Server Debugger
Other Debug and Test Tools
An Eclipse Remote Debug Example
Advanced Debug with printk, syslogd and LTTng
System-Level Debug
System-Level Debug Tools
The /proc Filesystem
Advanced Logging Methods
KGDB and KDB
Crash and Core Dumps

*Course Schedule Day 2*
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
Condition and Completion Variables
Mutexes and Futexes
Inter-Process Communications (IPC)
Message Queues
Semaphores Revisited
Shared Memory
Pipes and FIFOs
Remote Procedure Calls
Networking

*Course Schedule Day 3*
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
Advanced Memory Operations
Linux and Memory
Managing Aligned Memory
Anonymous Memory Mappings
Debugging Memory Allocations
Locking and Reserving Memory
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)
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
Major and Minor Numbers
Configuring the Device Driver

The Evolution of the New Device Driver Model
The Initial Object-Oriented Approach
Platform Devices, Busses, Adapters and Drivers
Comparing the Two Driver Models

*Course Schedule Day 4*
Advanced I/O Operations
Standard I/O Operations
Scatter-Gather and Asynchronous I/O
Poll, Select and Epoll
Memory-Mapped I/O
File Advice
I/O Schedulers
Interrupt and Exception Handling
Bottom Halves and Deferring Work
The Linux Boot Process
The Root Filesystem
Desktop Linux Boot
Bootloaders and U-Boot
Embedded Linux Boot Methods
Building and Booting from SD Cards
Managing Embedded Linux Builds
Configuring and menuconfig
Building Custom Linux Images
Target Image Builders
LTIB and Yocto
System Architecture Design Approaches
Deploying Embedded Linux
Choosing and Building the Root Filesystem
Useful Embedded Filesystems
Module Decisions
Final IT Work
Embedded Linux Trends
Some Final Recommendations

**Decision (Run/Cancel) Date for this Courses is Monday, October 24, 2016**

**Payment received by October 20**
**IEEE Members $400**
**Non-members $430**

**Payment received after October 20**
**IEEE Members $430**
**Non-members $455**

**http://ieeeboston.org/introduction-embedded-linux/**

# IEEE Boston Section goes Online!!!'

**The IEEE Boston Section is in the process of creating an comprehensive online course presence. We are working to populate our online course offerings with several courses. Our time line is to have the online curriculum operational by September 2017.**

**• Intro to Embedded Linux • Linux Optimization • Making you a Leader • DSP for Wireless Comm**

**• Forensics • S/W for Medical Devices • Verilog • Project Management • Linux Android**

**Please check our website, e-reflector and this Digital Reflector for details moving forward**

# Advanced Embedded Linux Optimization

**Time & Date:** 6 - 9PM, Mondays, January 9, 16, 23, 30, 2017

**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 methods for debugging, profiling and testing 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.

**OUTLINE**

***Course Schedule Day 1***

Getting Started with Embedded Linux
Linux and the GPL
Building the Kernel Source Code
Embedded Linux Kernels
BSPs and SDKs
Linux References (Books and Online)
Basic Debugging Review
Embedded Applications Debugging
GDB, GDB Server and the GDB Server Debugger
An Eclipse Remote Debug Example
Debugging with printk and LTTng
System Logs
Other Debuggers
System-Level Debug
System-Level Debug Tools
The /proc and /sys Filesystems
Basic Logging
KGDB and KDB
Crash Dumps and Post-Mortem Debugging
Debugging Embedded Linux Systems
Backend Debuggers
JTAG and In-Circuit Emulators
Hardware Simulators
Analyzers
Debugging Device Drivers
Kernel Probes
Kexec and Kdump
Kernel Profiling

***Course Schedule Day 2***

Testing
Design for Test
Agile Software Design
Unit-Level Testing
System-Level Testing
Code Coverage Tools
gcov
Automated Testing
DebugFS
Configuring DebugFS
DebugFS Capabilities
Advanced Logging
LogFS
Using Logwatch and Swatch
Using syslogd and syslog-ng

Kernel Hacking
Configuring Kernel Hacking
Kernel Hacking Capabilities
Tracing
ptrace and strace
New Tracing Methods
SystemTap
Ftrace, Tracepoints and Event Tracing
Tracehooks and utrace

***Course Schedule Day 3***

Profiling
Basic Profiling
gprof and Oprofile
Performance Counters
LTTng
Another DDD Example
Manual Profiling
Instrumenting Code
Output Profiling
Timestamping
Measuring Embedded Linux Performance
Some Ideas on Performance Measurement
Common Considerations
Uncommon Considerations
Using JTAG Methods
BootLoader Optimizations
Boot Time Measurements
Effective Memory and Flash Usage
Filesystem Choices
Addressing Performance Problems
Types of Performance Problems
Using Performance Tools to Find Areas for Improvement
Application and System Optimization
Device Driver Optimization
CPU Usage Optimization
Memory Usage Optimization
Disk I/O and Filesystem Usage Optimization
The Perf Tool
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
Performance Tool Assistance
Recording Commands and Performance
System Error Messages and Event Logging
Dynamic Probes
User Mode Linux and Virtualization

***Course Schedule Day 4***

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

**Decision (Run/Cancel) Date for this Courses is Friday, December, 30, 2016**

**Payment received by December 27**
**IEEE Members $395**
**Non-members $415**

**Payment received after December 27**
**IEEE Members $415**
**Non-members $435**

**http://ieeeboston.org/advanced-embedded-linux-optimization/**

***LAST NOTICE BEFORE COURSE BEGINS, PLEASE REGISTER NOW!!***

# Embedded Linux Board Support Packages and Device Drivers

**Date & Time:** **6 - 9PM; Mondays, Nov. 28, Dec. 5, 12, 19**

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

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

**Course Objectives**

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

**Course Schedule Day 1**

Getting Started with Embedded Linux
Linux and the GPL
Building the Kernel Source Code
Embedded Linux Kernels
BSPs and SDKs
Linux References (Books and Online)

Embedded Linux BSP Development Basics
BSP Requirements
U-Boot and Bootloader Development
Basic BSP Development
Files and Filesystem Support
The I/O Subsystem: Talking to Hardware
Memory Management and Paging
Error Handling in Embedded Linux BSPs
Timing and Timers
Interrupt Handling in BSPs
BSP Deployment Issues and Practices

Embedded Linux SDK Basics
The 3 Pieces of an SDK
Embedded Linux Distributions
The GNU Compiler Collection (GCC)
Other Embedded Linux Development Tools
Library Support
Glibc and Alternatives
SDK Deployment and Support
Debugging
GDB, GDB Server and the GDB Server Debugger
Other Debug Tools
An Abatron Board Bring-Up Example
An Eclipse Remote Debug Example
Advanced Debug with printk, syslogd and LTTng

System-Level Debug
System-Level Debug Tools
The /proc Filesystem
Advanced Logging Methods
KGDB and KDB
Crash Dumps

**Course Schedule Day 2**

Configuring Embedded Linux
Config Methods
Config Syntax
Adding Code to the Linux Kernel

Booting Embedded Linux
The Linux Boot Process

NFS and RAMdisk Booting
Root and Flash File System Development
Building the RAMdisk
Busybox Development
Testing and Debug of Embedded Linux BSPs
Kernel Debug and Kernel Probes
Kexec and Kdump
The Linux Test Project (LTP)
Performance Tuning Embedded Linux BSPs
User Mode Linux and Virtualization
Measuring Embedded Linux BSP Performance
Common Considerations
Uncommon Considerations
BootLoader Optimizations
Boot Time Measurements
Effective Memory and Flash Usage
Filesystem Performance Issues
Some Ideas on Performance Measurement

**Course Schedule Day 3**
The Original Device Driver Model
The fops struct and Char Drivers
The inode and dentry structs
Major and Minor Numbers
Embedding Channel Information
Deferring Work
The /proc Filesystem

Configuring the Device Driver
Modularization Revisited
The New Device Driver Model
An Object-Oriented Approach
Platform Devices and Drivers
Subsystem Registration
The Probe and Init Functions
The Show and Store Functions
The /sys Filesystem
Configuring the New Device Driver
Comparing the Two Driver Models
The Flattened Device Tree (FDT)
openBoot and its Effect on Embedded Linux
The Device Tree Script (dts) File
The Device Tree Compiler (dtc)
The Device Tree Blob (dtb) File
Building a dtb File
Hybrid Device Drivers
Other fops Functions
The Need for Ioctl
A Simulated Char Device Driver
The SIM Device Driver
Initialization
Open and Close
Read and Write
The /proc Driver Interface
MMAP Support

**Course Schedule Day 4**
Linux Device Driver Subsystems
Serial Drivers
The RTC Subsystem
Watchdogs
I2C & SPI
Block Devices
PCI
USB
VME
Video
Sound
What's Missing?
Memory Technology Devices
What is an MTD?
NAND vs NOR Flash Interfaces
The Common Flash Interface (CFI)
Driver and User Modules
Flash Filesystems
Drivers in User Space
Accessing I/O Regions
Accessing Memory Regions
User Mode SCSI, USB and I2C
UIO
High-Speed Interconnects
PCIe
GigE
iSCSI
Infiniband
FibreChannel
Serial RapidIO
Debugging Device Drivers
kdb, kgdb and JTAG
Kernel Probes
Kexec and Kdump
Kernel Profiling
User Mode Linux and Kernel Hacking
Performance Tuning Device Drivers
Some Final Recommendations

**Decision (Run/Cancel) Date for this Courses is Friday, November 18 2016**

**Payment received by November 15**
**IEEE Members $395**
**Non-members $415**

**Payment received after November 15**
**IEEE Members $415**
**Non-members $435**

**http://ieeeboston.org/embedded-linux-bsp-device-drivers/**

# Call for Course Speakers/Organizers

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

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

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

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

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

# Call for Papers, Posters, and Tutorials


**Call for Papers, Posters & Tutorials**

The 16th annual IEEE Symposium on Technologies for Homeland Security (HST '17), will be held 25-26 April 2017, in the Greater Boston, Massachusetts area. This symposium brings together innovators from leading academic, industry, business, Homeland Security Centers of Excellence, and government programs to provide a forum to discuss ideas, concepts, and experimental results.

Produced by IEEE with technical support from DHS S&T, IEEE, IEEE Boston Section, and IEEE-USA and organizational support from MIT Lincoln Laboratory, Raytheon, Battelle, and MITRE, this year's event will once again showcase selected technical paper and posters highlighting emerging technologies in the areas of:

- **Cyber Security**
- **Biometrics & Forensics**
- **Land and Maritime Border Security**
- **Disaster and Attack Preparedness, Mitigation, Recovery, and Response**

We are currently seeking technical paper, poster and tutorial session submissions in each of the areas noted above. Papers examining the feasibility of transition to practice will also be considered. Submissions should focus on technologies with applications available for implementation within about five years. All areas will cover the following common topics:

- Strategy and threat characterization, CONOPs, risk analysis,
- Modeling, simulation, experimentation, and exercises & training, and
- Testbeds, standards, performance and evaluations.

**Contact Information**

For more detailed information on the Call for Papers, Posters & Tutorials, as well as Sponsorship and Exhibit Opportunities, visit the website http://ieee-hst.org/ or email: information@ieee-hst.org. Submissions should be made at the following website: https://cmt3.research.microsoft.com/HST2017/

**Important Dates**

| | |
|---|---|
| Paper Abstract Deadline: **(extensions can be considered)** | November 1, 2016 |
| Paper, Poster and Tutorial Acceptance Notification | December 15, 2016 |
| Final Paper Submission Deadline: | March 1, 2017 |

*All deadlines are by midnight Eastern Time.*

**Organizing Committee**

| | |
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