



## August 2013 Newsletter

**Joint Section Chapter – Boston - New Hampshire - Providence**

**June 2013 – August 2013**

<http://www.ieee.org/bostonrel>

Greetings,

I hope that you had a great summer. Our big news from this summer occurred at the annual IEEE Reliability Society banquet, which was held in Gaithersburg, Maryland (in the suburbs of Washington, DC) on Saturday, June 22, 2013. Our chapter, which is the Boston IEEE Reliability Chapter, joint with New Hampshire and Providence, RI, rose to second place. Thanks to your support, we are now considered the second best IEEE Reliability Chapter in the world for 2012. Your support consists of contributing to the metrics that contribute to that ranking, including attendance at our meetings and, for those of you who are Reliability Society members, your publications and conference contributions, such as chairing a conference session. It was my honor to accept the award on behalf of the chapter. There is a small monetary award that helps us provide the refreshments at our events.

We've been planning the presentations for the fall, and we hope you enjoy them. On September 11, Martin Bazant, Professor of Mathematics and Professor of Chemical Engineering at MIT will be presenting a talk on the reliability of lithium-ion batteries, which is certainly a relevant topic for many consumer, commercial, and industrial systems, including everything from hand-held devices to airplanes, such as the July 12, 2013 incident at Heathrow airport.

In October, we are pleased that Dr. James Wade will be presenting, because of his unique perspective as the VP of Mission Assurance for Raytheon, past Head of the Safety and Mission Assurance Office at MIT Lincoln Laboratory, and, previous to that, the Head of Safety and Mission Assurance at NASA, during which time he was based in Houston.

Our November presentation will likely be on ESD (Electrostatic Discharge), which already is one of the two biggest causes of electronics failure. ESD failures will continue to become more important as devices become smaller, because Moore's Law predicts roughly the area of a given number of components halving every 18 months, so their linear dimension is reduced by a factor of about 1.4 in that time, and their ESD sensitivity is roughly linear with their linear dimension. We already are at a point where we rarely talk about ESD Class 3 or ESD Class 2 devices, and handling protocols routinely accommodate ESD Class 1, often as the default, and ESD Class 0 are becoming the norm. Since standards do not typically get established or even revised on a time scale on the order of 18 months, this exciting field appears to be outpacing the standards. Therefore, regardless of our specialty, all of us who work with electronics in any capacity must keep ourselves informed of the latest issues with ESD. In other words, unlike other standards that may be ancillary to our main focus, such as cleanroom standards or soldering standards, to name but two examples, ESD is probably unique

among the various topics that we deal with, because each of us needs to maintain expertise in this field due to the absence of good, generally accepted standards.

We are presently working on arranging speakers for our December and January presentations. We have some ideas, but your ideas are always welcome for presentations this fall or this spring. Let us know if you or a present or former colleague might like to give a presentation to our group. If you've attended in the past, then you know that our blend of a formal stand-up presentation with informal, friendly people and refreshments is a perfect venue for practicing an important presentation of any sort, or repeating a past presentation that may have some new material. Almost any topic that is related to reliability is welcome, whether it is hardware or software, theory or experiment, laboratory or industry, electronic or mechanical, etc.

I hope to see you at as many of our meetings as you can attend.

Regards,

*Dr. Dan Weidman*

*Chair, IEEE Boston Reliability Chapter, joint with Providence, RI and New Hampshire*

## Contents of this issue

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### Recent Activities

May 8<sup>th</sup>, 2013

"Certainty of Operations: the Origins of Reliability Engineering in Boston's fire alarm and transit systems", Gilmore G. Cooke, IEEE Boston Section ExCom, IEEE History Committee, held at MIT Lincoln Lab, Lexington, MA.

June 1<sup>st</sup>, 2013

Boston Fire Alarm Office Museum Tour.

June 18<sup>th</sup>, 2013

The event was organized jointly with SMTA Boston Chapter and held at Benchmark Electronics, Nashua, NH. The agenda included factory tour of Benchmark Electronics including Robot demonstration and a presentation on Stencil Technology Evaluation by Shea Engineering.

**Upcoming Events:** Visit <http://www.ieee.org/BostonRel> to register

September 11<sup>th</sup>, 2013

"Lithium-Ion Battery Degradation: Comparative analysis of theories with experimental data" by Prof. Martin Bazant of MIT's Dept of Mathematics and Dept of Chemical Engineering, at MIT Lincoln Lab, Lexington, MA.

October 16<sup>th</sup>, 2013

Dr. James Wade, Vice President of Mission Assurance, Raytheon, at MIT Lincoln Lab, Lexington, MA.

November 13<sup>th</sup>, 2013

Presentation on ESD. Meeting speaker to be announced. MIT Lincoln Laboratory, Lexington, MA.

December 11, 2013

Annual Past Chairs dinner. Meeting speaker to be announced.  
MIT Lincoln Laboratory, Lexington, MA

## Announcements

Details on other chapter and community related updates.

## Recent Activities

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### "Certainty of Operations: the origins of reliability engineering in Boston's fire alarm and transit systems"



Gilmore G. Cooke

Our May presentation was given by Gilmore Cooke, SLM, IEEE Milestones Committee Chair. His presentation, given on 5/8/13 to the IEEE Reliability Chapter of Boston, Providence, and New Hampshire, gave the audience an insight on how Reliability Engineering is believed to have been born in Boston over 160 years ago. Gilmore Cooke, SLM, IEEE spoke about Reliability Engineering concepts that are common to two of Boston's early milestone projects: Electric Fire Alarm System of 1852, and Power System of Boston's Rapid Transit, 1889. Certainty of operations, reliability through strength, and reliability through redundancy, were the ideas shared by two great innovators, William Channing and Fred Pearson.



(Chapter meeting: Pictures curtsey of Aaron C. Dermarderosian Jr, Chapter Secretary)

### "Boston's Fire Alarm Office Museum Tour" on June 1<sup>st</sup>, 2013

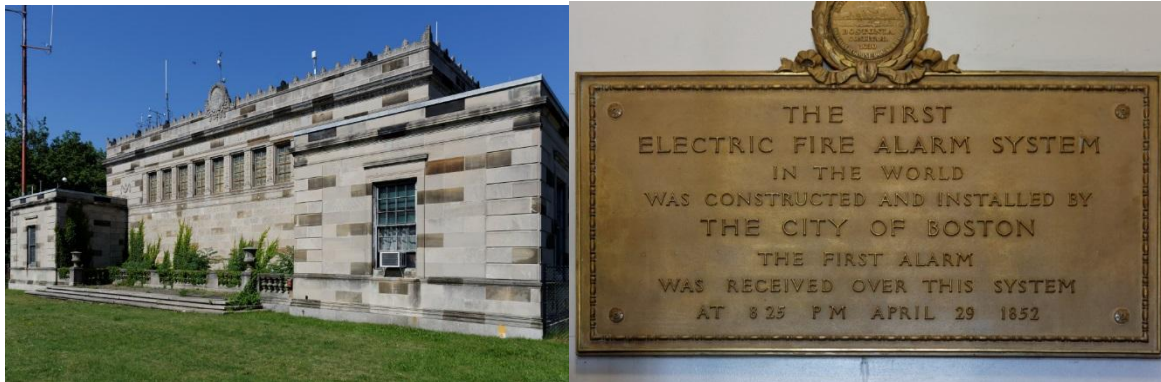
IEEE members, families and guests were invited to visit this unusual museum that is closed to the general public. In addition to its historic significance, this facility continues to be the dispatch center for Boston's emergency response to 911 calls. The first electric fire alarm system with notification features was right here in Boston about 1850. A small guided tour was arranged by Gil Cooke, who is the IEEE Boston historian and accompanied us.

The tour was two hours, led by one of the Boston 911 dispatchers, who spoke about items including:

- A description of the old hardware. One old alarm box from the street was installed indoors and connected to the old notification panel; all separate from today's systems, so we could play with it and examine its workings. It is quite reliably designed with mostly robust

mechanical components that generate sufficient electrical energy to transmit a signal. The signal was transmitted across two pairs of wires, which ran down two different streets, so that a disaster one street would not knock out the connection between any alarm box and the central station.

- A demonstration of the present Boston 911 system, which we were able to see in action when a few calls came in during the tour. The process was explained to us in detail, including how emergency equipment is chosen for dispatch depending on its location and availability, and how equipment is moved from one location to another, depending on which parts of the city need coverage due to an absence of equipment that may be out responding to an emergency.



(Boston Fire House Visit: Pictures courtesy of Ramon De La Cruz, chapter Vice Chair)

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## Chapter Event with SMTA, Boston on June 18<sup>th</sup>, 2013 at Benchmark Electronics, Nashua NH.



This event was highly successful. More than 60 people attended the event. The evening started with a factory tour of Benchmark Electronics' Surface mount assembly line and Robot assembly line, overview of counterfeit part detection in the product assurance laboratory and ended with a presentation on "Stencil Technology Evaluation" by Chrys Shea of Shea Engineering.

One of the highlights of evening was the robot, which was a guest from a company that is one of Benchmark's customers. The robot looked different; unlike the simple, blind, one-arm robot commonly used in semiconductor industry, such as Genmark. And, not like the huge, strong, dangerous, expensive robots in an automobile factory. This robot is like a human assistant for simple, repetitive tasks, such as sorting or packing at a small business. Imagine training someone who is human, with no keyboard and doesn't speak your language, but is cooperative, and has facial expressions. This is Baxter, from Rethink Robotics, introduced in Sep 2012, and only \$22,000. It's aimed at small businesses that have a task this week, but a different task next week. It is aimed at preserving American jobs by making simple tasks cost effective to keep in this country.

To train Baxter, you take either of its two arms by the wrist, and move it through the motions that you want. It has a video screen that swings around (azimuthally) towards the arm you're teaching, to acknowledge your presence. It even gives a small nod (in elevation) to indicate at each step that it has learned that step. We saw it picking up one small box after another, and moving each box to another location, either on the tabletop, or stacked. Also, we saw it stack disks into a box. It has a small camera in each wrist. It presently is very two-dimensional in its thinking, even though it's operating in 3d space. By the end of 2013, they plan 3d capability, such as being able to lift up a part that has fallen over. It has all the hardware required. It just needs the software. The video screen shows a face, rather than text, to indicate status, such as happy or confused. The motors are compliant enough that it's safe to work in close quarters and be bumped by the robot. In teach mode, all joints are even more flexible. The person demonstrating was quite good at making it all seem very natural to interact with this robot.

## Upcoming Events

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### **“Lithium-Ion Battery Degradation: Comparative analysis of theories with experimental data” by Prof. Martin Bazant of MIT’s Dept of Mathematics and Dept of Chemical Engineering at MIT**

The IEEE Reliability Chapter will resume monthly presentation in September.

Although performance metrics for batteries, such as gravimetric power density, receive the most attention, reliability often is more important for practical applications and much less well understood. Prof. Martin Bazant of MIT’s Dept of Mathematics and Dept of Chemical Engineering will discuss degradation mechanisms in Li-ion batteries and simple theories of capacity fade and lifetime statistics in single cells and battery packs, compared with experimental data.

**Location:**

Building: Main Cafeteria  
MIT Lincoln Laboratory  
244 Wood Street  
Lexington, Massachusetts

**Date: 11-Sept-2013**

**Time: 05:30PM to 08:00PM**

**Registration:** On-line at the IEEE Reliability joint section chapter website, <http://www.ieee.org/bostonrel>  
Registration deadline for this meeting is COB Monday Sept 9<sup>th</sup>, 2013

## Announcements

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### Reliability Chapter's Facebook Presence

The chapter recently established presence on Facebook so check it out. The latest meeting announcements are posted on wall. Visit the page at <https://www.facebook.com/pages/IEEE-Boston-Reliability/231112043598940>, or search Facebook for "Boston Reliability". Click "Like" and befriend us. Your feedback is most welcome.

### Annual Reliability Chapter Awards for 2013

The annual Reliability Chapter awards were presented on June 22<sup>nd</sup>, 2013 in Gaithersburg, Maryland. The IEEE Boston chapter was awarded the second best IEEE reliability Chapter in the world. The award selection criteria are based on membership, meeting attendances, number of meetings, workshops or conferences, training sessions, written papers, technical tours and other pertinent activities. Dr. Weidman, Chapter Chair, attended the award ceremony and accepted the honor on behalf of chapter.

### Community Outreach Actions



This summer, our chapter made a donation to Boston's One Fund, to help the victims of the tragedy at the Boston Marathon, on April 15, 2013.



We are sad to announce the passing of Venkateswara Rao Dhullipalla, who was known as "Rao" by most of us. He may have had the best attendance at our meetings. He often came very early to our monthly meetings and would help us set up. He will be missed by all of us who knew him. Our chapter made a donation in his memory to the American Cancer Society. He passed away on June 20, 2013. <http://www.obitsforlife.com/obituary/729904/Dhullipalla-Venkateswara.php>



We are interested in having you help out as a volunteer contributing as much or as little as you would like. We have a good team of volunteers that help us keep things going, so if you would like to join us, there is probably ample opportunity to choose how you would like to contribute. Email or talk to any of us at the next monthly presentation, or attend one of our Advisory Committee meetings.

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**The IEEE Reliability Society Joint Section Chapter  
– Boston - New Hampshire - Providence**

**August Newsletter is available at the following link:**

[Boston - New Hampshire - Providence Joint Chapter Newsletter](#)

or copy and paste the URL below on your browser

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