



**August 2015 Newsletter**  
**The IEEE Reliability Society**  
**Joint Section Chapter: Boston - New Hampshire - Providence**  
**June 2015 – August 2015**  
<http://www.ieee.org/bostonrel>

Greetings from the IEEE Reliability Joint Section Chapter (Boston - New Hampshire - Providence). The joint-section chapter had a very successful spring, with strong meeting attendance and member participation. With higher attendance of both IEEE members and non-members, you have opportunities to see people you know and meet new people of interest, whether networking for information to help with your current job, looking for a new job, or just socializing. In early August, I had the distinct honor of representing our Reliability Chapter at the IEEE Reliability Society Chapter Chairs Congress in Vancouver BC to receive the 3rd place award for our joint chapter due to our outstanding 2014 participation and accomplishments. My employer M/A-COM and the IEEE Reliability Society sponsored my travel to the event. Plans are under way for our fall presentations including two meetings in the month of September. Arrangements are also being made for the December "Past Chairs" meeting, where we will honor the past IEEE Boston Reliability Chapter chairs. Volunteers are the engine that drives our Chapter's success, and we are continuing to look to fill our vacant Chapter Secretary role. Hope you are enjoying a fun and restful summer. See you at an upcoming meeting!

Best Regards

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### **Recent Activities:**

May 13, 2015                    "Recent advances in Scanning Electron Microscopy" by Vern Robertson from JEOL USA Inc. Peabody, MA. Meeting was held at MIT Lincoln Laboratory, Lexington, MA."

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

Sept 9, 2015                    "STAMP process" by Dr. John Thomas, MIT Campus, Possibly joint with ASTR 2015, conference in Cambridge, MA.

September 23, 2015            Ted Dangelmayer on LENR (Low energy Nuclear Reactions also known as Cold fusion) at Teradyne, North Reading, MA

October 14, 2015                Mr. James McLeish from DfR Solutions at MIT LL, 3 Forbes Rd, Lexington, MA

## Recent Chapter Activities

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Boston Chapter Chair Charles Recchia receiving 3<sup>rd</sup> place Best-in-Class award from IEEE Reliability Society chairman Christian Hansen.

### "Advances in Electron Microscopy for Failure Analysis"

On Wednesday, May 13, 2015, Vernon E. Robertson of JEOL presented "Advances in Electron Microscopy for Failure Analysis." Vern focused on OMs (optical microscopes), TEMs (transmission electron microscopes), and SEMs (scanning electron microscopes). TEMs have the highest resolution, but produce an image that is two dimensional. SEMs have a much higher resolution and depth of field than OMs. Vern gave a clear, one-slide explanation summarizing the SEM operation: an electron beam (e-beam) raster scans the sample while a simple voltage-biased electron detector detects the emitted electrons and provides the intensity level for a synchronized raster-scan display.. Using emitted X-rays in a technique commonly known as EDS (energy-dispersive spectroscopy), EDX (energy-dispersive X-rays), or EDAX (energy-dispersive analysis by X-ray), Vern said that a SEM can image, identify, and quantify elemental composition at the nanometer scale for elements as lightweight as beryllium. Technological improvements include: the basic detector's design, new vacuum window materials, and a huge increase in detector size and throughput, along with the use of several detectors simultaneously instead of just one detector. SEM technology has advanced to the point where there are benchtop SEMs with EDS for less than \$150k, and some SEMs have spatial resolution down to 0.7 nm. Even more amazing, by using aberration-corrected TEMs, images can be obtained with a spatial resolution about a factor of two better than an atomic diameter (i.e., about 63 pm resolution while atomic diameters are on the order of 100 pm or larger). A particularly impressive imaging technology was a montage of many high-resolution images, all automatically stitched with adjusted background levels so that there are no visible edges. Two other technologies that Vern described were a defocused argon gun for deformation-free sample preparation and in-situ cleaners to sputter impurities, such as hydrocarbons, off the surface for a more representative image of the actual surface. The e-beam gun itself requires about  $10^{-10}$  or  $10^{-11}$  torr, but the system is so robust due to pressure-limiting apertures in the column that almost any sample can be imaged in the chamber (so-called variable-pressure imaging), thereby allowing outgassing and nonconductive samples to be imaged without the traditional "charging" associated with these types of samples. Throughout the presentation, Vern showed many impressive microscopy images of various materials.



This presentation was particularly interesting for this author (Daniel J. Weidman, Ph.D.), because of my past work at KLA-Tencor as a Systems Design Engineer in their e-Beam Review Division in Bedford, Massachusetts. In the late 1990's, as Vern mentioned, SEMs had only one or two detectors and many other shortcomings by today's standards. At the time, we built the highest-spatial resolution SEMs in the

semiconductor industry, so it was very exciting to see how the technology has advanced in the last 15 years.

Appointed SEM Technical Sales Manager in 2010, Vern Robertson's main responsibility is providing technical product support and customer applications support both pre- and post- sale. Vern served as the senior SEM Applications Specialist at JEOL since 1986. He was appointed National Laboratory Manager in 2004, and FEG SEM Product Manager in 2005. Vern received his B.S. in Geology from the University of New Hampshire, so he included some images of rock samples in his presentation. His industrial experience includes eight years of consulting in an independent testing lab specializing in industrial and environmental problem solving, with responsibilities including polarized light optical microscopy, and atomic emission and absorption spectroscopy SEM with EDS/ WDS and x-ray diffraction. Vern is a member of the MAS (Microanalysis Society) Council.

This was the first time that the IEEE Boston Reliability Chapter has held an event at the MIT Lincoln Lab Forbes Road facility, which is a short drive away from the main MIT LL location. The Forbes Road cafeteria is smaller than the Main Cafeteria at the MIT LL Wood Street location. However, everyone enjoyed the newly renovated building at Forbes Road, the new furniture, and easy accessibility with parking, entry, and the event all at ground level.

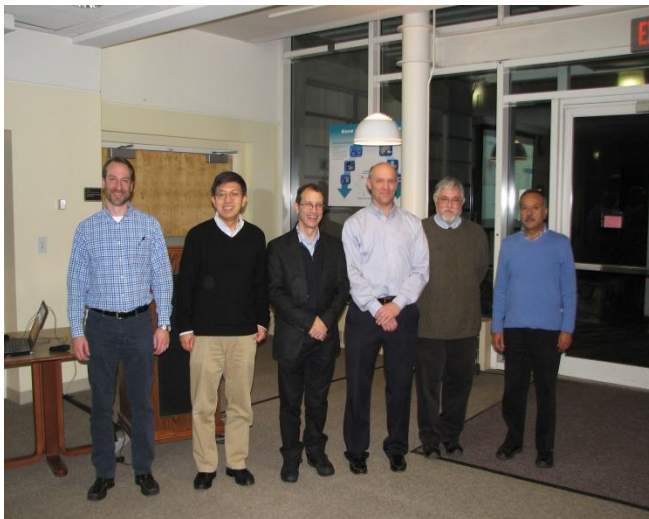
<http://ewh.ieee.org/r1/boston/r1/presentations.html>

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### ***Reliability Chapter's Past Chairs Dinner Meeting (December 2014) Pictures***



**IEEE Boston Reliability Chapter Officers and AdCom members**



**Reliability Chapter's past Chairs and Attendees**

## **Announcements**

### **I. Chapter Annual AdCom election results- IEEE Boston Reliability Chapter, Joint with New Hampshire & Providence**

#### **2015 Elected Chapter Officers and AdCom members**

Chair- Charles Recchia

Vice-Chair- Jay Yakura

Past Secretary- Aaron DerMarderosian, Jr.

Treasurer- Don Markuson

Immediate Past Chair- Dan Weidman

Acting Secretary: Giora Kedem

ExCom and Past Chair – Ramon De La Cruz

Website – Jeff Clark

Newsletter, Social Media Editor- Neeta Agarwal

Publicity – Nihar Senapati

Membership – Alik Apelian

If you are an IEEE & Reliability Society (RS) member in the IEEE Boston, New Hampshire, or Providence

section and interested in volunteering with chapter activities find details by contacting any person listed above or at <http://ewh.ieee.org/r1/boston/rl/adcom.html>.

## II. Regional Reliability Society Executive meeting

On Tuesday May 5, 2015, our regional RS joint section chair Charles Recchia attended the IEEE Providence Section Executive Committee Business Meeting in the Presidential Room at White's of Westport and presented information about the Reliability Society including upcoming meetings and conferences that would be of interest to the Section. He also suggested that the Reliability Chapter hold a future meeting at the Naval Undersea Warfare Center (NUWC) visitor's center (Bldg. 80). The suggestion was well received as it would likely be of interest of IEEE members working on Aquidneck Island.



Photograph (L to R): Gilmore Cooke, Steven Crocker, David Casper, Ted Dawson, Jason Gaudette, Charles Recchia, Cathy Ann Clark, Dave Clarke, Marty Cohen, Jacob George, Harold Belson, and Bill Horan. A number of former US presidents seemingly oversaw the entirety of the meeting.

## III. Annual Reliability Chapter Awards

The IEEE Boston chapter was awarded the "third best" IEEE reliability Chapter in the world based on 2014 data. 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.

## IV. IEEE Membership Elevation Information:

The IEEE Boston Section recently held a Membership Elevation Clinic at MIT Lincoln Lab. This was a way to help people through the process of being elevated from IEEE Member to IEEE Senior Member. Various information is needed for this process, such as a resume. Further, it helps if there is an "executive summary" of one or two paragraphs showing progression in one's career, such as promotion to a team leadership position or authoring publications or patenting inventions. Certain career accomplishments are required, such as a minimum number of years of experience since one's degree, with fewer years of experience needed for higher degrees. To qualify to become a Senior Member, you need 10+ year of

experience. The IEEE, for these purposes, counts a Ph.D. as the equivalent of 5 years of experience, while an MS is the equivalent of 4 years of experience. Most (almost all!) people take more than one year to get a Ph.D. Therefore, many recently graduated Ph.D.'s qualify to become Senior Member because the MS was more than 6 years ago even though the Ph.D. was less than 5 years ago! In practice, most people who are considering elevation to Senior Member are probably qualified for such a membership elevation. Recommendations from IEEE Senior members are required. We suggest interested people should get in touch with Senior Members from the IEEE Reliability Chapter as well as other Boston IEEE Chapters who are willing to write recommendations. If you are an IEEE Member and are interested in becoming a Senior Member, please contact Ramon de la Cruz at [rdelacru@ieee.org](mailto:rdelacru@ieee.org)

## **Chapter Participation and Outreach Efforts**

### **I. Leadership and membership development workshop**

Many reliability chapter officers attended an officer's workshop coordinated by Paul Zorfass of IEEE Boston main section on Jan 22, 2015 6pm at the MIT Lincoln Lab Cafeteria. It was an interesting workshop and fun to meet officers from IEEE Boston's other societies in the northeast region.

### **II. Chapter Seeks Volunteers**



We are interested in having you help out as a volunteer contributing as much or as little as you would like. We need a good team of volunteers that help us keep things going. If you would like to join us, there is probably an 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.

For updates on upcoming events: <http://ewh.ieee.org/r1/boston/rl/events.html>.

*Readers can contact chapter newsletter editor Dr. Neeta Agarwal ([neetaaqar93@gmail.com](mailto:neetaaqar93@gmail.com)) with any comment/suggestion or if interested in contributing to our next issue. Thanks.*

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**The IEEE Reliability Society Joint Section Chapter  
Boston - New Hampshire - Providence  
Newsletter available at the following link:**

[Boston - New Hampshire - Providence Joint Chapter Newsletter](http://ewh.ieee.org/r1/boston/rl/newsletters.html)

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