



## February 2017 Newsletter The IEEE Reliability Society

Joint Section Chapter: Boston - New Hampshire - Providence

Dec 2016 – Jan 2017

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

Happy New Year everyone! The Chapter officer elections this year resulted in a new Vice-Chair, Ken Rispoli of Raytheon. Ken is a Senior Principal Engineer at Raytheon Company Integrated Defense Systems' Materials Engineering Department in Massachusetts. He is responsible for the Commercial Off The Shelf (COTS) integration process and has over 40 years' experience in the field of component evaluation, failure analysis, application engineering and specification. Recent work includes participation on the counterfeit avoidance leadership team and integration of COTS hardware in military systems using Failure Mode and Effects Analysis (FMEA) and physics of failure methodologies. Ken is an active member IEEE Reliability Society and a member of ASM Electronic Device Failure Analysis Society. He is an instructor of Statistical Process Control and Design of Experiments and holds a BS in Electrical Engineering from Merrimack College and MS in Electrical and Computer Engineering from the University of Massachusetts, Amherst campus.

Please help me in welcoming Ken to the fold and thanking the continued service of Treasurer Don Markuson and Secretary Giora Kuller, as well as our two previous years' Vice Chairs Kevin Granlund and Jay Yakura, both of who are still active in the AdCom as Members-at-Large. Additionally, the AdCom has three new Members-at-Large: Adam Bahret, Chandra Gupta and Timothy Bond. Welcome!

In this newsletter, you'll see highlights of our past 3 monthly meetings, two of which featured IEEE Distinguished Lecturers!

Quick reminder that if you have an inputs/ideas for Chapter presentations, feel free to provide them at the [Suggest a Meeting Topic](#) link on our website.

Hope to see you at the next Chapter Meeting!

Cheers



Charles H Recchia, MBA, Ph.D.

IEEE Senior Member

IEEE Reliability Society AdCom Member '16-'18

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

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### Recent Activities:

- December 14, 2016                    “Microwave and Millimeter Wave Power Amplifiers: Technology, Applications, Benchmarks and Future” Dr. Komiak
- January 11, 2017                    “Phased Arrays and Radar: Advances and Breakthroughs” Dr. Eli Brookner
- February 8, 2017                    “ESD Concerns with Energetics & Explosives” Jay Skolnik, Certified ESD Program Manager  
This meeting is co-sponsored by the Northeast Chapter of the ESD Association (NE-ESDA).

### Upcoming Events:

- March 21-22, 2017                    **SELSE – Silicon Errors in Logic – System Effects**; SELSE-13: The 13th Workshop on Silicon Errors in Logic – System Effects Northeastern University, Boston, Massachusetts.  
This is a joint workshop with the Boston Chapter IEEE Reliability Society
- The growing complexity and shrinking geometries of modern manufacturing technologies are making high-density, low-voltage devices increasingly susceptible to the influences of electrical noise, process variation, transistor aging, and the effects of natural radiation. The system-level impact of these errors can be far-reaching. Growing concern about intermittent errors, unstable storage cells, and the effects of aging are influencing system design and failures in memories account for a significant fraction of costly product returns. Emerging logic and memory device technologies introduce several reliability challenges that need to be addressed to make these technologies viable. Finally, reliability is a key issue for large-scale systems, such as those in data centers. The SELSE workshop provides a forum for discussion of current research and practice in system-level error management. Participants from industry and academia explore both current technologies and future research directions (including nanotechnology).

**Key areas of interest are (but not limited to):**

- Technology trends and the impact on error rates.
- New error mitigation techniques.
- Characterizing the overhead and design complexity of error mitigation techniques.
- Case studies describing the tradeoffs analysis for reliable systems.
- Experimental silicon failure data.
- System-level models: derating factors and validation of error models.
- Error handling protocols (higher-level protocols for robust system design).
- Characterization of reliability of systems deployed in the field and mitigation of issues.



April 2-6, 2017

**IEEE International Reliability Physics Symposium (IRPS)** will be held in Monterey, CA in 2017. IRPS is the premiere conference for engineers and scientists to present new and original work in the area of microelectronics reliability. Drawing participants from the United States, Europe, Asia, and all other parts of the world, IRPS seeks to understand the reliability of semiconductor devices, integrated circuits, and microelectronic assemblies through an improved understanding of both the physics of failure as well as the application environment.

Visit [HERE](#) to register



## Recent Chapter Activities

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### December 14, 2016 Past Chair Recognition Dinner and Monthly Meeting Presentation by Dr. Komiak “Microwave and Millimeter Wave Power Amplifiers: Technology, Applications, Benchmarks and Future”

This event was the Chapter’s annual past chairs dinner and monthly meeting where we get a chance to recognize and thank past chairs of the IEEE Boston Reliability Chapter for their years of dedication and contributions to the chapter. Traditionally this meeting starts with social networking followed by dinner & announcements followed by our monthly presentation this month by Dr. Komiak on Microwave and Millimeter Wave Power Amplifiers.

Dr. Komiak presented on how solid state transistor device technology is ubiquitous in communications, radar, electronic warfare, and instrumentation applications. This abridged presentation covered Si LDMOS, PHEMT, InP HEMT/MHEMT and GaN HEMT. Topics covered included principles of operation, structures, characteristics, classes of operation, and device state of the art benchmarks. The art of power amplifier design was approached from a historical perspective. Power amplifiers utilizing these device technologies covering UHF through sub-millimeter wave was described including amplifier state of the art benchmarks. Future trends was highlighted and summarized.





James J. Komiak, Ph.D. of BAE Systems, IEEE Distinguished Lecturer (M'89-SM'90-F'05) received a Ph.D. in Electrical Engineering from Cornell University in 1978. Dissertation research developed the "Real Frequency Technique" for broadband matching an arbitrary load to a resistive generator. He has 37 years' experience in system, module, and MMIC design for EW, communication, and radar applications. Currently he is a BAE Systems Global Engineering/Scientific Fellow at Electronic Systems in Nashua, NH. He has over 100 publications and 12 patents. Elected to the grade of IEEE Fellow in 2005 for "Contributions to Monolithic Microwave Integrated Circuits, High Power Amplifiers, and

Transmit/Receive Modules." Received the Martin Marietta Jefferson Cup Award—"Outstanding Technical Leadership in Development and Demonstration of High Power and High Efficiency Monolithic Microwave Integrated Circuit Amplifiers and T/R Modules for Phased Array Radar (June 1993)" and his work is represented in the MTT Symposium MMIC Historical Exhibit "World's First Octave Band MMIC with Power Output in Excess of 10 Watts (1989)". Silver Award Winner of the BAE Systems Chairman's Award for Innovation for "Blue Force Locator & Monitor" (2001) and "Next Generation Power Amplifiers" (2012). Received the BAE Systems Engineering Fellows Leave A Legacy Award (2007). Inducted into the Association of Old Crows Electronic Warfare Technology Hall of Fame in 2008. MTT-S, IMS TPC/TPRC, MTT-5, GaAs IC Symposium (2000 Chairman), former ABET ECE PEV, CEAA. Dr. Komiak is an IEEE MTT-S Distinguished Microwave Lecturer (2014-2016).

[Link to Dr. Komiak presentation](#)

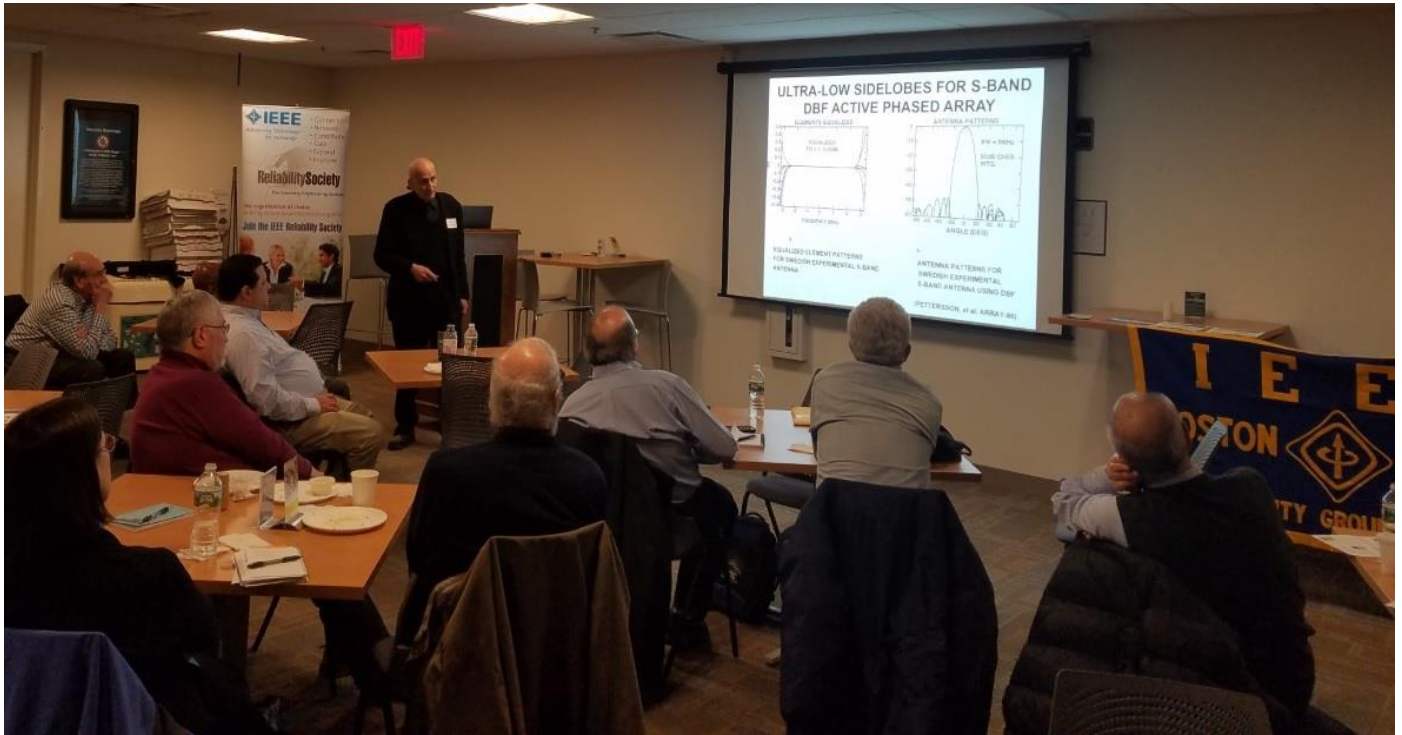
### **January 11, 2017 "Phased Arrays and Radar: Advances and Breakthroughs"**

Dr. Eli Brookner of Raytheon (Retired) covered recent developments and breakthroughs in Active Electronically Steered Arrays (AESAs) and radar including Extreme MMIC, graphene, digital beam forming (DBF, including Lockheed Martin space fence radar with element level DBF having 172K A/Ds).

Potential continuation of Moore's Law described:

1. Spintronics: could revolutionize computer architecture away from John von Neumann model
2. Memristor: potentially allows one to do what mouse brain does in a shoe box instead of a computer the size of a city requiring a nuclear power plants
3. Graphene: has potential for Thz clock speed transistors
4. Quantum Computing: has the potential of orders of magnitude advance in computation power per 2 years.
5. New Kymeta Metamaterial Antenna was explained in simple terms. Also covered was PARC (A Xerox Co.) and Echodyne meta material antennas. MIMO (Multiple Input Multiple Output) was explained in simple physical terms instead of with heavy math; where it makes sense to use and how conventional arrays can do as well.
6. Printed Electronics: Low cost 1.6 GHz printed diodes achieved (goal 2.4 GHz) has potential for revolutionary low cost microwave electronics.
7. Electrical and Optical Signals on Same Chip: IR transparent in silicon. Biodegradable Arrays of Transistors or LEDs: embedded under skin for detecting cancer or low glucose.
8. Quantum Radar: has the potential for detecting stealth targets.

Dr. Brookner included in his presentation photos of his latest travels to Ukraine, Turkey, China, Israel and Dubai. Talk was presented in lively and down to earth manner so that non-technical person could appreciate it.



Dr. Eli Brookner Bio: MEE & DrSc Columbia Un '55 &'62; BEE CCNY, '53. Raytheon 1962-2014 (retired) ; Principal Engineering Fellow; worked on radars for air traffic control, military defense, space & navigation: on ASDE-X, ASTOR RADARSAT II, AGBR, major Space Based Radar programs, NAVSPASUR, COBRA DANE, PAVE PAWS, MSR, COBRA JUDY Replacement, THAAD, SIVAM, SPY-3, Patriot, BMEWS, UEWR, SRP, Pathfinder, Upgrade for >70 ARSRs, AMDR, Space Fence, 3DELRR. Before Raytheon: Columbia Un Electronics Research Lab. [now RRI], Nicolet, & Rome AF Lab; Awards: IEEE 2006 Dennis J. Picard Medal for Radar Technology & Application; IEEE '03 Warren White Award; Journal of Franklin Institute Premium Award best paper, 1966; IEEE Wheeler Prize for Best Applications Paper, 1998. Fellow: IEEE, AIAA, & MSS. 4 books: Tracking, Phased Arrays & Radar. >10,000 attended courses in 25 countries. Banquet & keynote speaker 13 times. > 230 publications. > 100 invited. 6 papers in Books of Reprints. 9 patents.

**February 8, 2017 “ESD Concerns with Energetics & Explosives” Jay Skolnik, Certified ESD Program Manager**

This presentation was on ESD control for explosives and other energetic materials, introducing the attendees to the differences of ESD damage of electronics versus energetics. Mr. Skolnik discussed the

various energy levels and types of discharges which can cause catastrophic or latent failures. Enlightening demonstrations and case histories were included to illustrate practical, real-life situations of past ESD-induced failures of energetic components and methods to prevent them, as well as explanations of the use of ESD mitigation in the work environment. The prevention of ESD failures was examined, as well as methods to safely work with explosive products while ensuring human safety, preventing catastrophic health hazards, injuries, and severe damages.



Jay Skolnik, PE, CPI, CPM, a Licensed Professional Electrical Engineer, is the co-founder and Lead Engineer / Consultant of Skolnik Technical Training in Albuquerque, NM. With over thirty years of experience in the electronics industry, Jay has developed a multitude of products utilized in different industries, including military, defense, avionics, aerospace, commercial, industrial, medical, automotive, and sports entertainment. As an ESDA Certified Program Manager, Jay teaches ESD mitigation and control for the electronics & energetics specialties. He performs ESD audits to ensure factories and laboratories are following safe ESD control guidelines and procedures. He is also certified by iNARTE and is a Certified Professional Instructor of

National Instruments (NI). He received his Electrical Engineering degree from the University of Missouri-Rolla.

This meeting is co-sponsored by the Northeast Chapter of the ESD Association (NE-ESDA).

**Link to past presentations** <http://ewh.ieee.org/r1/boston/rl/presentations.html>

## IEEE Boston Reliability Chapter 2017 Election Results & Appointed AdCom Members

### Advisory Committee (AdCom) Members

<i>Chair Re-Elected 2017:</i>	<b>Charles Recchia</b> - M/A-COM Technology Solutions, Inc. <a href="mailto:charles.recchia@ieee.org">charles.recchia@ieee.org</a>
<i>Vice Chair Elected 2017:</i>	<b>Ken Rispoli</b> - Raytheon Company <a href="mailto:kenneth_p_rispoli@raytheon.com">kenneth_p_rispoli@raytheon.com</a>
<i>Secretary Re-Elected 2017:</i>	<b>Giora Kedem</b> - Reliability Professional <a href="mailto:g.k.kuller@ieee.org">g.k.kuller@ieee.org</a>
<i>Treasurer Re-Elected 2017:</i>	<b>Don Markuson</b> - Silicon Labs <a href="mailto:d.markuson@ieee.org">d.markuson@ieee.org</a>
<i>Publicity:</i>	<b>Nihar Senapati</b> - Philips Healthcare <a href="mailto:niharworks@yahoo.com">niharworks@yahoo.com</a>
<i>Website:</i>	<b>Jeff Clark</b> - The MITRE Corporation <a href="mailto:jaclark@ieee.org">jaclark@ieee.org</a>

### Members at Large

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**Jay Yakura** - Analog Devices, Inc.  
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## Chapter Participation and Outreach Efforts

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### I. 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 have a good team of volunteers that help us keep things going. If you would like to join us, there is probably ample opportunity to choose how you would like to contribute. Email or text any of us at the next monthly presentation, or attend our Advisory Committee meetings.

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

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*Readers can contact chapter newsletter editor Ken Rispoli (Ken-Rispoli@IEEE.org) 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  
Newsletters 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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<http://ewh.ieee.org/r1/boston/rl/newsletters.html>