

Reliability Society

NEWSLETTER

Vol. 55, No. 3, December 2009

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President's Message



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Dear Reliability Society Members,

In this last message for 2009, I would like to bring your attention to some of the issues that your Administrative and Executive Committees will be overseeing in 2010 as well as discuss slight changes to member benefits in 2010.

In this last message for 2009, I would like to bring your attention to some of the issues that your Administrative and Executive Committees will be overseeing in 2010 as well as discuss slight changes to member benefits in 2010. But before we do that, I would first like to congratulate our newly elected ADCOM class of 2012: Marsha Abramo, Loretta Arellano, Lon Chase, Christian Hansen, Dennis Hoffman, and James Bret Michael. These individuals will serve a 3-year term starting January 1, 2010. Also, I would like to acknowledge our officers for 2010: Dick Kowalski (Treasurer), Marsha Abramo (Secretary), Bob Loomis (VP, Publications), Dennis Hoffman (VP, Membership and Senior Past President), Sam Keene (VP, Technical Activities), Alfred Stevens (VP, Meetings), Jeffrey Voas (President and Jr. Past President). Based on the continuing vast administrative aspects and our past presidential experience, Dennis Hoffman and I will share the presidential duties in 2010, as was done in 2009.

For those in Society leadership positions, 2010 will be a year surrounded by three major activities: (1) successfully undergoing a 5-year review by the IEEE Technical Activities Publications Review Committee on the *Transactions on Reliability*, (2) successfully undergoing a 5-year Society review by the IEEE Technical Activities Society Review Committee, and (3) undergoing one or more reviews of our finances by the IEEE Technical Activities Finance Committee who have placed us on the "Watchlist", primarily resulting from indirect impacts of the economic downturn. When a society or council is placed on this list, it inhibits what the society or council is allowed to spend with respect to their surplus reserves, thus limiting their ability to invest in new products or services for members. While we will spare you the details on how a society or council gets placed on this list, the bottom line is that the sooner we can get off it (and 2011 would be the soonest), the sooner we can return to growing our offerings.

In terms of member benefits in 2010, our offerings are essentially the same as those you received in 2009. One notable exception is that *Security and Privacy* magazine will be delivered electronically in 2010 instead of hard-copy. As opportunities are presented to us to financially or technically co-sponsor conferences in 2010 that we believe are relevant to members, we will evaluate those individually for potential inclusion in our conference portfolio. Also, some of you may have noticed that we raised our yearly dues by \$5.00. This is our first increase in membership dues in 6 years, and like all organizations, our expenses increase over time. While we dislike doing so, we feel that the membership benefits we offer justify this increase.

The IEEE Board of Directors elevated 309 members to the prestigious grade of Fellow at its November 2009 meeting, three of whom are members of the Reliability Society:

Dimitrios Ioannou

Jeffrey Voas

Congratulations to each of you for this recognition.

Having given you a brief overview of what we have on our slate for 2010, I would now like to simply wish you a terrific 2010 and look forward to hearing from you throughout the year.

Best Regards,

Jeffrey Voas

[j.voas@ieee.org](mailto:j.voas@ieee.org)

From the Editor

Welcome to the IEEE Reliability Society e-Newsletter. An issue will be published quarterly and published to the Reliability Society website.

We welcome your articles, comments or questions. All RS Newsletter inputs should be sent electronically to [L.chase@ieee.org](mailto:L.chase@ieee.org).

<b>March</b>	<b>Inputs due February</b>
<b>June</b>	<b>Inputs due May</b>
<b>September</b>	<b>Inputs due August</b>
<b>December</b>	<b>Inputs due November</b>

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Society News

Congratulations to our newly elected RS Administrative Committee for 2010.

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#### New Fellows

The IEEE Board of Directors Elevated 309 members to the prestigious grade of Fellow at its November meeting, three of whom are members of the Reliability Society:

Jeffrey Voas

Dimitrios Ioannou

The Board of Directors confers the title of Fellow upon a person of outstanding and extraordinary qualifications and experience in IEEE-designated fields, who has made important individual contributions to one or more of those fields. For more information online visit <http://www.ieee.org/fellowprogram>. To view the full list of Reliability Society Fellows, please go to <http://www.ieee.org/web/membership/fellows/Societies/R.html>

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#### RS Scholarships

The IEEE Reliability Society is pleased to announce the awarding of two scholarships for 2009. The first scholarship went to K. Krishna Mohan, a Ph.D. student in the Dept. of Electrical Engineering at the Indian Institute of Technology Bombay. He is an IEEE RS member, and has published numerous papers on software reliability and quality. His Ph.D. dissertation is tentatively titled "Analysis of Process Oriented Performance for Early Software Reliability Prediction". The second scholarship went to Shahinur Rahman, who has completed his Doctoral Studies and graduated from the University of Ioannina, Greece. He is continuing postdoc studies in Germany, focusing on the reliability issues on HF<sub>2</sub>/CeO<sub>2</sub> gate stacks grown on germanium, and has published several papers relating to this and other research. Both of these recipients were chosen from an outstanding field of candidates, and the fact that they were chosen is a testimony to their outstanding scholastic achievements and demonstrated interest in IEEE and reliability-related professional activities.



K. Krishna Mohan



Shahinur Rahman

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#### The IEEE Technology Council

RS is a founding Member Society (one of 14) of the TMC, and has a voting representative, Brenda Huettner, on its Board of Governors. The TMC provides a critical opportunity to network with leaders from the other Member Societies in their common pursuit of the mission and goals of the TMC, and to explore additional ways for the Member Societies to interact with each other.

The Field of Interest for RS is well-suited to provide value to societal and council conferences, for example. In the same manner, the mission and goals of the TMC can enhance the experiences, knowledge, and skillsets of RS members who now also are, by virtue of RS being a TMC Member Society, members of their local TMC Chapter.

Opportunities to network will exist at societal conferences, as well. Anyone with interest in the management of technology, management principles in general, or who is a technical professional responsible for technology management, or is striving to become a manager, should have interest in what the TMC has to offer.

RS members may want to consider, when rejoining IEEE for 2010, getting a subscription to the TMC publications (individuals cannot 'join' a Council, but can certainly subscribe to its publications). The Transactions on Engineering Management is more research-oriented, and the very popular Engineering Management Review (EMR) is a compilation of papers reprinted from the most respected Engineering and Technology Management journals in the world, as selected by its editorial board. The EMR is targeted more for the practicing professional.

More information about the TMC can be found at <http://www.ieeetmc.org/>. The IEEE Technology Council

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#### Society Solicitations:

The IEEE is cooperating with IEEE Educational Activities to develop and produce technical video tutorials from the reliability field. We refer you to the direct link to the IEEE Expert Now "Call for Authors" web page, <[http://www.ieee.org/web/education/Expert\\_Now\\_IEEE/smerecruit.html](http://www.ieee.org/web/education/Expert_Now_IEEE/smerecruit.html)>

Those who are interested are invited to complete the presentation form and forward to Ms Marsha Abramo, [m.labramo@ieee.org](mailto:m.labramo@ieee.org). We plan to produce one or more such tutorials each year supporting the IEEE EA education base for our membership.

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#### Chapter Activities:

The most recent chapter activity reports are linked below:

[Baltimore](#)

[Dallas](#)

[Singapore](#)

[Twin Cities](#)

[UK & RI](#)

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#### Technical Activities:

## Society Technical Activity Organization

"Technical operations" is now called "technical activities" to align with the naming used by the IEEE technical advisory board. "Technical activities" is obviously the technical arm of the IEEE Reliability Society. Its charge is to:

- Help incubate new conferences
- Foster ways to get more technical information to our members through:
  - Annual Technical Report that comes out each January
  - Enable a content rich web site that will provide IEEE RS organizational data, technical reports and data, and tools (These capabilities are under development)
  - Publicize state of the art work in the IEEE Transactions, Spectrum magazine, our web site, and discussion groups
  - Enhance the RS promotional flyer with technical activities content
  - Build templates, guides and resources to guide and mentor new members of the society and profession
  - Interface with other technical societies and collaborate on joint ventures to gain synergy
  - Deliver technical information through: classes, tutorials, DVD's, and online collaboration (meetings)

Technical Activities organization:

Sam Keene VP Technical Activities

Tech Ops Deputy	Dennis Hoffman
Tech Ops Japan	Shuichi Fukuda
Tech Ops Europe	Enrico Zio
Tech Ops Taiwan	Shiuhpyng Shieh
Tech Ops Communications	Lon Chase

Technical Pillar leads:

Jim McLinn	System of Systems Development and Performance
Robert Stoddard	Software Development and Performance
Lou Gullo	System/Subsystem Development and Performance
Aaron Dermarderosian	System Foundation Development and Performance

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### Announcements:

[Security & Privacy \(S&P\) Magazine](#)

[RAMS 2010](#)

[UK & RI Outreach Seminar Workbooks](#)

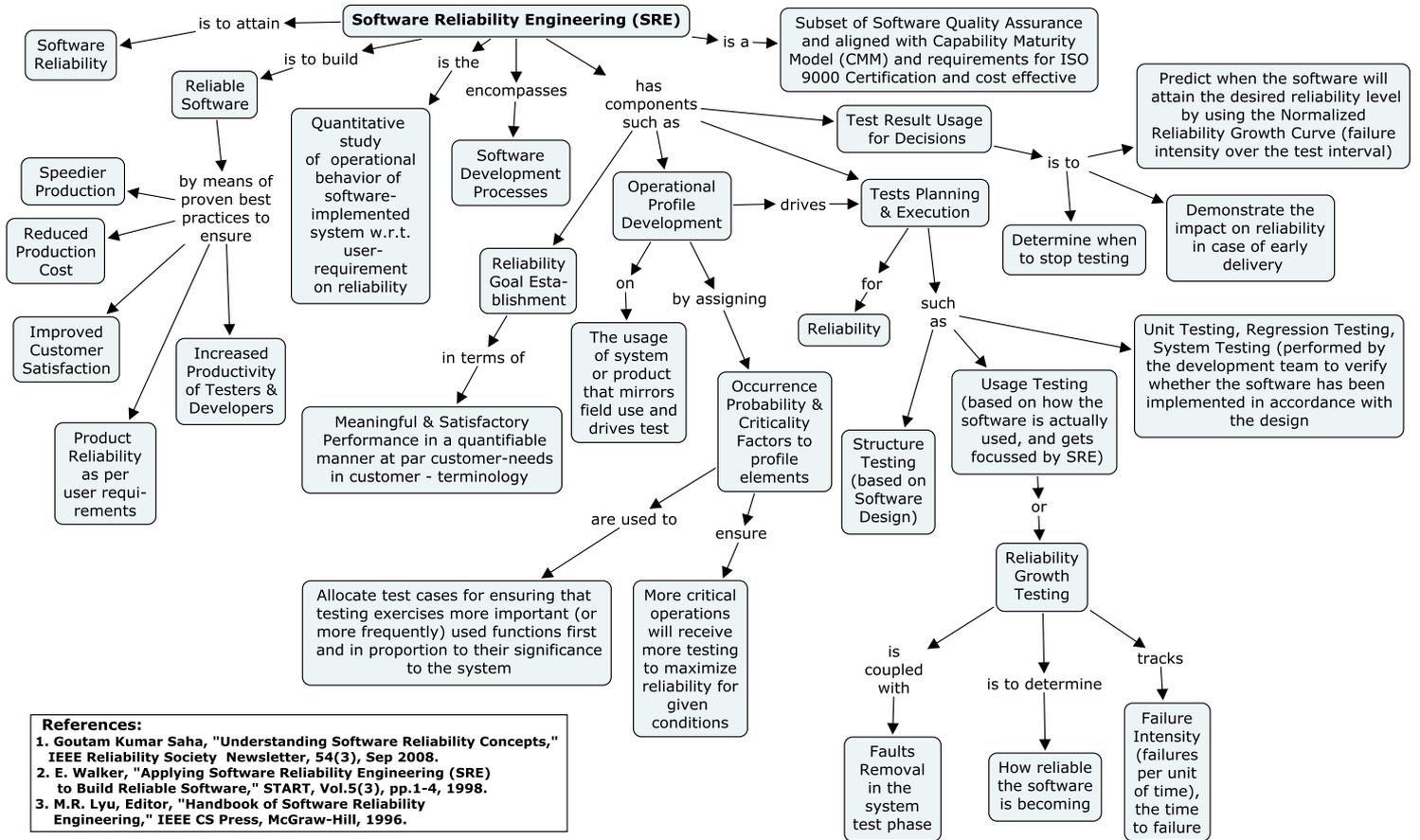
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# Software Reliability Engineering (SRE) Concept Map

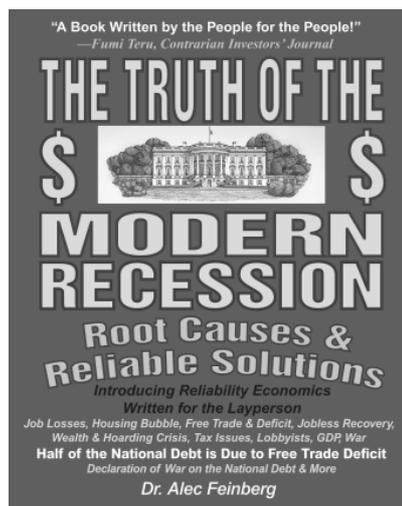
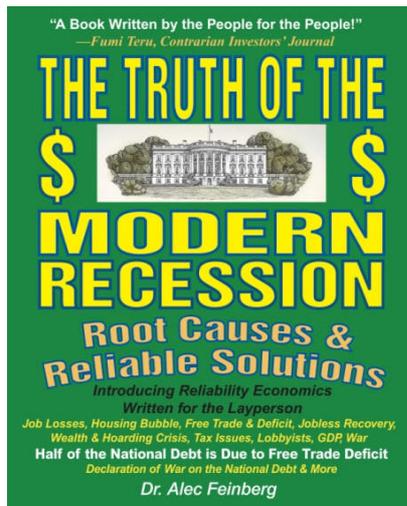
By Goutam Kumar Saha  
SMIEEE <sahagk@gmail.com>

IEEE Reliability Society Newsletter, Vol. 55, No. 1, March 2009



## References:

1. Goutam Kumar Saha, "Understanding Software Reliability Concepts," IEEE Reliability Society Newsletter, 54(3), Sep 2008.
2. E. Walker, "Applying Software Reliability Engineering (SRE) to Build Reliable Software," START, Vol.5(3), pp.1-4, 1998.
3. M.R. Lyu, Editor, "Handbook of Software Reliability Engineering," IEEE CS Press, McGraw-Hill, 1996.



The Truth of the Modern Recession,  
Root Causes and Reliable Solutions,  
By Dr. Alec Feinberg

This book is written from the point of view of a reliability engineer. Dr. Feinberg, also author of Design for Reliability, uses his background to investigate the economy in the same way he does product reliability. The result is potentially a new science, Reliability Economics. The author reasons that if industry spends millions of dollars each year ensuring viable products using the science of reliability, it might make sense to utilize this same set of tools in a similar manner to safeguard our economy. His book has been well received to date by reviewers, and the IEEE reliability society will be hosting his talk soon on Reliability Economics. Chapters start-off typically with a Failure Modes Effects Analysis on the main topics of the Modern Recession. Some of the FMEA root analysis findings conclude that: 1) Half of our National Debt is due to the accumulation of years of free trade deficits. 2) A root-cause collapse of Lehman Brothers from a top-down perspective was blamed on money market failures and unsubstantiated marketplace rumors. 3) the U.S. has a lopsided tax structure with increasing tax brackets as you make more money, except after \$372,950. There for example, a person who makes \$1 billion dollars in a year is illogically in the same 35% tax bracket as one who makes \$372,950. 4) However, the top 1% to 5% of the wealthiest individuals in the 35% bracket (some who made \$1 Billion Dollars or more in a year) actually paid taxes at about the 20% tax rate (in 2006). 5) The wealthy top 5% pay 60% of all U.S. taxes while the bottom 50% pay roughly only 3% of all taxes. The effect of these root cause failure modes are fiscally irresponsibility leading to U.S. job cuts, individual hoarding, a society of haves and have nots, and an increase in our National Debt. The book lists for \$19.95 on Amazon.

I would like to inform you about some of the efforts we (the IEEE Baltimore Reliability Society) have been involved recently. For your reference, I have attached the chapter newsletter which includes details of past and upcoming events.

Also, I would like to share the POC information of the new Baltimore RS board (attached weblink) [http://ewh.ieee.org/r2/baltimore/rls/ieee\\_rs\\_officers.html](http://ewh.ieee.org/r2/baltimore/rls/ieee_rs_officers.html)

Best Regards,  
Yamaris Soto  
IEEE Baltimore RS Chair  
[yamaris.soto@ieee.org](mailto:yamaris.soto@ieee.org)



## IEEE Baltimore Reliability Society Newsletter

October 2009

Vol 1, Issue 1

### Greetings IEEE BRS Member,

The Baltimore Reliability Society would like to thank everyone who was able to attend our first **Professional Networking** social at the Hilton Baltimore (photo below) as well the **Technical Seminar** hosted in Northrop Grumman ES Baltimore Facility titled: " Logistics vs. Reliability Based Spares Modeling".



### In This Issue

Next Technical Meeting  
RAMS 2010 Conference  
IEEE BRS Membership

[Join our Mailing List!](#)

### Join us for our Next Technical Meeting !!

#### Technical Paper:

The Impact of Changes in Defense Policy on

## Reliability and Sustainment

The paper assesses the impact of policy and legislative changes in the area of reliability program plans, reliability growth tests, review criteria, and "enablers" that facilitate the RAM/sustainment outcomes.

The strengthening of Systems Engineering (SE) processes and reviews as part of DoD's risk reduction strategy are discussed in the context of the impact of technology on reliability and sustainment via Technology Readiness Assessments and Competitive Prototyping.

### **Guest Speaker: Patrick M Dallosta, CPL**

Performance Learning Director,  
Life Cycle Logistics Defense Acquisition University

#### **Biography:**

Patrick M. Dallosta is the Program Director for Logistics and Sustainment at the Defense Acquisition University. Mr. Dallosta has thirty years of government, defense and industry experience in Reliability Engineering, Program Management, Logistics Management and Quality Management with applications in the areas of communications-electronics, power generation, satellites, shuttle payloads, avionics, weapons systems, curriculum development and Operations and Maintenance training.

#### **Date:**

November 12th, 2009

#### **Time:**

12:00 noon - 1pm

#### **Location:**

Northrop Grumman ES Facility, Baltimore MD  
7323 Aviation Blvd  
Baltimore MD 21240 (Gate # 2)  
Central Bldg -HR Executive Conference Room (CR-30)

#### **Space is limited!**

To reserve your seat,  
please RSVP to [latoya.spells@ieee.org](mailto:latoya.spells@ieee.org) by Nov 4th, 2009

## RAMS 2010 in San Jose, CA

### **RAMS 2010: Transcending Traditional Reliability Approaches-from Theory to Practice**

The Annual Reliability And Maintainability (RAMS) publicity video, posted on YouTube for the 2010 Symposium is provided for your reference:

<http://www.youtube.com/watch?v=k3x7HsoUEcY>

For questions regarding the 2010 RAMS Symposium, please contact:

Walt Willing  
walter.willing@ngc.com  
410-765-7372

## IEEE BRS Membership - Join us!

### IEEE BRS Membership Benefits:

- IEEE Transactions on Reliability (electronic)
- IEEE Transactions on Device and Materials Reliability (electronic)
- Digital Library - International Symposium on Physical & Failure Analysis of Integrated Circuits (1997-present)
- IEEE Reliability Society Conference Digital Library: Access to the Annual Reliability and Maintainability Symposium (RAMS) (1988-present) and IEEE Reliability Physics Symposium (IRPS) (1988-present) (electronic)
- Society Newsletter
- Interesting Technical seminars and the opportunity to grow your professional network

### IEEE Baltimore Reliability Chapter's Mission:

Promote dissemination of best practices and advancements in reliability engineering among members and professionals to provide a platform for further career development and knowledge transfer.

**Renew your membership online today!** <http://www.ieee.org/web/membership/societies/RL007.html>

### Contact us

For questions or additional information on how to get involve in the IEEE Reliability Society, please contact any of our officers. Point of Contact Information can be accessed following the attached website [http://ewh.ieee.org/r2/baltimore/rls/ieee\\_rs\\_officers.html](http://ewh.ieee.org/r2/baltimore/rls/ieee_rs_officers.html)

Best Regards,  
The IEEE Baltimore Reliability Society

## Dallas Chapter

Faye Bilger  
Chapter Chair

### Dallas chapter recent activity:

**Title: "Security and Privacy Issues on Online Social Networks"**

Date: Thursday, Nov 5, 2009

Speaker: Dr. Murat Kantarcioglu, UT Dallas

#### Program Summary:

On-line social networks (OSNs) are platforms that allow people to publish details about themselves and to connect to other members of the network through friendship links. The existence of OSNs that include person-specific information creates both interesting opportunities and challenges. For example, social network data could be used for suspicious event detection. At the same time, security and privacy concerns can prevent such efforts in practice.

This talk discusses the security and privacy issues in online social networks and discusses our current work on how to use social network data without sacrificing privacy and security. We give an overview of how to develop efficient access control techniques for online social networks using semantic web technologies. In addition, we discuss how to launch inference attacks using released social networking data to predict undisclosed private information about individuals. We will then discuss three possible sanitization techniques that could be used in various situations.

#### Speaker:

Dr. Murat Kantarcioglu is currently an assistant professor of computer science at the University of Texas at Dallas. He has a Ph.D. degree from Purdue University in 2005. He received his master's in Computer Science from Purdue University in 2002 and his bachelor degree in computer engineering from METU, Ankara, Turkey in 2000. He is also a recipient of the NSF CAREER Award.

His research interests lie at the intersection of Privacy, Security, Data Mining and Databases: Security and Privacy issues raised by data mining; Distributed Data Mining techniques; Security issues in Databases; Use of data mining for intrusion and fraud detection. His current research is funded by grants from NSF, NIH, AFOSR, ONR and IARPA.

**Title: "Risk-Based Testing"**

Date: Thursday, Dec 3,

2009

Speaker: Dr. Rajesh Subramanyan, Siemens Research

#### Program Summary:

Risk-based testing (RBT) is a type of software testing that prioritizes the features and functions to be tested based on priority/importance and likelihood or impact of failure. Techniques like boundary value analysis aim to find the area most likely to be defective, thus the tester is already selecting tests based on risks. RBT offers an exciting approach to cost effective testing.

This talk will focus on "practical" RBT and cover areas including:

- Applying RBT; i.e. transforming theory to practice
- Fitting RBT to agile methodology
- Measuring the effectiveness of RBT
- Benefits and Challenges of RBT

#### Speaker:

Rajesh Subramanyan is a project manager with Software Development Technologies at Siemens Corporate Research (SCR), Princeton, NJ. He has been with SCR, Software Engineering department since July 2005. He is currently serving as a program-chair for 34th IEEE COMPSAC and a steering committee member of SSIRI 2010.

Prior to joining Siemens, he was a visiting assistant professor with CS Purdue University between 2003-2005 where he ran a successful software development life cycle program in collaboration with large industries like HP, Cisco, Microsoft etc.

His current interests include broad areas of software engineering with focus on quality & testing. He has a PhD from ECE, Purdue having worked in the areas of large distributed computing, performance engineering & networking and MS in EE from the University of Houston.

## **Twin Cities IEEE Reliability Society**

Twin Cities RS Chapter Report for December, 2009

During the Fall of 2009 the Twin Cities chapter of IEEE RS held three chapter meetings. All were joint with two societies participating (IEEE-RS and ASQ-RD) to create a large pool of reliability interest. All Twin Cities RS meetings are open to other reliability societies and we have regular participation from the ASQ Reliability Division at every meeting, the Twin Cities SRE and Twin Cities IEST at each meeting. Other chapters of IEEE also participate in special meetings such as September 2009

Chris Simon, General Dynamics presented on September 22 th. to the Twin Cities Reliability Chapter, the Twin Cities Management Chapter and the Twin Cities PES chapter his creation. Chris had converted his gasoline powered Ford Focus to all electric battery powered version operating at 136V DC. Chris first presented the overview and details of this year long project and then demonstrated the car operation in the parking lot. The joint meeting with the two other societies was a great success with 50 people attending. Chris showed what we all could do to advance technology.

The October 20 th. Reliability meeting generated great interest in the Twin Cities Section. Kelley Weyrauch of Medtronic spoke on "Generating Agile Software for enhanced Reliability". Kelley explained how the formal Agile Development process leads to higher reliability of the software. This software process has a well developed formalism that can be learned and used to document progress during the development cycle. Kelly showed some outputs and examples of what could be done. A total of 31 people attended from IEEE RS, ASQ RD and SRE. They gave the speaker rousing applause at the end.

The November 17 th. Reliability was titled "Semiconductor Memory Reliability" and focused upon the recent history of DRAM, SRAM, FLASH and MRAM memory options. The Speaker, Patrick Ryan of Seagate, showed the limits of each memory, the typical reliability and indicated what the future of each memory type held. This meeting was joint with IEEE RS, ASQ RD and SRE, enthusiastically attended by 22 people. A spontaneous 45 minute question and answer session finished the meeting.

On January 19 th, 2010, the Twin Cities reliability chapter will present John Hoschette, Manager at General Dynamics speaking upon "Finding a Job in a Nightmare Economy". John has published two books about helping yourself in your engineering career. We anticipate this will be well attended as this meeting will be joint with the IEEE Management Society.

The Twin Cities chapter is planning additional meetings in 2010 and at least one seminar for the local reliability professionals.

Contact James McLinn at 763 498-8814 or [JMReL2@Aol.com](mailto:JMReL2@Aol.com) for more details of Twin Cities RS Chapter activities.

Report by IEEE Singapore REL/CPMT/ED Chapter for October-December 2009

The Chapter organized a series of talk over the past three months.

1. Dr Steven H. Voldman, Intersil Corporation, USA on “Latchup in Semiconductor Components and Systems” on 6 October 2009, Nanyang Technological University.
2. Prof. JJ Liou, University of Central Florida, on “Compact Modeling of Silicon Controlled Rectifier for Electrostatic Discharge Computer-Aided Design Applications” on 16 October 2009, Nanyang Technological University.
3. Mr. Jan de Vreugd, Delft University of Technology, Netherlands, “Determination of Mechanical Properties of Molding Compound”, on 7 December 2009, National University of Singapore.
4. Mr. Gerd Schlottig, Infineon Technologies AG, Delft University of Technology and Fraunhofer Institute, “Delamination of the Si-EMC interface: Why and How?”, on 7 December 2009, National University of Singapore.
5. Mr. An Xiao, Delft University of Technology, Netherlands, “Temperature Moisture and Mode Mixture Dependent Interfacial Toughness of EMC-Copper (Oxide) Interfaces for Semiconductor Applications”, on 7 December 2009, National University of Singapore.

The Chapter hosted the EPTC 2009, 11th Electronics Packaging Technology Conference, on 9<sup>th</sup>-11<sup>th</sup> December 2009 at Shangri-La Hotel, Singapore. This premier international conference is jointly sponsored by IEEE CPMT Society and Singapore Exhibition and Convention Bureau. This 3-day event featured Keynote Addresses, Executive Forum, Short Courses, Workshop, Exhibitions, Technical Sessions and Social Networking activities. A total of 173 papers were selected for oral presentations and 21 papers were selected for poster presentations. These papers covered a wide spectrum of topics including Advanced packaging Technology, Material & Processes, Electrical Simulation & Signal Integrity, Mechanical Simulation & Structural Integrity, Interconnect Technology, Quality & Reliability and Emerging Technology. In spite of the slowdown in business activities, there were over 350 delegates from 25 countries, 41 universities, 15 research institutes and 34 corporations attended the conference. Professor Rao Tumalla of Georgia Institute of Technology and Professor Fujio Masuoka of Unisantis Electronics, delivered keynote addresses at the opening of the conference. EPTC 2009 was honored to have Dr William Chen, President of IEEE/ CPMT Society, to organize and chair the Executive Forum entitled "Electronics & Semiconductor Leading the Economic Recovery". The speakers were from KPMG, Texas Instruments, Fraunhofer Institutes and ASE. Dr Charles Bauer of Tech Lead chaired a workshop on "Challenges and Opportunities of 3D Packaging". The conference also had 4 well attended short courses led by industrial and academic experts. This year, the table-top exhibition consisted of 11 companies to share and promote their services and products at EPTC 2009.

Submitted by Kin-Leong PEY, Chair Singapore REL/CPMT/ED Chapter

Dear Fellow Reliability Engineering Leaders,

You will have received previous information of this Seminar and Workshop on Reliability with world leading contributors, held during 14-15 September 2009. The event was supported with a Workbook incorporating an Extended Abstract and Slide-handouts provided by each speaker, adding up to 160 printed pages. A few extra hard copies of the Workbook were printed in case others who did not attend the event wished to obtain a copy. These few copies may be purchased for GBP 35 or USD 50 plus cost of postage.



Information about the event is retained on the website <http://reliability-outreach.gre.ac.uk/>



If you, your members or your colleagues are interested in obtaining a copy, the arrangement will be made through the office that handled the event registrations which can also take your delivery details and credit card payments, email: [m.a.greenaway@gre.ac.uk](mailto:m.a.greenaway@gre.ac.uk)



Sincerely

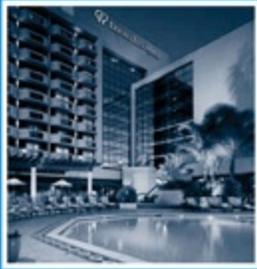
Nihal Sinnadurai

Chair, Reliability Society UK & RI

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# Can you find the way to San Jose?

"The 56th Annual Reliability and Maintainability Symposium."



[www.rams.org](http://www.rams.org)

Join us January 25-28, 2010 at the fabulous Doubletree San Jose Airport Hotel for the best value in Reliability, Availability, and Maintainability knowledge sharing.

Our theme this year—"Transcending Traditional Reliability Approaches—*from Theory to Practice*" provides for a focused program that will enable you and your organization to optimize the mitigation of risk and the performance of your systems.



## Save the Date: January 25-28, 2010.



SAE International



The World's Team in Aerospace Leadership



Celebrating 125 years  
of engineering the future



Institute of  
Industrial Engineers  
A Better Way

