



THRESHOLD™

The ESD Association newsletter, published for everyone with an interest in the understanding and control of electrostatic discharge.

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November/December 2011

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Reminders

- IEW Call for Presentations**
Abstract Submission Deadline - November 13, 2011
- 2012 Symposium Call for Papers • Student Call for Papers**
Abstract Submission Deadline - January 13, 2012

Numerous individuals contribute to the success of the industry, organization, and events. For those who go above and beyond, the ESD Association annually recognizes individuals who have made a lasting impact on the Association or on the ESD industry. These awards are presented at the annual EOS/ESD Symposium.

Awarding Excellence!



Outstanding Contributions Award:
Steve Gerken (left)
presented by John Kinnear (right)

The Outstanding Contributions Award is the ESD Association's most prestigious award. It is awarded to an individual who has made a major contribution to either the development or the operation of the ESD Association or has had a significant impact in the field of EOS/ESD.



Founders Award:
Burt Unger
accepted by Terry Welscher (left)
on behalf of Burt Unger
presented by Tim Maloney (right)

The Founders Award is presented to a Member or former member of the ESD Association who was involved in the formation and growth of the ESD Association or the EOS/ESD Symposium. The Founders award is presented at the Annual General Meeting.



Industry Pioneer Award:
Don Yenni (left)
presented by Dave Swenson (right)

The ESD Association Industry Pioneer Award is presented to an individual whose contributions, vision and service helped to form, or significantly change, the industry.



David Barber Memorial Award:
Tim Maloney (right)
presented by Gianluca Boselli (left)

The David Barber Sr. Memorial Award is presented to an individual who has made a significant contribution to the development, organization, management and growth of the EOS/ESD Symposium. The candidate for this award is chosen by the Symposium Business Unit Manager and current General Chair, and is presented at the annual volunteer recognition event.

Continued on page 2

Association

Symposium Awards continued



Ed Weggeland Memorial Recognition Award:

Stephen Halperin of SH&A and Prostat

Ron Gibson (left) Craig Zander (center left) Steve Halperin (center right) presented by Lisa Pimpinella (right)

The Ed Weggeland Memorial Recognition Award is presented to individuals and/or companies who have demonstrated exemplary dedication to the ESD Association through continuous support of programs, leadership in the various committees and, above all, for making indelible contributions to the management of the organization.



President's Award:
Ginger Hansel (right)

presented by Donn Bellmore (left)

The President's award is presented in recognition of significant contributions, leadership and management that has enhanced ESDA operations and effectiveness in serving industry and the organization. The candidate is chosen by the ESDA President and is presented at the annual volunteer recognition event.



TPC Award:

Ann Concannon (left)

presented by Theo Smedes (right)

The ESD Association Technical Program Committee award honors individuals for outstanding contribution to the Symposium Technical Program Committee.



Education Recognition:

Leo G. Henry (right)

presented by Ginger Hansel (left)

In recognition of outstanding contributions to the Education Committee.



Volunteers Recognizing Volunteers

Volunteer Merit Award:

Alan Righter (right)

presented by Donn Pritchard (left)

The Volunteer merit award is to recognize the dedication, exemplary effort, and/or outstanding participation of an ESDA volunteer in regard to the development and promulgation of ESDA activities and committee work with the nominations coming from volunteer peers.



Symposium Award:

Elyse Rosenbaum (left)

presented by Robert Gauthier (right)

Awarded to a volunteer who supports the EOS/ESD Symposium through their participation and active involvement.



Volunteer Award:

Dale Tucker (right)

presented by Donn Pritchard (left)

In recognition of exceptional volunteer service, dedication and support of the ESD Association.



General Chair's Plaque:

Robert Gauthier (left)

presented by Gianluca Boselli (right)

Presented to the General Chair in recognition of their commitment, dedication, and leadership in their position as Symposium General Chair.

Continued on page 3

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Symposium Paper Awards



Best Paper Award
as selected by the Awards Committee

On the Dynamic Destruction of LDMOS Transistors beyond Voltage Overshoots in High Voltage ESD
Yiqun Cao, Ulrich Glaser, Joost Willemen, Stephan Frei, and Matthias Stecher, Infineon Technologies, and Technische Universität Dortmund



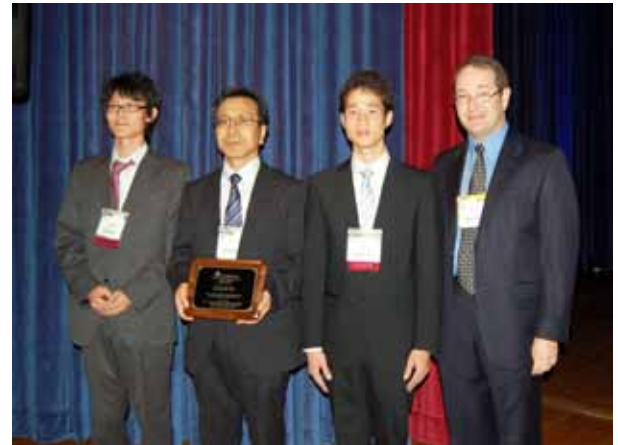
Symposium Outstanding Paper
as voted by attendees of the 2010 Symposium

The Relevance of Long-Duration TLP Stress on System Level ESD Design
Gianluca Boselli, Akram Salman, Jonathan Brodsky, and Hans Kunz, Texas Instruments, Inc.



Best Student Paper Award
as selected by the Awards Committee

Investigation of Current Flow During Wafer-Level CDM Using Real-Time Probing
Nathan Jack and Vrashank Shukla
Advisor – Prof. Elyse Rosenbaum University of Illinois at Urbana-Champaign



Friendship Award
Best Paper 2010 RCJ ESD Symposium, Japan

Characteristic of Radiated Electromagnetic Wave by ON/OFF Discharge on Sub-Micron Gap
Takayoshi Ohtsu
Co-authors: Shunsuke Okada, Shota Ito, Shogo Imai, Ryota Oka, Kazuyuki Tanitsuji, Taro Takai, Hiromichi Fujikawa, Suzuka National College of Technology

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From the President

Inside ESDA....



Donn G. Bellmore

It is hard to believe that two years as ESDA President are rapidly coming to a close! The time seems to have flown by and it was my distinct honor and a privilege to serve as your President. My commitment and support of this great organization will continue in the future and I have, along with hard work, enjoyed the fun and laughs with my ESDA family.

I would like to welcome the new officers, Leo G Henry 2012 President, Terry Welsher 2012 Senior Vice President, and Robert Gauthier 2012 Vice President. I know they will dedicate themselves to their positions and hope they enjoy it as much as I did. The ESDA officers, directors, business unit managers, committees, and committee chairs are all volunteers and I want to recognize and thank them for being

a part of what makes ESDA a superb industry organization. You all are part of the ESDA family and without you we could not succeed. Thank you!! I also want to thank our EXCOM Team consisting of Leo G Henry, Terry Welsher, Robert Gauthier, Donn Pritchard, Dave Swenson, and Lisa Pimpinella; all of whom over the last two years have been invaluable to me and this organization. I appreciate their passion and commitment to ESDA.

I also want to thank our fantastic headquarters staff. I enjoy calling the office to hear a touch of cheery sunshine when Karen answers the phone. Karen is our primary customer service representative and we count on her to make your headquarters experience a great one. Terry works primarily within the Marketing and Communications group and has worked hard to transform the website to make it easier and more efficient for our customers use. Terry also works with many other organizations to improve our operation. Christina works hard to keep up with all of the Standards Groups volunteers and has the largest number of volunteers to interact with. She also interfaces with other professional organizations and she represents ESDA in a professional manner. I also want to thank Lisa, who I caution you, is capable of close to total recall, and sometimes that comes back to us directly. It is amazing how we can be sitting in a meeting and she

remembers what is written in minutes the rest of us are trying to find. Regardless of what you might call it, Lisa is a valuable resource who is on top of all of the events and activities. She has put together an impressive and efficient team. As a volunteer, the Headquarters staff has helped me immensely and when working with all volunteers, Lisa, Christina, Terry, and Karen all really strive for success of the volunteers and are committed to ESDA.

Next year should be an exciting time as we continue to battle the economic trends and work hard to remain in service to our great industry, customers, and volunteers. I welcome all of our new officers, board members, and volunteers to our family. I am excited to see their planning vision for the next few years. I personally, cannot wait to get on to my next assignment as Past President. I think I'll be able to handle that.

Once again, I would like to thank everyone and as this year comes to an end and wish each and every one of you a Happy, Healthy, and Prosperous New Year.

Donn G. Bellmore

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Association

ANNUAL REPORT OF DIRECTORS EOS/ESD ASSOCIATION, INC.

The following is a summary of the financial position and operating results for the periods indicated:

	Jan-July 2011 (un-audited)	2010 (audited)	2009 (audited)
Total Assets	\$1,099,358	\$1,016,701	\$935,521
Total Liabilities	(\$11,548)	(\$70,623)	(\$ 71,761)
Net Assets Unrestricted	\$1,087,810	\$946,078	\$863,760

	Jan-Aug 2011 (un-audited)	2010 (audited)
Operating Income	\$810,162	\$829,202
Functional Expenses	\$551,964	\$1,102,273
Increase (Decrease) in Net Assets	\$258,198	\$37,163

* Note: The un-audited Jan-Aug 2011 figure does not include 2011 Symposium/Tutorial program expenses.

The following is ESD Association membership numbers for the period indicated. All membership lists, including address information, are stored in a database at the Headquarters office.

	Jan-Aug 2011	2010	2009
Total Membership	1413	1616	1680

**ESD ASSOCIATION
ELECTS BOARD
MEMBERS AND
OFFICERS FOR 2012**

Election results were reported during the annual ESD Association business meeting luncheon at the 2011 EOS/ESD Symposium, in Anaheim CA.

Elected to the Board of Directors, by the members of the ESD Association, for a three-year term from January 1, 2012 to December 31, 2014, were Kevin Duncan, Seagate Technology; Harald Gossner, Intel Mobile Communications; Michael G. Khazhinsky, Silicon Labs; and Alan Righter, Analog Devices.

The Board of Directors also elected its officers, for a one-year term, of January 1, 2012 to December 31, 2012. The following officers were elected: Leo G. Henry, ESD-TLP Consultants, LLC, President; Terry Welsher, Dangelmayer & Associates, Senior Vice President; and Robert Gauthier, IBM, Vice President.

Do you know who did that?

Developing ESD training materials is a challenging experience; the presentation programs and formatting of text, images, and even equations, takes time and experience. To make sure that the student has an accurate visual reference to understand the

materials presented, the presentation must be formatted correctly.

One volunteer recently went one step above the expected contribution, and voluntarily assisted an instructor in formatting calculation formulas in a presentation.

Kathy Muhonen spent a large amount of her time and knowledge of Microsoft equation editor to assist with the re-formatting of the Electrostatic Calculations for the Program Manager presentation.

Kathy's dedication to the ESDA and extra effort as a volunteer have earned her special recognition by the Association.

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2011 Research Grant Awards

The ESD Association promotes research in understanding the impact of new materials in the electronics industry with a perspective on the technology roadmap for ESD. Each year, research grants are awarded to further work towards these goals that is being conducted at leading universities.

Each 2011 research grant award is for \$10,000. The award is granted to an academic professor or researcher who may wish to conduct exploratory work in the field of ESD. The outcome of the research should advance the fundamental understanding of ESD knowledge. The work could be any field of ESD including device/design, materials, test methods, or factory control methods. The researchers are required to first publish the outcome of the work at the ESD Symposium before submitting to any professional journal.

Recipients are:

UNIVERSITY OF CALIFORNIA,
SANTA BARBARA

Prof. Kaustav Banerjee, University of California. The title of the research is Investigation of High-Current/ESD Behavior of Emerging Graphene Based Green Electronics. Recognizing the importance of graphene as a new advanced material with impact on future ESD development, the Association Board of Directors have approved to award a research grant in the sum of \$10K to Prof. Kaustav Banerjee for the year 2011-2012. We are excited about this novel research work being done at the UCSB and for the world recognition in advanced electronics.

UNIVERSITY COLLEGE LONDON
Dr. Katherine B. Holt, University College London. The title of the research is Investigation of Charge Accumulation by Insulating Materials Using in-situ Surface Spectroscopy. The Association Board of Directors have approved a research grant in the sum of \$10K to Dr. Katherine B. Holt for the year 2011-2012. The ESDA is looking forward to Dr. Holt's research on monitoring the surface chemistry of two model systems (polystyrene and silica nanoparticles) using Attenuated Total Reflectance Infrared (ATR-IR) spectroscopy.

ESD Association Symposium and Exhibit Attendees Donate \$2,600.01 to Support the Orangewood Children's Foundation

During the 2011 EOS/ESD Symposium the ESD Association and event attendees opened their hearts and their pockets to support the Orangewood Children's Foundation. The Children's Foundation is one of Anaheim's local organizations chartered to build the county's first emergency shelter for abused and neglected

children called the Orangewood Children & Family Center. The Foundation works to meet the ongoing needs of children while in foster care and as they transition out of the system into independent adulthood. The foundation's programs offer hope, healing, education and assistance, and are ultimately designed to break the

generational cycle of child abuse. We are very pleased to have been able to assist the foundation by raising funds and awareness for the foundation. The Association would like to offer a special thank you to all who gave and will continue to support organizations local to the annual Symposium.

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ESDA SPOTLIGHT: William DeJean

"The ESDA organization is unique in its "Commitment to Excellence" demonstrated by the members, staff and volunteers in providing a professional and efficient profile. As important, it is a remarkable fraternity of relationships that develop into genuine friendships. I am honored to be a member of your organization!"



In 1966, Bill DeJean initiated his career in the electronics industry with a sales position at Fansteel, Inc., providing refractory metal components to power semiconductor device manufacturers in California and Arizona. In 1968, following Fansteel acquiring Ceramics International, a ceramic-to-metal packaging device manufacturer, he was appointed sales manager for their domestic electronics markets.

Bill joined Ceradyne, Inc. in 1970, as program manager to coordinate the introduction of high thermal dissipation ceramic packages for power transistor device packaging applications.

In 1972, Bill founded Electronic Technical Services, Inc., dba California Technical Services [CTS], to specialize in providing direct materials and process equipment required in the manufacturing of Semiconductor, RF, Microwave, Hybrid and Military devices. For the next 35 years, CTS represented the premier manufacturers providing these products to these electronic device markets in California.

In 1977, Bill founded TDI International Inc., which today is an international supplier of precision hand tools and cleanroom/assembly equipment to the electronics, medical device, disk drive,

biotechnology, and pharmaceutical industries. TDI relocated from Northern California to Tucson, Arizona in 2000.

During the 1990 time frame that the disk drive industry was converting to ESD sensitive MR heads, Bill coordinated the development of static dissipative tweezers to meet the extremely low current/voltage and contamination requirements in handling MR Sliders, HGA, HSA and HDD assemblies.

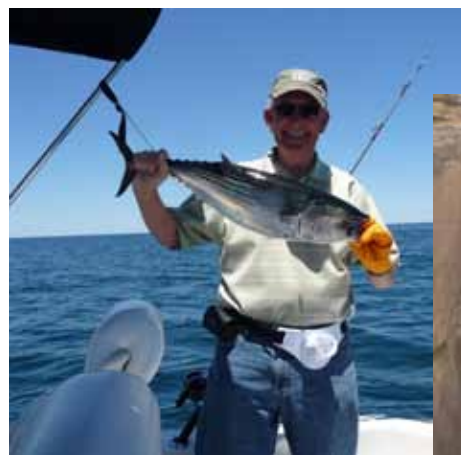
He was also a member of the IDEMA hand tools standards committee [1994-1996] as these static dissipative tweezers specifications were reviewed and defined, including "transient current discharge" disk drive industry performance requirements.

Bill joined the ESD Association in 1995

and TDI has exhibited at virtually all of the annual ESDA Symposium events. Currently, he is chair of the seating five-year review committee and a member of the hand tools standards committee.

Bill and his wife Karen have been married for 28 years and she is his important partner in TDI, serving as VP/GM of operations. His son, Dr. William DeJean PhD, resides in Sydney Australia and is directing the introduction of AVID into Australia, a youth educational opportunities program.

Bill is a graduate of St. Joseph's College, Indiana, B.S. Marketing [1964]. His hobbies include off-road camping/hiking, fishing, and photography. His interests also include the Native American culture with particular focus on the Hopi tribe of the Pueblo Nation.



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Symposium

“SNAPSHOTS FROM SYMPOSIUM”

The EOS/ESD Symposium would not be what it is without the support of our exhibitors. In the exhibit hall there were a variety of displays for ESD testing and control equipment, clothing, protective packaging, and consultants.



The Exhibit Hall was a bundle of activity from the setup on Monday through the welcome reception and on into the next two days that included demonstrations and networking. The 2011 symposium offered exhibitors the opportunity to give a special demo presentation to attendees. Thirteen exhibitors presented a twenty-minute demo to visitors and customers interested in their products.

During the welcome reception, exhibitors, attendees, and customers enjoyed an evening of conversation and refreshments while getting to know the companies who offer ESD products and services.



The attendees were enticed to visit the Exhibit hall often and enjoy a session break or lunch while perusing the many exhibitor booths.

We would like to thank all of the exhibitors who continue to support the Association and help to make the Annual EOS/ESD Symposium a rewarding event for everyone who attends.

A special thank you to **Samsung** for sponsoring the WiFi connection in the registration area and exhibit hall.

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Standards Update

Standards Working Group activity updates

September 2011 Meeting Series, Disneyland Hotel, Anaheim, CA



Standards Committee meeting attendees in Anaheim CA, September 2011

WG1.0 – Wrist Straps

The working group (WG) began reviewing and adjudicating Standards Committee (STDCOM) vote-by-mail (VBM) comments on ESD WIP1.1. The WG will finish between meeting series and submit the document for industry review.

WG2.0 – Garments

The WG reviewed and adjudicated STDCOM VBM comments on ESD WIP2.1. Technical changes were made to the document so it will be distributed for a VBM between meeting series.

WG3.0 – Ionization

The WG reviewed editorial changes in ANSI/ESD SP3.3. The document is being recommended for reaffirmation at the February meeting series. The WG reviewed changes to ESD WIP3.4. A new block diagram will be added and the document will be sent to the Technical and Administrative Support Committee (TAS) by November 1st. The WG continued reviewing ESD

WIP3.1. Changes are being made to add a voltage follower type ionizer. The WG reviewed data comparing performance of field meter type and voltage type using a steady state DC ionizer. The data collected shows good correlation. Additional comparisons will be conducted using pulsed DC to further understand ionizer technology influence on measurement technology.

WG4.0 – Worksurfaces

The WG reviewed ESD WIP4.1. Further changes will be made to add sections for mobile carts and conveyors that are used as work surfaces. This will be included in the new revision of ANSI/ESD S20.20. Steve Gerken provided data to review on new voltage resistance test method for work surfaces. The information gathered will be looked at as a new test method document to replace the current test method in ANSI/ESD STM4.2. ANSI/ESD STM4.2 will be recommended for reaffirmation at the February meeting series.

JWG – (HBM) Device Testing. (formerly WG5.1)

The WG reviewed the current status of ANSI/ESDA/JEDEC JS-001 and the limited ballot that is currently in the JC14 voting machine. The document will be sent to TAS for review after the JC14 meeting in September and then the document will be distributed for STDCOM VBM before the February meeting series. The WG reviewed member comments on the “user guide” technical report (TR) draft. A final draft is expected for submission to TAS in October. The WG reviewed new changes identified for 2012.

WG5.2 – (MM) Device Testing

The WG adjudicated STDCOM VBM comments on ESD WIP5.2. A discussion was held to change the final re-designation of ESD WIP5.2 from standard practice (SP) to standard test method (STM) to address comments received in the VBM process. The WG will adjudicate STDCOM VBM comments on ESD WIP5.2.1 and ESD WIP5.2.2 between meeting series.

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Standards Update continued

JWG – (CDM) Device Testing. (formerly WG5.3.1)

The WG completed gathering data on 1 GHz and 3 GHz multisite JEDEC vs. 10 ohm CDM and the WG has begun analyzing the data. There were three presentations given: Tim Maloney (Intel) - Filter Models of CDM Measurement Channels, Tim Maloney (Intel) - 50 ohm self-resonance in 10 ohm CDM test head, Andrea Boroni (ST Microelectronics) – CDM on Package With Metallic Slug. The WG reviewed the latest draft of the joint CDM document. Questions remain on the specifications for CDM metrology chain and measurement specifications for JEDEC coin modules. A task team was formed to review these sections of the document and define the specifications. Updated data on multisite 10 ohm CDM vs. JEDEC testing was reviewed. 1 GHz data showed peak currents that were very close but 10 ohm data showed more spread (higher standard deviation) for peak current, faster FWHH, and nearly equivalent integrated charge. 3 GHz data showed peak currents that were 20-30% higher for 10 ohm CDM than for JEDEC, but 10 ohm data showed slightly less spread (lower standard deviation) for peak current, faster FWHH, and nearly equivalent (but more spread) in integrated charge compared to JEDEC. Discussion was held about the data and industry benefit from moving to 10 ohm CDM based on results, and if all the items causing variation were properly addressed. The 10 ohm results would create increased peak currents than JEDEC if the WG moved forward with the new direction. The WG decided not to move forward with 10 ohm CDM and better address the issues causing variability. It was

decided that a new round of multisite data gathering would be conducted, comparing the CDM system ESDA 1 ohm head (without a ferrite) / JEDEC field plate dielectric, with the standard JEDEC head / JEDEC dielectric.

WG5.4 – (TLU) Device Testing

The current work on the new technical report was summarized. The introduction and the large section about the phenomenon (physical background) are completed. A new section on analog circuits and ICs will be added. There are two different classes of TLU effects - the first class can be reproduced with JEDEC 78 static latch-up with increased compliance levels; the second class requires transient methods, e.g., transmission line pulsing with powered devices. These test methods will be discussed in the TR as base for further work of the working group. The TR should be ready for final review in February 2012 and is targeted for release in mid-2012. Two new TLU phenomena have been reported. Reinhold Gärtner (Infineon) gave a presentation on transient triggering of bipolar transistors during ISO 7673 stress tests for an automotive application. Charvaka Duvvury (Texas Instruments) presented the turn-on of an ESD power clamp during IEC system level tests which causes the system to fail. Both examples show latch-up typical behavior although the physical phenomenon behind the fail is different to “classical” latch-up. These examples will be included in the TR.

WG5.5 – (TLP) Device Testing

The WG reviewed VF-TLP round robin data. The conclusion is that some data requires explanation as to why some of the statistics were out of expectations. The data will be submitted to TAS for review. Two presentations were given: Tim Maloney – Filter Transients for Transient Phenomena, and Kathy Muhonen – Transient TLP.

WG5.6 – (HMM) Device Testing

Two Presentations were given: David Tremouilles gave a presentation on using HMM to investigate the ESD robustness of three different processes and the ESD endurance. Robustness is a figure of merit describing the range of failure with one zap. Endurance is a figure of merit that defines the parts ability to withstand repetitive zaps at the same voltage level. Jon Barth gave a presentation on characterizing the ESD guns based on total energy. This, he believes would bring the failure levels of a part closer together when using different guns. A discussion was held about total energy being the next best way to characterize the guns. Based on this discussion, it was clear that some liked this idea and others did not believe it would get us any closer to a repeatable and reproducible test. Two sub-committees were formed to conduct studies on testing repeatability. One committee will use Jon Barth’s proposal to characterize the guns based on how much energy is in the waveform. The other committee will investigate using pulsers instead of the ESD guns to see if that may yield a repeatable waveform. These committees will report back at the

Continued on page 11

INTERFERENCE TECHNOLOGY

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Standards Update continued

WG5.6 – (HMM) Device Testing cont.

February meetings with their findings. All agreed that the two sub-committees were a better idea than tightening up the waveform tolerances to +/-10% and then conducting another round robin with those pieces of equipment that could hold to the tighter tolerances. In the meantime, it was decided that the results from the round robin should be submitted as an abstract for the 2012 Symposium and in a trade journal.

WG7.0 – Flooring

The WG reviewed the final changes to ESD WIP7.1 and ESD TR7.0. The files have been submitted to headquarters for STDCOM VBM for ESD WIP7.1 and publication of ESD TR7.0.

WG9.0 – Footwear

The WG reviewed and finished adjudicating TAS comments on WIP9.1 and WIP97.1. The documents will be distributed for STDCOM VBM between meeting series.

WG10.0 – Handlers

The WG discussed Arnie Steinman's and Vladimir Kraz's test data presented at the June meeting. The conclusion is that voltage measurements and resulting currents of the smaller target in the test fixture was linear and correlated to the CDM testing data provided by Alan Righter. The WG reviewed the targets tested and the target recommended by Tim Maloney. After reviewing the data and target types, the group confirmed the previous decision to replace the large target contained in ESD WIP10.2 with the smaller target.

WG11.0 – Packaging

The WG reviewed and adjudicated TAS comments for ANSI/ESD STM11.31. The document will be recommended for reaffirmation in February. The WG is beginning new work on a document related to the physical characteristics of bags.

WG12.0 – Seating

The WG reviewed comments submitted by five industry users of chairs and technical changes were made. The document will be submitted to TAS for review. No meeting was held during the September 2011 meeting series.

WG13.0 – Handtools

The WG reviewed and began adjudicating STDCOM VBM comments on ESD WIP13.1. There were technical changes made so the document will be submitted for another VBM.

WG14.0 – System Level ESD

The WG reviewed and adjudicated STDCOM VBM comments on ESD WIP14.1. The document will be submitted for industry review. ESD WIP14.4 will be combined with ESD WIP14.3 and submitted to TAS before the February meeting series. Work is continuing on TR and ESD WIP14.5 (EMI scanning). A brainstorming session was held about new work the WG would like to pursue next.

WG15.0 – Gloves

The WG finished adjudicating VBM comments on ESD WIP15.2. Technical changes have been made so the document will be submitted for another VBM.



WG2.0 – Garments meeting, Anaheim, CA, September 2011

WG17.0 – Process Assessment

The WG continued working on the HBM section of the document. The focus is more on process and less on instruments right now.

WG20.20 – ESD Control Program

The WG continued reviewing and revising ESD WIP20.20 during the five-year review. The main topics discussed were order of insulators, the values in Table 3, changes to Table 3, and editorial changes for clarification in the document. The document should go to TAS in November for review.

WG53 – Compliance Verification

The WG voted to keep the document as a technical report instead of re-designating it as a standard practice. The WG continued reviewing and adjudicating TAS comments on TR53. The document will go to TAS for review by the end of September.

WG 97.0 – Footwear Systems

The WG reviewed and finished adjudicating TAS comments on WIP9.1 and WIP97.1. The documents will be distributed for STDCOM VBM between meeting series.

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As secretariat of ISO/TC 209, IEST offers ISO 14644 and ISO 14698 standards, as well as peer-approved standardized procedures, IEST Recommended Practices.

Standards

Standards Working Groups

There are over 70 active volunteers who belong to one or more of 23 active standards working groups. Working groups meet three times each year to develop modify and review ESDA standards, test methods, practices, and technical reports to ensure that they are up-to-date and meeting industry needs. They also collaborate between meetings by phone and email as the process of creating documents requires.

The working group volunteers conduct round robin testing, participate in presentations and demonstrations to make sure our documents are accurate.

Although volunteers spend many hours on the development of the documents, the networking benefits of being an ESD Association volunteer have been expressed by many of our volunteers.



Attending a meeting as a guest can be a great way to experience what the ESD Association Working Groups are about. If you are interested in a specific group come to the meetings and join in the discussions. Meeting schedules are posted on the ESDA Website at <http://esda.org/calendar.html>.

If you know someone who may be interested in something a WG is doing, please invite them to join our next meeting or send their contact information to the WG chair and ESDA headquarters so a personal invitation can be sent.

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“Local Sparks”

The Local Chapter Connection

Northeast Chapter

The NE Chapter continues to enjoy strong attendance at our meetings. On October 19th we have a plant tour scheduled at Benchmark Electronics that promising to be very interesting. Donn Bellmore is schedule to give a presentation on Automation Analysis later this year. We will also be holding a joint meeting with IEEE early next year.

Silicon Valley ESD Society

SiVa will hold their next meeting on November 15th, 2011. The meeting will include a GROUNDING for TODAY Presentation, titled “From Finding Simple Grounding to High Frequency Types”. Finding ground noise on power lines and grounds inside and their effect on EOS is not an easy task. Come hear an industry expert on this subject give personal experience and tools to fight this industry wide problem. The first presentation will by Vladimir Kraz, Onfilter Inc.

A second presentation will be given by Marti Farris, Intel Corporation, on the changes to the newly released Human Body spec, ANSI/ESDA/ JEDEC JS-001-2011. The talk will cover the four significant changes; I/O to I/O combinations have been reduced to Coupled Pin Pairs, two pin testing for low parasitic testers are allowed, elimination of cross domain I/O to power supply testing, and single polarity supply to supply testing.



New Korea Chapter provisional recognition presented to Joshua Yoo, President (left) and Elly Koo, Liaison (right) by Donn Prichard of the ESD Association.

Welcome Korea Chapter!

The newest local chapter representing the ESD Association

Korea Chapter

During the 2011 EOS/ESD Symposium In Anaheim, the ESD Association awarded provisional recognition for the formation of its newest local chapter in Korea.

Meetings for 2012 have been set:

- Feb 9th 2012, SEMICON KOREA at COEX
- May, 2012, Korea Chapter Conference
- Aug, 2012, Membership / Working Group Meeting
- Nov, 2012, Working Group Meeting

You can visit their website, which is still under construction, and will officially launch in Dec of 2011. <http://www.esd.or.kr>.

For more information on the Korea Chapter Contact:

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Elly Koo, Liaison
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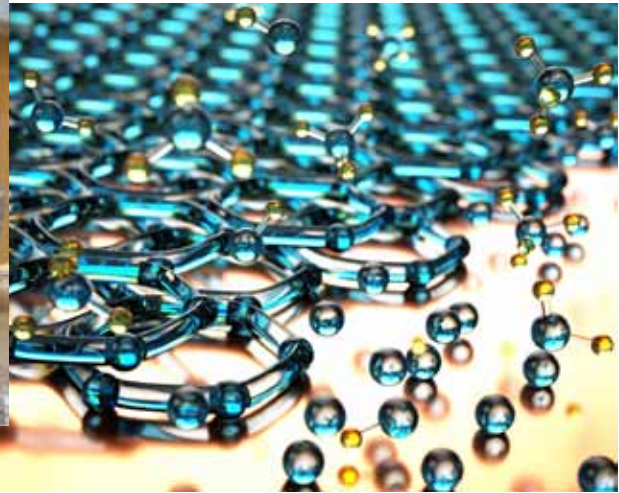
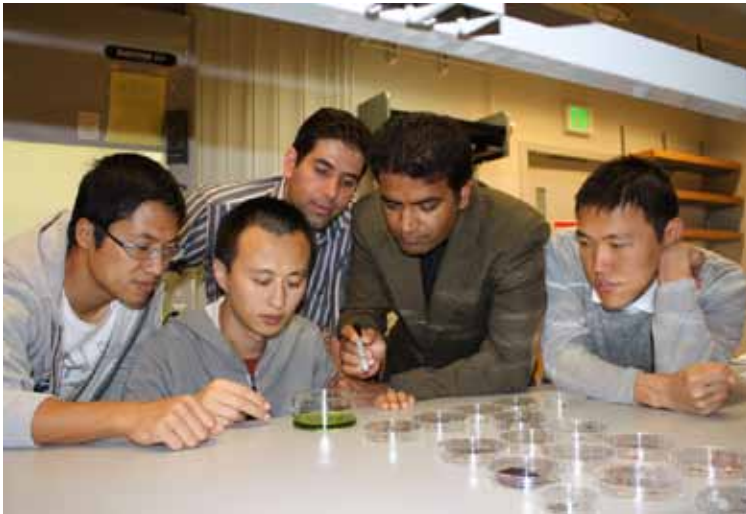
Quick Links to ESD Local Chapters and affiliated organizations

ASEMEP ESD Council • aec.asekep.com.ph
Asociación ESD de Mexico • www.esdmexico.com
Indian Chapter no website available
Korea Chapter • <http://www.esd.or.kr>
North Central Chapter • www.esdnorthcentral.org
Northeast Chapter • www.nechapter-esda.org
Silicon Valley EOS/ESD Society • www.esdiscovery.org
Texas Chapter • www.Centxesdassoc.homestead.com

For more information on starting a local chapter or student chapter visit <http://esda.org/chapters.html>. Or contact the ESD Association at 315-339-6937.

Graphene Adds New Dimension to ESD: Research at University of California at Santa Barbara (UCSB)

by Charvaka Duvvury



The structure of new exciting material graphene (right) and Prof. Banerjee with his graduate students at the UC Santa Barbara synthesizing the new material for applications in green electronics (left).

Visiting universities to give on-campus seminars on ESD is always exciting. Just when you think you have covered all the advances in the semiconductor technologies and their potential impact on ESD, the academic research takes another leap, making us wonder if we should support research on yet another new topic. For example, recently we had to wonder and investigate about 3-D transistors and strain-induced devices. But on my recent visit to present a student/faculty seminar on advanced ESD issues at UCSB during this year's Symposium, I learned that researchers at UCSB are now moving along with the next generation electronics with graphene-based transistors. This material graphene, composed of a single (or few) layer of Carbon atoms arranged in a hexagonal pattern, can become the ultimate

electrical conductor at room temperature, making it ideal for green electronics and medical technology plus many other applications such as ultra-efficient solar cells. But perfecting the synthesis of this material is the key challenge if these exciting features are to be realized. Professor Kaustav Banerjee, Director of Nanoelectronics Research Lab at UCSB, and his group have discovered a new way to synthesize high quality graphene.

What does this have to do with ESD? According to Professor Banerjee, "Although, from a purely materials perspective, they are known to sustain high current densities, there is almost no information in the literature about the high current / ESD behavior of graphene-based transistors as well as interconnects lying

over or embedded in dielectrics. Such studies can not only help understand some fundamental issues in these structures but can also help open up exciting new applications and opportunities in the Green Electronics arena including their novel ESD protection solutions." The ESDA is pleased to announce that Prof. Banerjee has been awarded \$10K for his proposal to study the characterization of graphene-based devices and to model their electro-thermal behavior. This work is to be funded during 2011-2012 period and will be mentored by Dr. Christian Russ from Intel's Mobile Communication Division, in Munich, Germany. We are looking forward to this exciting work and offer our congratulations to Professor Banerjee!

Q&A

Generic Tape for Sealing Static Dissipative Bags

Q What are your thoughts on the use of regular Scotch tape for sealing static dissipative ESD bags? I am developing an ESD process and this question came up in one of our review meetings and we could not fully support saying YES or NO.

A Normal office tape should not be recommended for use in sealing bags. The plain tape you mention is often used in classes and by consultants to demonstrate static charge generation. A typical roll of plain office tape will produce electrical field values of 8kV to 12kV at 1 inch when a piece is

unrolled quickly. That does not sound like something that should be used in an ESD protected area. That being said, it most certainly should not be used on static dissipative bags since these types of materials do not provide any level of electrical field shielding. You probably could get away with sealing static discharge shielding bags (metallize film) or most moisture barrier type bags since they have a metal layer to provide shielding and the electrical field from the charged tape would be attenuated on the outside surface of the bag. However, the simple answer to your question would be No, not a good idea.

Your ESD control areas should be evaluated for insulators and only process essential insulators allowed. A process essential insulator could include tape but to meet the requirements you would have to ensure that the electrical field was less than 2,000 volts at 1 inch as a starting point. For close proximity to ESD susceptible items, the field strength should be lower. You would be much better off using a low-charging tape or labels made for sealing bags.

The response given is a service to industry; the ESDA is not responsible for content. The users of this information need to determine the suitability of the response.

Education

ESD PROGRAM DEVELOPMENT AND ASSESSMENT (ANSI/ESD S20.20 Seminar)

November 9-10, 2011 ESD Association, 7900 Turin Rd Bldg 3, Rome NY 13440
8:00 a.m. - 5:00 p.m.

Ron Gibson, Stephen Halperin & Associates; John T. Kinnear, IBM

This seminar provides instruction for designing and implementing an ESD control program based on ANSI/ESD S20.20. The course provides participants with the tools and techniques to prepare for an ESD facility audit. This two-day course is an ESDA certification requirement for in-plant auditors and program managers who are working toward professional ESD certification. The following topics are covered in this course:

- Overview of ANSI/ESD S20.20
- How to approach an assessment
- Administrative elements
- ESD program assessment
- ESD program techniques for different applications
- Technical elements
- Overview of the assessment process
- The audit checklist and follow-up questions

It is recommended that the ESD Program Development and Assessment Seminar be taken after the Certification candidate has taken most of the other Program Manager related tutorials.

NOTE:

This class is part of the Program Manager Certification curriculum. More details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification.html.

S20.20 SEMINAR

FOUR PART ONLINE TRAINING - ELECTROSTATIC CALCULATIONS FOR THE PROGRAM MANAGER

PART 1 ARCHIVED • PART 2 ARCHIVED

**PART 3-NOVEMBER 3, 2011 • PART 4-NOVEMBER 17, 2011
11:00 A.M. US/EASTERN TIME**

Instructors: Terry Welsher, *Dangelmayer Associates, L.L.C.*; Leo G. Henry, *ESD/TLP Consultants, L.L.C.*

This online tutorial is a four part series on Electrostatic Calculations. The material included is the same as is included in the full tutorial usually presented at the EOS/ESD Symposium or ESDA Regional Tutorials. The four parts focus on the basic calculations and techniques of use to the Program Manager and the ESD engineer. The content is at the introductory high school or college pre-calculus and introductory college physics level set in the context of electrostatic discharge and its effects. Each part also includes an additional review of the mathematics used in the practical calculations. In Part One the topics covered include the electric force, the electric field and Coulombs law, electric potential and voltage. Gauss' Law is discussed as it relates to the electric field, induction and the Faraday cup. Part Two covers capacitance, the fundamental equation $Q = CV$, the parallel plate capacitor, stored and transferred energy and electrical resistance. Part Three covers static decay as it relates to charge flow from humans, devices, wrist straps, dissipative materials and air ionization. Part Four covers relationships among ESD device testing methods and simple models for estimating failure levels of devices in terms of peak current, power, energy and threshold voltage for simple devices.

NOTE: Taking all four parts of this online calculations class will fulfill the requirement for the full length calculations tutorial that is part of the ESDA Program Manager Certification curriculum. Details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification.html. The Calculations class is recommended to help prepare for the INARTE ESD Engineer exam. For details visit www.esda.org/nartecert.html

CONTROLLING ESD IN AUTOMATED EQUIPMENT BY PROPER GROUNDING

**NOVEMBER 15, 2011 • 11:00 A.M. EASTERN TIME
COURSE LENGTH - ONE HOUR**

Instructor: Donn Bellmore, *Advanced ESD Services +*

Is your Automatic Handling Equipment (AHE) capable of safely processing the devices of today and future technologies with lower ESD thresholds? What is proper grounding and what should you look for and specify? What are the proper materials and designs to establish proper ground paths through the equipment? And finally, how do you measure them? This course will focus on the grounding and material requirements of ESD Controls in AHE for prevention of CDM and MM type damage to ESD sensitive devices. Design methods and material selections that provide effective ground paths through the assembly will be introduced. Test methods used to qualify the design will be discussed. Students will also become familiar with different types of plating and practices to provide effective designs.

SINGAPORE DECEMBER 12-14, 2011

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ESD Association Standards Overview

December 12 • 8:30 a.m. - 12:00 p.m.

David E. Swenson, *Affinity Static Control Consulting, L.L.C.*

The ESD Association's introduction of the program manager certification curriculum has created a need to modify the standards tutorial that has been presented for a number of years, mainly to help individuals prepare for the iNARTE engineering and technician exams. Currently, many of the ESDA standards and standard test methods are discussed in-depth in the individual tutorials related to the specific subject matter. This standards tutorial provides an overview of all the standards, grouped into common test types, based on measurement probe and test instruments. A common methodology is used in this tutorial to cover the requirements, applications and specifications for each standard and standard test method.

Note: This class is part of the Program Manager Certification curriculum.

Electrostatic Standards Overview – Outside of ESDA

December 12 • 1:00 p.m. - 4:30 p.m.

David E. Swenson, *Affinity Static Control Consulting, L.L.C.* • Leo G. Henry Ph.D., *ESD/TLP Consultants, L.L.C.*

The ESDA ESD Standards Overview course, that has been offered for years, mentions other related standards organizations, but only briefly, and not with the detail required to thoroughly answer any proposed questions from other documents. Most of these other documents have had an impact on the field of electrostatics. This new course provides more details on related standards and other publications to help prepare students interested in pursuing iNARTE certified ESD engineer or iNARTE certified ESD technician designations, and the course may also help the ESD certified professional program manager. These other standards developing organizations include: the National Fire Protection Association (NFPA), Semiconductor Equipment and Material International (SEMI), US Military, ASTM, JEDEC, Electronic Industry Alliance (EIA – operations terminated), IEEE, IEC, JEITA, ANSI and AEC. Standards, test methods, and related information produced by these other global entities are discussed. The requirements, specifications, applications, instrumentation, and basic procedures/methods will be covered and differences, where relevant, will be pointed out. The student attending this tutorial will have an understanding of the other organizations and their documents and what is important about them in the field of electrostatics.

System Level ESD/EMI: Testing to IEC & Other Standards

December 13 • 8:30 a.m. - 12:00 p.m.

Leo G. Henry Ph.D., *ESD/TLP Consultants, L.L.C.*

This tutorial is intended to help those tasked with testing products to IEC and other system level ESD standards by providing additional information on IEC 61000-4-2, the most widely used standard, and highlighting the harmonization and differences among IEC, ANSI, Telcordia, and some automotive ESD standards. We will answer common questions regarding test set-ups, test points and procedures, and address key issues, including: 1) Differences between "verification" and "calibration" and when is each required; the influence of ESDA WG14 (TR) on IEC and how it affects the calibration and verification procedures. 2) Test set-up requirements, the test environment, ground connections, and return paths and ground plane effects. 3) Testing procedures with demonstration on actual products, how the tester affects test results, and problems with test result variations due to simulator influences. 4) What points need to be tested and why, guidance on determining "operator accessible" points and ports, exempted points and ports, and what to do around connectors and connector pins. 5) ANSI and other ESD standards, the drive toward harmonization with IEC, why standards will probably never be the same as IEC, and the scope of different standards. This system level ESD tutorial will cover several facets of ESD as applied to electronic systems.

Note: This class is part of the Program Manager Certification curriculum.

Electrostatic Calculations for the Program Manager and the ESD Engineer

December 13 • 1:00 p.m. - 4:30 p.m.

Leo G. Henry Ph.D., *ESD/TLP Consultants, L.L.C.*

This tutorial focuses on the basic calculations and techniques of use to the program manager and the ESD engineer. The content is at the introductory college pre-calculus and introductory college physics level set in the context of electrostatic discharge and its effects. It is suggested that the student gain some familiarity with these subjects prior to the tutorial. Topics covered include the electric force, the electric field and Coulombs law, electric potential, and voltage. Gauss' Law is discussed as it relates to the electric field, induction, and the Faraday cup. The capacitance in $Q = CV$ is used to explain charge sharing. RC decay is discussed as it relates to ESD discharge from humans, devices, wrist straps, and materials. After completing this course, the attendee should leave with a proper understanding of the differences among the calculations for peak current, power, energy, and threshold voltage for a simple device.

Note: This class is part of the Program Manager Certification curriculum.

December 14 • 1:00 p.m. - 4:30 p.m.

iNARTE Certification exams for both ESD Engineers and Technicians.

Calendar of Events

November 3, 2011 Online training
Electrostatic Calculations for the
Program Manager • **Part 3**
[http://www.esda.org/documents/
Calculations%20Part1.pdf](http://www.esda.org/documents/Calculations%20Part1.pdf)

November 9-10, 2011 ESD Seminar
ESD Program Development and
Assessment (ANSI/ESD S20.20
Seminar)
ESD Association
Rome, NY 13440
[http://www.esda.org/documents/
S2020seminar11-2011.pdf](http://www.esda.org/documents/S2020seminar11-2011.pdf)
Register Online!

November 15, 2011 Online training
Automated Handling
[http://www.esda.org/documents/
AutomatedHandling11-2011.pdf](http://www.esda.org/documents/AutomatedHandling11-2011.pdf)

November 15, 2011
SiVa Local Chapter Meeting
AMD Commons Building
Sunnyvale, CA
<http://www.esdiscovery.org/>

November 17, 2011 Online training
Electrostatic Calculations for the Program
Manager • **Part 4**
[http://www.esda.org/documents/
Calculations%20Part1.pdf](http://www.esda.org/documents/Calculations%20Part1.pdf)

December 12-14, 2011
International ESD Seminar
ESD Association Standards Overview • Electrostatic
Standards Overview – Outside of ESDA • System
Level ESD/EMI: Testing to IEC & Other Standards •
iNARTE Exam
TÜV SÜD PSB Pte Ltd • PSB Science Park
Building 1 Science Park Drive, Singapore
Registration available soon!

Plan ahead!
February 7-12, 2012
ESD Association Meeting Series,
Westin La Paloma, Tucson, AZ

**“MORE
SNAPSHOTS FROM
SYMPOSIUM”**



A room full of supporters at the Annual Luncheon



Registration



Author's Corner



The Womens Reception

Photo Corner

*Goofy
attended Symposium!*

ESDA's President's Goofy moment



Poster setup



Read any ESD books lately?

Editorial Deadlines

Threshold™ is published six times a year by the ESD Association, a not-for-profit corporation. It strives for the advancement of theory and practice of electrical overstress avoidance and of allied arts and sciences and the maintenance of a high professional standing among its members and others.

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Threshold™ Publication Schedule

Issue	Deadlines
January/February	Nov. 19
March/April	Feb. 1
May/June	April 1
July/August	June 1
September/October	Aug. 1
November/December	Oct. 1

Threshold Institutional Listings

Space in the Threshold Institutional Listings, which appear at the bottom of newsletter pages, can be purchased for \$600.00 for six consecutive issues. Listings will also appear in the online calendar. Larger contributions are welcome. No agency fee is granted for soliciting such contributions. Inquiries, or contributions made payable to the ESD Association, should be sent to:
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