APEMC
Singapore 2012

www.apemc2012.org

2012
Asia-Pacific International Symposium on Electromagnetic Compatibility

21 - 24 May 2012
Resorts World Sentosa, Singapore

Towards Greener ICT

Final Program

Organisers and Technical Co-sponsors:

IEEE

EMC SOCIETY

Institute of High Performance Computing
A*STAR

NUS National University of Singapore

NANYANG TECHNOLOGICAL UNIVERSITY

浙江大學

Gold Sponsor:

CST

Silver Sponsor:

ST Electronics
A company of ST Engineering

In co-operation with:

CMA
CMA International Consultants Pte Ltd

ST Electronics

– *Your Partner in EMC & RF/Microwave Solutions*

At ST Electronics, we deliver innovative system solutions to government, defence, homeland security, commercial and industrial customers worldwide. A leader in Asia Pacific for EMC, RF/microwave and a diverse range of calibration and repair services, we have more than two decades of experience and track record which consistently meet the stringent demands of our customers. We are committed to offering quality services to all our customers, providing a wide range of turnkey solutions and services to suit your business needs.

EMC Services & Consultancy

- *Turnkey EMC Test Facility Solutions*
- *Architectural Shielding Solutions*
- *EMC Consultancy & Services for Military / Commercial Sectors*

Email: info_infocomm@stee.stengg.com

EMC TRONIC AB | Siepel | Eurofarad

EMC Test and Measurement Solutions

- *Amplifier Solutions from Instruments for Industries Inc.*
- *EMC and EMI Antennas from A.H. Systems*
- *Repair and Calibration Services by Instrument Calibration Centre*

Email: sales@stee.stengg.com

A.H. SYSTEMS | NSI NEARFIELD SYSTEMS, INC.

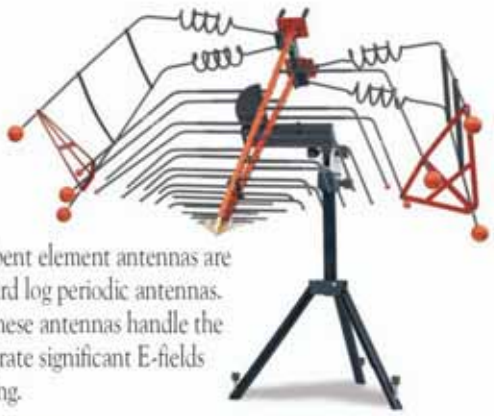
For more details, log on to:
http://www.stee.stengg.com

ST Electronics
A company of ST Engineering

What Have You Done For Me Lately? Plenty!

16,000 Watts of Pure Power

Stand back! We've exceeded our old limits with the new 16000A225 amp. It covers 10 kHz to 225 MHz and delivers 16,000 watts of power.



We've Bent The Rules

Our family of Radiant Arrow bent element antennas are up to 75% smaller than standard log periodic antennas. Covering 26 MHz to 6 GHz, these antennas handle the necessary power levels to generate significant E-fields for radiated susceptibility testing.

Our New Dual Band Amplifiers Break Down Old Barriers

With two amplifiers in a single package, you can finally go all the way from 0.7 to 18 GHz with the reliability of solid state.

We've Pushed TheTechnology Envelope

We ripped that envelope wide open with our small, lightweight Solid State Hybrid Power Modules. They deliver high output power (up to 5 watts) across an ultra-wide instantaneous bandwidth (4 to 18 GHz).

More Power To You

They're smaller and lighter. Yet our new "S" Series amps are available from 0.7 to 4.2 GHz, 20 to 1200 watts and everything in between.

Our New EMI Receiver: Amazing Speed, Incredible Accuracy

The CISPR-compliant DER2018 covers 20 Hz to 18 GHz and beyond. It combines sensitivity, dynamic range and speed with a more intuitive interface.

Accuracy, Linearity & Bandwidth. Need We Say More?

Our two newest laser-powered E-Field probes, FL7040 – 2 MHz to 40 GHz and FL7060 – 2 MHz to 60 GHz; each do the work of multiple probes, with outstanding accuracy and linearity.

All-In-One Fully Integrated Test Systems

Get more done in less time with everything right at your fingertips. Since it's all provided by AR, you obtain the best accuracy, lowest risk and greatest support in a fully tested system prior to shipping.

ISO 9001:2008 Certified

To learn more, visit www.arworld.us or call us at 215-723-8181.

rf/microwave instrumentation

Other ar divisions: modular rf • receiver systems • ar europe

USA 215-723-8181. For an applications engineer, call 800-933-8181.

In Europe, call ar United Kingdom 441-908-282766 • ar France 33-1-47-91-75-30 • emv GmbH 89-614-1710 • ar Benelux 31-172-423-000


Rely on the
market leader
We have what
you need.
Rohde & Schwarz provides EMC customers with
state-of-the-art test solutions for all requirements:
Widest range of test receivers and analyzers for EMI measurements
Turnkey EMC test systems
Most advanced and flexible broadband amplifier system
Software tools for computer-controlled EMC measurements
Radiated spurious emissions and over-the-air performance tests
of wireless communication devices
Want to learn more?
http://www.rohde-schwarz.com/ad/emc
More than
40 years of EMC
T&M experience
ROHDE&SCHWARZ

emtest
the benchmark for emc

EM TEST offers worldwide:

EMC-Simulators

for Automotive + Telecom + Consumer Products + Military + Industrial + Medical + Avionics + Renewable Energy

EMC-Solutions

for standards such as:
IEC/EN 61000-4-2,-4,-5,-6,-8,-9,-11,-16,-29, ISO 7637, ISO 11452, MIL-Std., DO-160, Airbus, Boeing ...

EMC-Service

Guaranteed by our excellent technical support and accredited calibration laboratory

EMC-Labs and Seminars

Implementation and effective transfer of our testing expertise and design knowledge for interference suppression

Your partner for all your needs throughout SOUTH EAST ASIA:

EM TEST Malaysia › 52200 Kuala Lumpur, Malaysia
Phone +603 6273 2201 › Fax +603 6274 2201 › Email sales@emtest.com.my
www.emtest.com.my

HAEFELY TECHNOLOGY

Customer satisfaction is our motto!

APEMC 2012 Singapore Exhibition
Visit us - **Booth 20**

*As a leader in the field of EMC, **HAEFELY EMC Technology** provides a high quality range of full compliance EMC test equipment for the market segments industrial electronics, telecom, household, medical, components, military and renewable energy. Our objective is to provide the best-in-class range of instruments that are flexible enough to be used in many applications including CE marking, product development, type verification, product safety, component and production testing. The new benchmark in a conducted immunity test system AXOS and the innovative ESD simulator ONYX are the perfect pair for your daily needs.*

COMPACT IMMUNITY TEST SYSTEM

AXOS 5

The new AXOS^5 compact immunity test system integrates all of the best features of our stand alone test systems into one single economic solution. It combines 5kV Burst/EFT, Surge combination wave, AC/DC Dips & Interrupts, along with an integrated single-phase coupling/ decoupling network (CDN) into one compact system.

www.axos.haefely.com

ELECTROSTATIC DISCHARGE ESD SIMULATOR

ONYX

The ONYX is a state of the art electrostatic discharge simulator available in 16kV or 30kV versions. It is the most ergonomic 30kV ESD gun without an additional based control unit that can be battery or mains operated. The easy to use touch screen, ergonomic design, modular RC units, multilingual interface, remote control software, built-in LED light and temperature & humidity display allows for trouble-free use of the ONYX in all types of test sites.

www.onyx.haefely.com

HAEFELY Test AG
Birsstrasse 300
4052 Basel
Switzerland
Mail: emcsales@haefely.com
Phone: +41 61 373 41 11 Fax: +41 61 373 49 12

S.E.A Rep:

Quantel Pte Ltd
46 Lorong 17 Geylang #05-02 Enterprise Industrial Building Singapore 388568
www.quantel.com.sg Mail: sales@quantel.com.sg
Phone: +65 6745 3200Fax: +65 6745 9764

NO LOSS ONLY PROFITS

WITH DIGITAL OPTICAL LINK

APEMC 2012
Singapore
Exhibition

Visit us :

Booth 20

PMM 9030/9060/9180

PMM 9010

DIGITAL EMC/EMI RECEIVERS
FULLY CISPR COMPLIANT
10 Hz – 18 GHz

PMM is the EMC Italian brand of NARDA Safety Test Solutions international group, leader for innovative solutions in EMC and EMF applications. R&D, manufacturing and calibration facilities for EMC products range are located in Italy, keeping full control on the whole development chain in just one site. Accredited Calibrations capabilities for RF Power and Electromagnetic Fields, plus Notified Body entitlement for EMC testing validation, do provide a 360° know-how in RF which can be directly transferred to development of its effective solutions. PMM brand is very well known first of all for its EMI Receivers up to 18 GHz, digital and fully compliant to CISPR & MIL Standards, with innovative direct antenna mounting for effective uncertainty reduction. Other solutions include Single/Four-Channels Click Analyzers, LISNs up to 300A, Antennas up to 18GHz, Field Probes up to 1500V/m, RF Generators, Power Meters, Conducted and Radiated Emission and Immunity Software.

PMM a brand of narda Safety Test Solutions® an L3 Communications Company

PMM-Narda Safety Test Solutions
Via Leonardo da Vinci, 21/23 - 20090 Segrate (Milano) - ITALY
Tel. +39 02 2699871 - Fax +39 02 26998700
www.narda-sts.it - email: support@narda-sts.it

S.E.A Rep:

Quantel Pte Ltd
46 Lorong 17 Geylang #05-02 Enterprise Industrial Building Singapore 388568
Phone: +65 6745 3200 Fax: +65 6745 9764
www.quantel.com.sg Email: sales@quantel.com.sg

SPONSORSHIP ACKNOWLEDGEMENT

The Organisers of
APEMC 2012
gratefully acknowledge the generous contribution:

Gold Sponsor
CST – Computer Simulation Technology

Silver Sponsor
Singapore Technologies Electronics

TABLE OF CONTENTS

MESSAGE FROM THE SYMPOSIUM GENERAL CHAIR

Wolfgang J. R. Hoefer

On behalf of the APEMC 2012 Steering Committee and the EMC Community of Singapore, I am privileged and honored to invite you, your colleagues and families to join us for the flagship event of Asia Pacific EMC from Monday, May 21 to Thursday, May 24 in Singapore, the Lion City.

The 2012 Asia-Pacific International Electromagnetic Compatibility Symposium and Technical Exhibition perpetuate a proud tradition that began in 2006 with the first EMC-Zurich in Singapore. That seminal conference combined the many scattered EMC events and initiatives in the region to form a major Asia-Pacific EMC Symposium with the scope and quality of the EMC Zurich in Europe and the IEEE EMC Symposium in the States. It was followed by the highly successful 2008 APEMC in Singapore, the 2010 APEMC in Beijing, and the 2011 APEMC on Jeju Island, Korea. The Asia-Pacific Symposium and Exhibition on Electromagnetic Compatibility has thus become a much anticipated annual event that moves among the different countries of the region and features a substantial industrial exhibition to address the needs of industry.

APEMC returns to Singapore in 2012 with the ambition to respond to the needs and aspirations of a rising EMC community in the region, to promote excellence among its members and to foster links to the rest of the world. We will offer a rich scientific program of highest quality with invited speakers from all over the world and provide a broad forum of exchange for both academia and industry. The Symposium will cover the entire scope of electromagnetic compatibility and extend to the emerging technologies associated with EMC. Prospective authors are invited to submit original papers on their latest research results. We also solicit proposals for topical meetings, special sessions, the industrial forum, workshops and tutorials. The IEEE EMC Society is the technical co-sponsor of this event. The IEEE MTT International Microwave Symposium (IMS) paper submission system is the official electronic paper submission portal for APEMC.

The venue for the Symposium and exhibition will be Resorts World Sentosa, Singapore, which boasts not only some of the best convention facilities for our technical sessions, workshops, special events and exhibits, but also world-class accommodation, spectacular attractions, entertainment, and fine dining for the entire family. Singapore is a vibrant, innovative, ultra-modern and safe city state that embraces many different cultures. Among its four official languages, English is spoken by virtually all its inhabitants.

So come and join us in Singapore in May of 2012 for an outstanding scientific/technical event and an unforgettable experience for you and your family.

With best wishes
Prof. Wolfgang J. R. Hoefer, IEEE Life Fellow
General Chair for APEMC 2012

MESSAGE FROM THE TECHNICAL PROGRAM CHAIRS

Er-Ping Li

James L. Drewniak

The Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) comes back to its founding place, Singapore, in 2012 again!

Despite the continuing economic dark clouds in the world, especially in the Europe and USA, the response to the paper call was overwhelmingly strong, with submissions received from 33 countries for this event. Over 300 full-paper submissions were received. Each paper was reviewed by multiple qualified reviewers and recommendations made by the topic chair on acceptance. The final paper acceptance was made by the technical program committee. Approximately 65% of the submissions were accepted for oral presentation at the Symposium. In addition, more than 50 papers were received for the special topic meetings, which feature advancements and recent developments in particular areas. Not only are the traditional topics such as shielding and grounding still well represented, but also some new areas join the EMC family with unique contributions and increasing importance such as nano-EMC and renewable energy EMC. In addition, some traditional topics such as low-frequency power systems are coming back to the center of the EMC field with a new face, for example, Smart Grid with new technical requirements and much better efficiency.

Furthermore, we are honored to have four renowned experts as keynote speakers who will share the most recent advances in their respective fields during the event. Four parallel tracks span three days of May 22-24 to address the advancements of EMC and the associated topics. Twelve workshops and tutorials with over 40 renowned EMC specialists from industry and academia will be held on May 21, the first day of the Symposium.

To honor Professor Ruediger Vahldieck, one of the pioneers in the EMC field, who made many significant contributions in computational electromagnetics, and to recognize his great contributions in the promotion of EMC in the Asia-Pacific region (he co-founded the first APEMC in 2006 in Singapore), a special session in his memory is featured in the technical program.

The Technical Program Committee has worked diligently to generate a diverse and well-organized technical program that spans a wide bandwidth of topics of importance to the EMC community. We take this opportunity to express our sincere appreciation to the TPC members, special session organizers, topical meeting chairs, workshop and tutorial organizers and speakers, and numerous reviewers for their effort and strong support.

We are honored and privileged to invite you, your family and friends to take part in this unique event - the 2012 Asia-Pacific EMC Symposium in Singapore from May 21 to May 24, 2012, and enjoy the tropical ocean atmosphere in Singapore, the most vivid city in the world, highly recommended in top travel magazines.

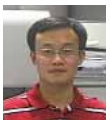
We are looking forward to seeing you in Singapore!

Chairs for Technical Program Committee
Er-Ping Li, IEEE Fellow
James L. Drewniak, IEEE Fellow

SYMPOSIUM STEERING COMMITTEE

General Chair
Wolfgang J. R. Hoefer
A*STAR Institute of High Performance Computing, Singapore

Program Chair
Xiangchang Wei
Zhejiang University, China



Symposium President & TPC Chair
Er-Ping Li
A*STAR Institute of High Performance Computing, Singapore

Publication Chair
Richard Xian-Ke Gao
A*STAR Institute of High Performance Computing, Singapore

Technical Program Committee Chair
James L. Drewniak
Missouri University of Science and Technology, USA

Finance Chair
Mark Tan
AAC Technologies, Singapore

Technical Chair
En-Xiao Liu
A*STAR Institute of High Performance Computing, Singapore

Publicity Chair
Eng Kee Chua
Nanyang Technological University, Singapore

Chair for Workshops and Tutorials
Huapeng Zhao
A*STAR Institute of High Performance Computing, Singapore

Symposium Secretariat
Allison Law
CMA International Consultants Pte Ltd, Singapore

Junhong Deng
TÜV SÜD PSB Pte Ltd, Singapore

Jenny See Toh
ETS – Lindgren Asia, Singapore

SYMPOSIUM TECHNICAL COMMITTEES

The Technical Program Committee (TPC) led by Prof. Er-Ping Li and Prof. James Drewniak, plays a significant role in the success of the Symposium, and has been actively involved in promoting the Symposium, organizing sessions and workshops, reviewing technical papers, and chairing sessions during the Symposium. The Technical Program Committee members for the 2012 APEMC are:

Technical Program Committee

Hideki ASAI, Japan	Wenxing LI, China	Kye Yak SEE, Singapore
Yoshihiro BABA, Japan	En-Xiao LIU, Singapore	Zhongxiang SHEN, Singapore
Jens BORNEMANN, Canada	Kai Sang LOCK, Singapore	Wah Hoon SIEW, United Kingdom
Flavio CANAVERO, Italy	Junwei LU, Australia	Poman SO, Canada
Bill Qinghua CHEN, China	Jaroslaw LUSZCZ, Poland	Ruixue SUN, Singapore
Xiang CUI, China	Junfa MAO, China	Thomas STEINECKE, Germany
Sonia Ben DHIA, France	Francesca MARADEI, Italy	Donglin SU, China
Alistair DUFFY, United Kingdom	Mark MONTROSE, USA	Madhavan SWAMINATHAN, USA
Jun FAN, USA	Ivan NDIP, Germany	David THOMAS, United Kingdom
Christophe FUMEAUX, Australia	Antonio ORLANDI, Italy	Jianqing WANG, Japan
Heyno GARBE, Germany	Hark Byeong PARK, Korea	Robert WEIGEL, Germany
Jinliang HE, China	Sergio PIGNARI, Italy	Perry WILSON, USA
Todd HUBING, USA	Farhad RACHIDI, Switzerland	Tzong-Lin WU, Taiwan
Sungtek KAHNG, Korea	William RADASKY, USA	Qun WU, China
Joungho KIM, Korea	Vladimir RAKOV, USA	Wenyan YIN, China
Wee Jin KOH, Singapore	Vesna ROJE, Croatia	Shih-Yi YUAN, Taiwan
Frank LEFERINK, The Netherlands	Franz SCHLAGENHAUFER, Australia	Qingsheng ZENG, Canada
Peter LEUNG, Hong Kong	Christian SCHUSTER, Germany	Yao-Jiang ZHANG, USA

International Advisory Committee

Flavio CANAVERO, Italy	Joungho KIM, Korea	Albert RUEHLI, USA
Christos CHRISTOPOULOS, UK	Liuji KOGA, Japan	Peter RUSSER, Germany
Marcello D'AMORE, Italy	Er-Ping LI, Singapore	Robert WEIGEL, Germany
Osamu FUJIWARA, Japan	Shanghe LIU, China	Ke WU, Canada
Todd HUBING, USA	Junfa MAO, China	Tzong Lin WU, Taiwan

Topical Meeting: 2D and 3D Integrated Circuit (IC) EMC

Chairs: Sonia Ben DHIA, France, and Fabian VARGAS, Brazil

Scientific Committee:

K. ABOUDA, France
A. BARIĆ, FER, Croatia
P. BESSE, Freescale, France
A. BOYER, LAAS CNRS, France
M. COENEN, EMCMCC, The Netherlands
C. DUEÑAS, Freescale, Brazil
B. DEUTSCHMANN, Infineon, Germany
F. FIORI, Polito, Italy
E. GATTI, INTI, Argentina
F. HERNANDEZ, Univ. ORT, Uruguay
R. MALTIONE, Freescale, Brazil
C. MAROT, EADS, France
M. RAMDANI, ESEO, France
L. PÖHLS, PUCRS, Brazil
F. SILVA, UPC, Spain
T. STEINECKE, Infineon, Germany
B. VRIGNON, Freescale, France
O. WADA, Kyoto Univ. Japan
X. C. WEI, Zhejiang Univ., China
S. YUAN, FCU, Taiwan

Topical Meeting: Power Systems and Smart Grid EMC

Chairs: Kai Sang LOCK, Singapore, and Wah Hoon SIEW, UK

Scientific Committee:

Henglin CHEN, China
Jinliang HE, China
KHALID Mohd Nor, Malaysia
Jaroslaw LUSZCZ, Poland
Farhad RACHIDI, Switzerland
William RADASKY, USA
Ener SALINAS, Sweden
David THOMAS, UK
KingJet TSENG, Singapore
Rong ZENG, China

Special Session Organisers

Iftikhar AHMED, Singapore
Hideki ASAI, Japan
Henglin CHEN, China
Meng CUI, China
Ken KAWAMATA, Japan
Peter LEUNG, China
William A. RADASKY, USA
Peter RUSSER, Germany
Eng Leong TAN, Singapore
Shuo WANG, USA
Huapeng ZHAO, Singapore

GENERAL INFORMATION

Registration

Early Bird Registration:

- **Author registration: the authors must register on or before 15 March 2012**
- **Early bird registration: for other delegates is on or before 16 April 2012**

Advance Registration: All attendees are required to register, including authors, workshop/tutorial instructors and exhibitors. For paper authors, inclusion of your final paper in the conference proceedings and IEEE Digital Library requires at least one of the authors on your author list to register on or before **15 March 2012** and attend the conference to give a presentation. The paper will not be included in the proceedings and IEEE Digital Lib (EI Index) if no presentation is given during the conference.

To register for the Symposium, please go to the on-line registration portal. Those who have registered can collect the official conference badges from the on-site registration desks upon arrival at the conference site.
On-line registration: http://www.apemc2012.org/registration.htm

Package-A: Full registration, 4-day registrants (21-24 May) are entitled to the Symposium proceedings (thumb drive) and admission to all the Workshops and Tutorials, Parallel Technical Sessions, Topical Meetings, Special Sessions, Technical Exhibitions, Welcome Reception and Symposium Banquet.

Package-B: Standard registration, 3-day (22-24 May) registrants are entitled to the Symposium proceedings (thumb drive), admission to the Parallel Technical Sessions, Topical Meetings, Special Sessions, Technical Exhibitions, Welcome Reception and Symposium Banquet. Attendance of Workshops and Tutorials requires an additional fee.

Students Rate is open to all full-time students and presentation of a student verification letter including student matriculation number (student ID), expiration date and university name. Student registration includes the Symposium proceedings (thumb drive), admission to the Parallel Technical Sessions, Topical Meetings, Special Sessions, and Technical Exhibitions**.** Attendance of Workshops, Tutorials and Symposium Banquet requires additional fee.

Withdrawal/Cancellation Policy & Invoices: We regret that no refund will be given for a registration withdrawal notice received after **1 May, 2012**. An administrative charge of SGD50.00 applies for all registration withdrawals. Substitutions are permitted. Mailing address on invoices shall follow addresses on the registration form.

Registration Enquiry
Symposium Secretariat
Miss Allison Law
Tel: (65) 6336 2328
Email: emcsingapore@cma.sg

Conference Venue

Resorts World™ Sentosa

Resorts World™ Sentosa – Asia's ultimate destination – is Singapore's first integrated resort that promises the richest experiences to last a lifetime.

Taking pride of place at Singapore's resort island of Sentosa and spanning 49 hectares, this mega-resort, costing S$6.59 billion to build, will be home to Southeast Asia's first and only Universal Studios theme park and the world's largest oceanarium, Marine Life Park.

The resort dazzles with 6 world-class themed hotels, Universal Studios Singapore® - a movie-themed park, Voyage de la Vie™ - a theatrical circus spectacular, and a myriad of gourmet fare with more than 60 restaurants featuring dining options by celebrity chefs.

The meeting and incentive event venues in Resorts World Sentosa™ comprises of The Resorts World Convention Centre™ which houses the largest column-free ballroom in the region, 30 function rooms, and also several indoor and outdoor spaces. The first corporate event was hosted in March 2010. They have since welcomed more than 415,000 MICE delegates and guests, with more than 2,300 corporate events in the past year.

Venue - Location Map

CONVENTION & EXHIBITION CENTRE

1 Resorts World Convention Centre™

HOTELS	ENTERTAINMENT & SHOPPING	ATTRACTIONS
2 Crockfords Tower	8 Gaming	12 Universal Studios Singapore
3 Hotel Michael	9 VOYAGE de la VIE	13 Marine Life Park
4 Hard Rock Hotel Singapore	10 St James Power Station	14 Maritime Experiential Museum & Aquarium
5 Festive Hotel	11 VivoCity	15 Festive Walk
6 Equarius Hotel (Opening Soon)		16 Crane Dance
7 Spa Villas (Opening Soon)		

Resorts World at Sentosa Pte Ltd
8 Sentosa Gateway, Sentosa Island, Singapore 098269
✆ +65 6577 8888 F +65 6577 8890
Website: www.rwsentosa.com

Nearest MRT Station: HabourFront Station in VivoCity Shoppling Mall

How to Get to Resorts World Sentosa

Please visit Resorts World™ Sentosa official website for more information on directions.

Car
If entering via RWS B1 car park (at the casino), only car park charges apply. If entering via Sentosa gantry, Sentosa Island admission and car park charges apply.

MRT
Take a **North-East** line MRT rail system, alight at HarbourFront Station. From there, you may take any of the following transportation:

- **The Sentosa Express**
- **RWS 8**

The Sentosa Express
Take the Sentosa Express located on Level 3 VivoCity (Lobby L) then alight at Waterfront Station. A flat fee of S$3.00 applies.

RWS 8
Proceed to the bus stop either outside VivoCity or Merrill Lynch HarbourFront. For a flat fee of S$2.00, guests will be taken into the resort.

Boardwalk / Travellator (Walking)
The Sentosa Boardwalk, featuring canopy-covered travellators, F&B and retail will let you take leisurely strolls to Sentosa. S$1 fee applies.

Taxi
Taxi bays are located at various points of the resort to ensure visitors easy access to taxis.
If entering via RWS B1 car park, only prevailing taxi charges apply. If entering via Sentosa gantry, Sentosa island admission and taxi charges apply. All guests departing from RWS will be required to pay S$3.00 surcharge.

Accommodation

Special rates have been negotiated for the 2012 APEMC in Singapore attendees at the hotels listed in the Symposium web. For hotel reservation, please refer to the conference website www.apemc2012.org/ travel_hotel.htm

Hard Rock Hotel
Rock and roll attitude meets five-star service at the Hard Rock Hotel Singapore. Breathtaking design, fashionable dining options, and the legendary entertainment experience only Hard Rock can offer make this the obvious choice for those looking for a stay that is beyond the ordinary.
Room rate per night: S$280++

Festive Hotel
Exuberant yet relaxing, Festive Hotel is ideal for vacationers seeking a welcoming and relaxing island stay. Other than the luxurious king-sized bed or twin beds, there's also a bonus sofa bed that folds out to a double bed in all rooms and loft beds to cater to the children in most rooms, so it's the perfect getaway hotel for families travelling with their kids.
Room rate per night: S$280++

Hotel Michael
Art lovers would appreciate this gem of a hotel, a tribute to one of America's greatest contemporary architects, Michael Graves. The designer lends his elegant, distinctive strokes to every aspect of this boutique hotel, from lamps to crockery, to lounge chair and carpet.
Room rate per night: S$280++

Furama City Centre
Furama City Centre is centrally located in vibrant Chinatown and at the fringe of the Central Business District (CBD). This Singapore business hotel is within easy access to Chinatown and Clarke Quay MRT stations, as well as shopping, food and entertainment.
Room rate per night: S$255++

Bay Hotel
Bay Hotel Singapore is a business choice, city getaway and lush escape all in one at the entertainment district and close to VivoCity, just outside of Sentosa.
Room rate per night: S$215++

Hotel registration enquiry and for other lower rate hotels, please contact
Symposium Secretariat
Miss Allison Law
Tel: (65) 6336 2328
Email: emcsingapore@cma.sg

Useful Information and Telephone Numbers

Restaurant and Food

Level 2, 3 & II

HARD ROCK HOTEL SINGAPORE

1. Rang Mahal Pavilion
2. The Rock Bar
3. Starz Restaurant
4. The Rock Bar

FESTIVE HOTEL

5. Boulangerie
6. Festive Pool & Deck (Level 3)
7. Fiesta (Level 3)
8. Festive Lounge

WORLD SQUARE

9. OSIA

HOTEL MICHAEL

10. Chinois
11. Palio
12. Michael's Lounge

Level 1

THE BULL RING

13. Chili's Grill & Bar
14. Noodle8

HOTEL MICHAEL

15. L'Atelier de Joël Robuchon
16. Joël Robuchon Restaurant

THE FORUM

17. The Coffee Bean & Tea Leaf
18. Putien
19. Hard Rock Café
20. Ding Tai Fung @Baits
21. Big Easy

WATERFRONT

22. Malaysian Food Street
23. Korean Charcoal BBQ Buffet
24. Singapore Seafood Republic
25. Anar

Basement 1

CROCKFORDS TOWER

26. Feng Shui Inn (Level G2)

THE FORUM

27. Imperial Treasure La Mian Xiao Long Bao
28. Bread Talk & Toast Box
29. Livewire – Pick & Bite
30. Only You Desserts
31. Lunar Café
32. Ramen Play
33. Ruyi

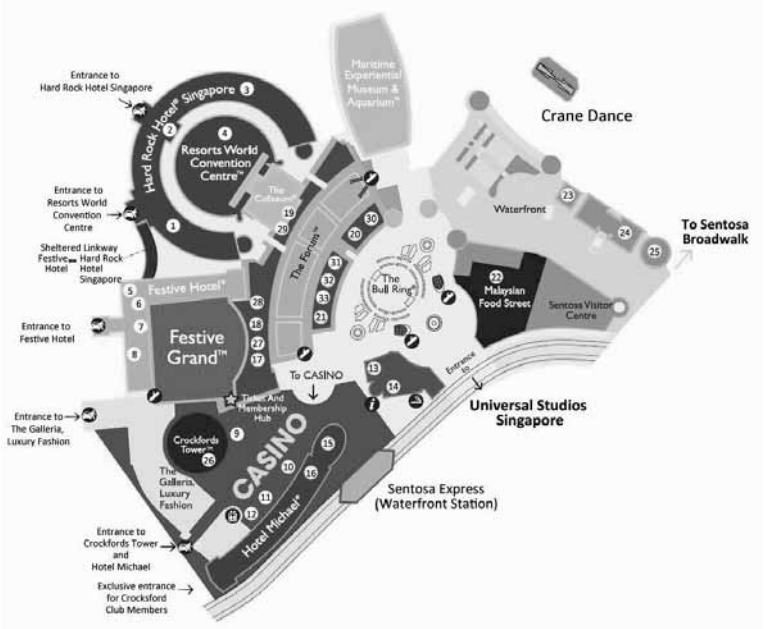
Getting Around

MRT

The nearest Mass Rapid Transit (MRT) station to the Symposium venue is Habour Front MRT Station. You may check for the exact fare at an MRT station or call the Transitlink hotline 1-800-225 5663 for assistance. The operating hours for the hotlines, from Mondays to Sundays (excluding Public Holidays), are 8.00 am to 6.00 pm.

Bus

Public bus (air-conditioned) fares are tied to routes. You may check with the bus driver for the exact bus fare of your intended route or call the TransitLink hotline 1-800-225 5663 for assistance.



Cab Calling

Dial-A-Cab	:	(65) 6342 5222
CityCab	:	(65) 6552 1111
SMRT Taxis	:	(65) 6555 8888

About Singapore

Tourist Hotli	:	1800 736 2000
Flight Information	:	1800 542 4422
Weather Forecast	:	(65) 6542 7788

Emergency

Ambulance	:	995
Police	:	999
Fire Brigade	:	995

Credit Cards

American Express	:	(65) 6396 6000
Diners Club	:	(65) 6416 0800
JCB	:	(65) 6734 0096
MasterCard	:	1636 722 7111
Visa	:	800 4481 250

Registration Hours

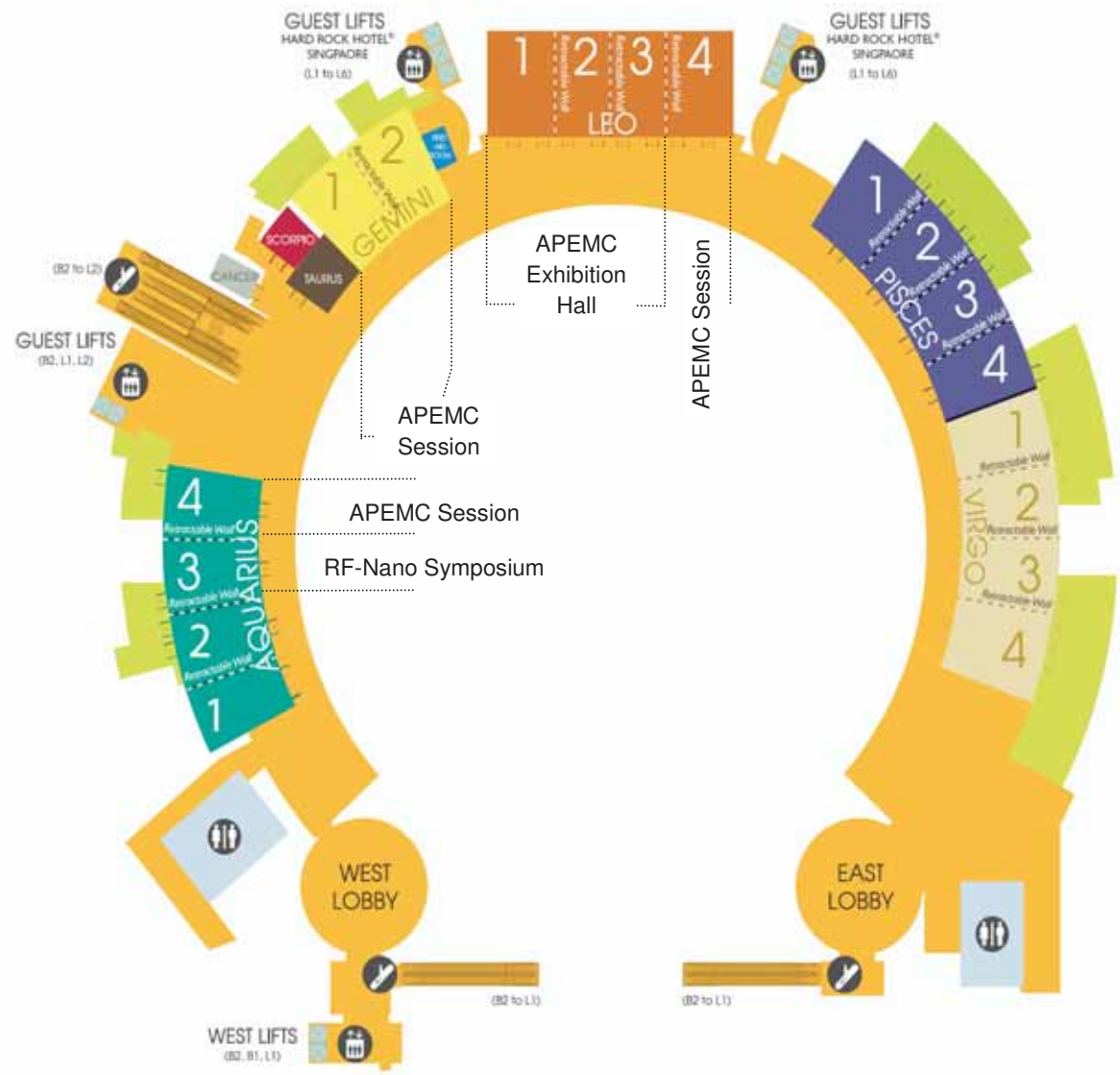
Admission to all sessions and hosted functions requires identification.

Please wear your name badge at all times.

- 20 May, Sunday : 3:00pm - 6:00pm (Scorpio)
- 21 – 24 May, Monday to Thursday : 7:30am – 6:00pm (outside Level 1 Gemini 2)

Floor Plan – Level 1: Exhibition Hall and Meeting Rooms

Meeting Rooms: Gemini 1 & 2, Leo 4 and Aquarius 3 & 4
Secretariat Room: Scorpio
Exhibition Hall: Leo 1 – 3



Instructions to Presenters

1. Poster Presentation

Poster sessions will be held at Foyer @Leo 4.
Please register at the Registration Desk before proceeding to locate your assigned poster board. To locate your assigned poster board, look for the board marked with your Paper ID.

Prepare your poster

- Each presenter is provided with a 2.4 metre high by 1 metre wide poster board.
- The presentation must cover the same material as the paper.
- Place the title of your paper and your paper number prominently at the top of the poster to allow viewers to identify your paper easily. Indicate 1) the paper's identification number, 2) title, and 3) authors' names.
- Highlight the authors' names, e-mail and address information in case the viewer is interested in contacting you for more information.
- You have complete freedom in displaying your information in figures, tables, text, photographs, etc in the poster.
- Include the background of your research followed by results and conclusions. A successful poster presentation depends on how well you convey information to an interested audience.

Set-up Your Poster

- Posters should be set up half an hour earlier for the respective Open Forum sessions on **22** and **23 May**.
- Please make sure that your paper number is clearly visible on your poster board.
- Presenters are required to be at their posters during their scheduled Open forum session.
- Tapes and other materials are available at the Information Desk, nearby the poster boards.

Remove Your Poster

Posters must be removed after the respective Open Forum sessions within half an hour.
Posters remaining after these times will be removed. EMC in Singapore organizer will not be responsible for posters and materials left on poster boards after the stated hours.

Information Desk

Staff at the Information Desk will be available to assist you with location and other on-site needs. Tapes and scissors will be available for your use. If you have special needs for your poster presentation, please bring those supplies with you to the meeting.

If you have questions, please contact the Symposium Secretariat at emcsingapore@cma.sg

2. Best Student Paper Competition

Time: 9:00am – 10:30am, Wednesday, 23 May
Venue: Foyer @Leo 4

3. Oral Presentation

Prepare Your Presentation

Each oral presentation is limited to 20 minutes including questions and answers. Length of presentation material should be in accordance to your time allotted. You are requested to load your Power Point presentation materials before the session starts.

Determine Your Audio Visual Needs

All meeting rooms are equipped with the following audio-visual equipment:
1-LCD Projector
1-Windows-based PC
1-Screen
1-Laser Pointer

The computers in the meeting rooms are being provided to Windows-based PC users. The PC will be configured with Microsoft Windows 7 Professional operating system as well as with Microsoft Office 7.

Create a Backup Copy of Your Presentation

We recommend you bring at least 2 copies of your presentation to the meeting in case there is a problem with one of them. Thumb Drive and hard disk are accepted.

Give Your Presentation

- Be considerate of the other speakers and audience by staying within your allocated time. The allocated time for your presentation includes a discussion and changeover to the next speaker. Session Chairs will hold you to the allotted time. This is essential to ensure adequate time for questions and discussion as well as adherence to the schedule.
- Please discuss the same materials as reported in your paper submission. At the end of the meeting, all presentation files will be destroyed.

PROGRAM OVERVIEW AND HIGHLIGHTS

Symposium Web: www.apemc2012.org

Symposium Hours

21 – 24 May 2012, 8:30am – 6:00pm

21 May – Monday

- Workshops/Tutorials
- Booth Dressing for Exhibitors (Leo 1 - 3)
- Cocktail Reception (Fiesta Restaurant Poolside, 6:00pm – 9:00pm)

22 May – Tuesday

- Official Opening and Plenary Speeches (Gemini 1 - 2, 10:40am – 12:30pm)
- Parallel Technical Sessions
- Topical Meetings
- Technical Exhibition

23 May – Wednesday

- Best Student Paper Competition
- Parallel Technical Sessions
- Topical Meetings
- Technical Exhibition
- Dinner Banquet (Marina Mandarin Singapore, 7:00pm- 9:00pm)

24 May – Thursday

- Parallel Technical Sessions
- Topical Meetings
- Technical Exhibition

Refreshments & Lunch

21 May 2012, Monday	Refreshments & Lunch on Delegate's own. (Please see Food and Restaurant Directory for more options)
22-24 May 2012	Refreshments are served in Exhibition Area Lunch is served in Pisces 1 to 4

Symposium Special Events

- **Welcome Reception**
  21 May, Monday, 6:30pm – 8:30pm
  Venue: Fiesta Restaurant Poolside, Level 3
  Festive Hotel, Resorts World Sentosa

Welcome Asia-Pacific EMC Symposium participants to mingle while enjoying the light food and drinks during the welcome reception. Take the opportunity to interact with old friends and network new friends. The full registration fee includes the welcome reception.

- **Symposium Banquet Dinner cum Award Presentations**
  23 May, Wednesday, 7:00pm - 9:00pm
  Venue: **Marina Mandarin Singapore**
  Marina Mandarin Ballroom, Level 1
  6 Raffles Boulevard, Marina Square, Singapore 039594

The Marina Mandarin Singapore is a world-class, five-star luxury hotel that enjoys an excellent location in the heart of the city. With breathtaking views of Marina Bay and the financial district, the hotel is also only a stone throw away from the Marina Square Shopping Mall, and is directly opposite the Suntec Convention & Exhibition Centre and The Esplanade – Singapore's Performing Arts Centre.

The Best Student Papers and Best Symposium Paper will be announced and the awards will be presented during the Symposium Banquet Dinner. The award presentations include:

- **Best Student Paper Awards**
- **Best Symposium Paper Award**
- **Certificates of Appreciation of Sponsorship**

One-way Transportation to the Venue of the Banquet Dinner

Please meet at Foyer @ Gemini Room, 6:20pm sharp. Our ushers will guide you to the coach parking bay for your transfer to Marina Mandarin Hotel.

TECHNICAL PROGRAM AT A GLANCE

Date	Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4	Aquarius 3	Exhibition Hall (Leo 1-3)
21 May (Mon)	8:50 – 12:00	EMC for High Speed PCB Design	Automotive EMC Measurements	Evaluation of Lightning-Induced Disturbances in Distribution Networks for Power Quality Assessment	Reverberation Chamber for EMC Tests		
	12:00 - 13:20			*Lunch Break*			
	13:20 – 17:30	EMC Modeling and Simulation; Power Electronic EMC	Modeling and Measurement, EMC Design	SI and EMC Design for High-speed Differential Channels; New Material and New Analysis Tools for EMC	Novel Antenna Measurement Techniques for Commercial and Military; EMC Accreditation		
	18:30 – 20:30			*WELCOME RECEPTION @ Fiesta Restaurant Poolside*			
22 May (Tue)	8:40 - 10:20	ICEMC1: [Topical Meeting] 2D and 3D Integrated Circuit EMC	PS1: [Topical Meeting] Power Systems and Smart Grid EMC	CEM1: [Special Session] Advanced Modeling and Design of SI/PI/EMI	ESD: [Special Session] ESD, Gap Discharge and Transients	**RF Nano Technology**	
	10:20 - 10:40			*Tea Break*			
	10:40 - 12:30			*OPENING CEREMONY / PLENARY TALKS @ Gemini 1-2*			
	12:30 - 13:30			*Lunch Break*			
	13:30 - 15:30	ICEMC2: [Topical Meeting] 2D and 3D Integrated Circuit EMC	PS2: [Topical Meeting] Power Systems and Smart Grid EMC	WJRH1: [Special Session] Computational Electromagnetics – Retrospective and Outlook	MEAS1: EMC Measurement and Environment		Open Forum-1,2 Technical Talks at the Exhibition
	15:30 - 15:50			*Tea Break*			
	15:50 - 18:10		PE1: [Special Session] Power Electronics	WJRH2: [Special Session] Computational Electromagnetics – Retrospective and Outlook	MEAS2: [Special Session] Time Domain Measurement of Electromagnetic Interference		Open Forum-3,4 Technical Talks at the Exhibition
23 May (Wed)	8:40 - 10:20	ICEMC3: [Topical Meeting] 2D and 3D Integrated Circuit EMC	IEMI: [Special Session] IEMI and HEMP Threats, Interaction, Protection and Standards	BIO1: Biomedical EMC	MS: EMC Management and Standards	**RF Nano Technology**	
	10:20 - 10:40			*Tea Break*			Technical Talks at the Exhibition
	10:40 - 12:30			*PLENARY TALKS @ Gemini 1-2*			
	12:30 - 13:30			*Lunch Break*			
	13:30 - 15:30	ICEMC4: [Topical Meeting] 2D and 3D Integrated Circuit EMC	HPEM: High Power Electromagnetics	Bio2: Biomedical EMC	AP1: Antenna and Propagation		Open Forum-5,6 Technical Talks at the Exhibition
	15:30 - 15:50			*Tea Break*			
	15:50 - 18:10	SI-1: Signal and Power Integrity	PS3: [Topical Meeting] Power Systems and Smart Grid EMC		MEAS3: EMC Measurement and Standards		Open Forum-7,8 Technical Talks at the Exhibition
	18:30-22:00			*SYMPOSIUM BANQUET DINNER cum AWARD PRESENTATIONS, MARINA MANDARIN SINGAPORE*			
24 May (Thu)	8:40 - 10:20	SI-2: Signal and Power Integrity	PE2: [Special Session] Power Electronics	CEM2: Computational Electromagnetics	Bio3: [Special Session] Human Safety and Dosimetery in Wireless Communications		
	10:20 - 10:40			*Tea Break*			
	10:40 - 12:40	NANO: Nanotechnology EMC	SYS1: System Level EMC and Protection	VAH: Memorial Session for Professor Rüdiger Vahldieck	MEAS4: EMC Measurement and Environment		
	12:40 - 13:30			*Lunch Break*			
	13:30 - 15:30	RC: [Special Session] Reverberation Chamber	SYS2: System Level EMC and Protection	LIGHT: Lightning	AP2: Antenna and Propagation		
	15:30 - 15:50			*Tea Break*			
	15:50 - 18:10	COM: Wireless Communication EMC	PS4: [Topical Meeting] Power Systems and Smart Grid EMC	CEM3: Computational Electromagnetics	AUTO: Electric Vehicle, Automotive, Rail, and Ship EMC		

Workshop / Tutorial Program

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
8:50am–12:20pm	**T-AM-1: High Speed PCB Design**	**W-AM-1: Future Trends for Automotive EMC Measurements: The Impact of eMobility**	**T-AM-4: Evaluation of Lightning-Induced Disturbances in Distribution Networks for Power Quality Assessment**	**W-AM-2: Use of the Reverberation Chamber for Wireless Test and Calibration Applications Modeling**
	T-AM-1.1 8:50am-10:20am **High Speed PCB Design-Part I** Frits Buesink, University of Twente, The Netherlands	**W-AM-1.1 8:50am-9:30am** **EMC Testing of Hybrid and Electric Vehicles – Challenges to Simulate the Li-Ion Battery with External Power Sources** Wolfgang Winter, EMV, Germany **W-AM-1.2 9:30am-10:10am** **Designing for Reliability of Automotive Electronic Systems** Todd Hubing, Clemson University, USA	**T-AM-4.1 8:50am-9:20am** **Lightning Currents for Engineering Applications** A. Borghetti, University of Bologna, Italy **T-AM-4.2 9:20am-9:50am** **Lightning Location Systems** M. Rubinstein, University of Applied Sciences of Western Switzerland, Yverdon **T-AM-4.3 9:50am-10:20am** **Field-to-Transmission Line Coupling Models with Special Emphasis to Lightning-Induced Voltages** F. Rachidi, Swiss Federal Institute of Technology, Lausanne, Switzerland	**W-AM-2.1 8:50am-9:20am** **Introduction to Reverberation Chamber Concept and its Application for Probe Calibration and Antenna Efficiency** Dennis Lewis, The Boeing Company, USA **W-AM-2.2 9:20am-9:50am** **MIMO and Other Wireless Measurements in Reverberation Chambers at NIST** Perry Wilson, National Institute of Standards and Technology, USA **W-AM-2.3 9:50am-10:20am** **Certification of Wireless Devices on Aircraft: Performance Evaluation Using Discrete Frequency Stir Technique** Kenneth Kirchoff, The Boeing Company, USA
	10:20am-10:40am Tea Break			
	T-AM-1.2 10:40am-11:10am **High Speed PCB Design-Part II** Frits Buesink, University of Twente, The Netherlands	**W-AM-1.3 10:40am-11:10am** **Full Vehicle Testing for CISPR 12 and ISO 11451-2 (and equivalent) Automotive EMC Standards** Vince Rodriguez, ETS-Lindgren, USA	**T-AM-4.4 10:40am-11:10am** **Estimation of Lightning Performance of Distribution Network** C.A. Nucci, University of Bologna, Italy **T-AM-4.5 11:10am-11:40am** **Voltage Transient Measurements in a Distribution Network Correlated with Data from Lightning Location Systems** M. Paolone, Swiss Federal Institute of Technology, Lausanne, Switzerland	**W-AM-2.4 10:40am-11:10am** **Over-The-Air Measurement with Reverberation Chambers** Bryan Sayler, ETS-Lindgren, USA
	T-AM-2 11:10am-12:20am **Designing for EMC–Fundamentals for Printed Circuit Boards and Systems** Mark Montrose, Montrose Compliance Services, Inc., USA	**T-AM-3 11:10am-12:00am** **New EMC Test Requirements for Electric– and Hybrid Electric Vehicles** U. Flor, EM TEST GmbH, Germany	**T-AM-5 11:40am-12:20am** **Electromagnetic Integral Equation Methods used for the Simulation of Power Integrity** Xing Chang Wei, Zhejiang University, China	**T-AM-6 11:10am-12:00am** **Using Reverberation Chambers for Actual EMC Tests** Frank Leferink, University of Twente, The Netherlands
	12:00am-1:20pm Lunch Break			

Workshop / Tutorial Program

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
1:20pm-5:30pm	**T-PM-1: EMC Standards**	**T-PM-4: Modeling and Measurement of Stochastic Electromagnetic Fields in EMI**	**W-PM-1: SI and EMC Design for High-speed Differential Channels**	**W-PM-3: Novel Antenna Measurement Techniques for Commercial and Military**
	T-PM-1.1 1:20pm-1:50pm **New Requirements of IEC 61000-4-4 Edition 3 – 2012 – Trends for Next Revision of IEC 61000-4-5** Eric Dudenhoeffer, TESEQ AG, Switzerland	**T-PM-4.1 1:20pm-3:20pm** **Modeling and Measurement of Stochastic Electromagnetic Fields in EMI** Peter Russer, Technische Universität München, Germany Johannes Anton Russer, Technische Universität München, Germany	**W-PM-1.1 1:20pm-1:50pm** **A Successive Approach for Simple Models with Equivalent Sources bearing on both EMI and SI** Liuji R. Koga, Okayama University, Japan	**W-PM-3.1 1:20pm-1:50pm** **Use of a Tapered Chamber for Far-field and Spherical Near-field Antenna Measurements Over an Extended Frequency Range of 200 MHz to 18 GHz** Vince Rodriguez, ETS-Lindgren, USA
	T-PM-2: EMC and ESD for Analogue Integrated Circuits		**W-PM-1.2 1:50pm-2:20pm** **Equalizer Design for High-speed Differential Channels** Joungho Kim, KAIST, South Korea	**W-PM-3.2 1:50pm-2:20pm** **Large Size, Light Weight Broadband RF Lens for Far Field Measurements** S. Matitsine, National University of Singapore
	T-PM-2.1 1:50pm-2:30pm **ESD for Analogue Integrated Circuits** P. Besse, Freescale Semiconductor		**W-PM-1.3 2:20pm-2:50pm** **Common-mode Noise Mitigation for High-speed Differential Channels** Tzong-Lin Wu, National Taiwan University, Taiwan	**W-PM-3.3 2:20pm-2:50pm** **Determining Radiation Efficiency of Antennas in Reverberation Chambers** P. Wilson, NIST, USA
	T-PM-2.2 2:30pm-3:20pm **EMC for Analogue Integrated Circuits** K. Abouda, Freescale Semiconductor		**W-PM-2 2:50pm-3:20pm** **Numerical Testing via Virtual EMC Lab** Richard Gao Xian-Ke, A*-STAR IHPC, Singapore	**W-PM-3.4 2:50pm-3:20pm** **Evaluation of Leaky Feeder Coaxial Antenna Performance Onboard Commercial Aircraft Using Statistical Methods** Dennis Lewis, Boeing, USA
	3:20pm-3:40pm Tea Break			
	T-PM-3 3:40pm-5:00pm **EMC Complaint DC/ DC Converter Design** Stefan Klein, Würth Elektronik eiSos, Germany	**T-PM-5 3:40pm-5:00pm** **Grounding: The Grounds for EMC Design** Elya B. Joffe, Israel	**T-PM-6.1 3:40pm-4:20pm** **Metamaterials, Periodic Structures and EBG in EMC/ Antenna/ RF Designs** Sungtek Kahng, University of Incheon, Korea	**T-PM-8 3:40pm-5:00pm** **Model Validation and Accreditation for EMC Simulations** F. Schlagenhaufer, International Centre for Radio Astronomy Research (ICRAR)/ Curtin University, Australia
			T-PM-6.2 4:20pm-5:00pm **Low-profile and High-directivity Antennas** Jeongho Ju, ETRI, Korea	
			T-PM-7 5:00pm-5:30pm **Application of Numerical Inversion of Laplace Transform in EMC Modeling** Qingsheng Zeng, Canada	

OVERVIEW OF TUTORIALS AND WORKSHOPS

Tutorial T-AM-1: **High Speed PCB Design**

Time : 8:50am – 11:10am, Monday, 21 May
Venue : Gemini 1
Organizer : F. Leferink, University of Twente, The Netherlands

Abstract

This tutorial explains the effects encountered in electrical interconnections as frequencies are increased. The simple, low frequency approach based on lumped parameter inductive and capacitive models are replaced by per unit length versions. This becomes critical when a signal transition fits the length of an interconnecting line (combination of risetime and propagation speed). Interconnections become transmission lines and impedance control is necessary to reduce reflections and assure signal integrity.

Another effect is crosstalk between "long" lines. Using several practical demonstrations, these effects are made visible. Measures are then explained and demonstrated that can be used to reduce the undesired effects. One of the tricks is the partitioning of an electrically "large" design into smaller modules using the current boundary.

Finally, the similarity between crosstalk and field emission of transmission line structures is explained and demonstrated, together with the measures to reduce both effects.

Tutorial Outline:

T-AM-1.1 **High Speed PCB Design –Part I**
Frits Buesink, University of Twente, The Netherlands

T-AM-1.2 **High Speed PCB Design –Part II**
Frits Buesink, University of Twente, The Netherlands

Frits Buesink graduated in 1977 at the Twente University of Technology (UT), Electrical Engineering Department, in Enschede (Netherlands) and works at the former Hollandse Signaal Apparaten, now Thales Nederland B.V. in Hengelo, the Netherlands.

In 1989 he became involved with EMC and has set up educational programs for EMC awareness in the various disciplines in the company. He is a member of the Environmental Competence Center at Thales and works as an EMC engineering consultant for various programmes. In May 2009, he also joined the Faculty of Telecommunications Engineering at the Twente University as a part time researcher to coach PhD students in the EMC disciplines.

Tutorial T-AM-2: **Designing for EMC–Fundamentals for Printed Circuit Boards and Systems**

Time : 11:10am – 12:20pm, Monday, 21 May
Venue : Gemini 1
Speaker : Mark Montrose, Montrose Compliance Services, Inc., USA

Abstract

This course provides a simplified overview on the complexity of designing a system to achieve EMC, both printed circuit board and enclosure with a focus toward "hands-on or applied engineering concepts." Fundamentals of both time- and frequency-domain aspects of EMC are examined. Without understanding what Maxwell tells us, we can spend considerable time, money and effort experimenting to achieve compliance, thus the focus of this fundamental tutorial is "EMC Made Simple".

Topics examined include fundamentals of transmission line theory, material science related to printed circuit board, material for high-speed operation, efficient power distribution network design, plus related topics on system level aspects to achieve EMC.

Mark Montrose is principle consultant of Montrose Compliance Services, Inc., a full service regulatory compliance firm specializing in Electromagnetic Compatibility with over 30 years of applied EMC experience. Prior to becoming a consultant, Mark was responsible for regulatory compliance at high technology companies located in the Silicon Valley region of California. His work experience includes extensive design, test, and certification of Information Technology Equipment (ITE) and Industrial, Scientific and Medical (ISM) products plus providing training courses and consulting services to clients worldwide.

Tutorial T-AM-3: **New EMC Test Requirements for Electric–and Hybrid Electric Vehicles**

Time : 11:10am – 12:00am, Monday, 21 May
Venue : Gemini 2
Speaker : U. Flor, EM TEST GmbH, Germany

Abstract

Electrical and hybrid electrical vehicles are powered by connecting directly to an external power station and the public mains supply, which means that electrical vehicle manufacturers need to meet standard testing requirements outside the traditional transient automotive testing range. This tutorial informs you on the most important news in regard to:

- Comparison between the EMC requirements according to ECE Regulation 10, Annex 17-22 and the product standard IEC 61851-21 Ed. 2.0 Part 21
- The new test methods of the ECE R10 (draft Juli 2010) according to annex 17 to 22
- The new requirements for cars and components caused by the connection to the public mains supply 230V/ 400V during charging
- The consequences for car manufacturers and sub-suppliers.
- The differences between tests outside the vehicle (charging stations) and inside the vehicle.

Uwe Flor was born in 1957. He received a degree in electrical engineering and started in 1981 as sales manager at Haefely, Germany. He joined Schaffner in 1984 and founded EM TEST in 1987. He has experience in EMC for more than 30 years. He was responsible for the realization of huge turn-key projects on the Asian market in the 90s and establishment of EM TEST subsidiary in China. He provides support for key projects worldwide, e.g. research institutes for arms, development departments for electric and hybrid cars. He is member of various standard committees.

Tutorial T-AM-4: **Evaluation of Lightning-Induced Disturbances in Distribution Networks for Power Quality Assessment**

Time : 8:50am – 11:40am, Monday, 21 May
Venue : Leo 4
Organizer : F. Rachidi, Swiss Federal Institute of Technology (EPFL), Switzerland

Abstract

Lightning is one of the major causes for power systems outages and thus the protection of the next generation of electrical infrastructure, characterized by a massive penetration of distributed generation, is of growing importance. The objective of the tutorial is to present methods and models for the evaluation of lightning-induced voltages on power lines. The use of lightning location systems for correlating transients in power distribution with lightning discharges will also be discussed with reference to on-going research activities.

Tutorial Outline:

T-AM-4.1 **Lightning Currents for Engineering Applications**
A. Borghetti, University of Bologna, Italy

T-AM-4.2 **Lightning Location Systems**
M. Rubinstein, University of Applied Sciences of Western Switzerland, Yverdon, Switzerland

T-AM-4.3 **Field-to-Transmission Line Coupling Models with Special Emphasis to Lightning-Induced Voltages**
F. Rachidi, Swiss Federal Institute of Technology, Lausanne, Switzerland

T-AM-4.4 **Estimation of Lightning Performance of Distribution Network**
C.A. Nucci, University of Bologna, Italy

T-AM-4.5 **Voltage Transient Measurements in a Distribution Network Correlated with Data from Lightning Location Systems**
Mario Paolone, Swiss Federal Institute of Technology, Lausanne, Switzerland

Farhad Rachidi received the M.S. degree in electrical engineering and the Ph.D. degree from the Swiss Federal Institute of Technology, Lausanne, in 1986 and 1991 respectively. He is currently a professor and the head of the EMC Laboratory at the Swiss Federal Institute of Technology, Lausanne, Switzerland. Dr. Rachidi served as the Vice-Chair of the European COST Action on the Physics of Lightning Flash and its Effects (2005-2009) and the Chairman of the 2008 European Electromagnetics International Symposium (EUROEM). He is presently the President of the International Conference on Lightning Protection (ICLP) and Associate Editor of the IEEE Transactions on Electromagnetic Compatibility. Farhad Rachidi is an IEEE Fellow, the recipient of the IEEE Technical Achievement Award (2005), the CIGRE Technical Committee Award (2005) and the 2006 Blondel Medal.

Alberto Borghetti was born in Cesena, Italy, in 1967. He graduated (with honors) in Electrical Engineering at the University of Bologna, Italy, in 1992. Since then he has been working with the power system group at the same University, where he was appointed Researcher in 1994 and Associate Professor of Electric Power Systems in 2004. His main research interests concern power system analysis, with particular reference to voltage collapse, power system restoration after black-out, electromagnetic transients, optimal generation scheduling and distribution system operation. He is associate editor of IEEE Trans. on Smart Grid.

Mario Paolone was born in Italy in 1973. He graduated (with honors) in Electrical Engineering and received the Ph.D. degree from the University of Bologna, Italy, in 1998 and 2002, respectively. In 2005 he was appointed as Assistant Professor in Electric Power Systems at the University of Bologna and in 2010 he got the Associate Professors eligibility from the Politecnico di Milano, Italy. He was with the Power Systems Laboratory of the University of Bologna until 2011. Currently he is Associate Professor at the Swiss Federal Institute of Technology of Lausanne, Switzerland where he accepted the EOS Holding Chair in the area of Distributed Electrical Systems. His research interests are in the area of smart grids, with particular reference to real-time monitoring and operation of active distribution networks, power systems protections, dynamics and transients.

Marcos Rubinstein received the Master's and Ph.D. degrees in electrical engineering from the University of Florida, Gainesville in 1986 and 1991. He is currently a professor in telecommunications and a member of the IICT institute team at the University of Applied Sciences of Western Switzerland HES-SO, Yverdon-les-bains. His current research interests include Lightning, EMC in telecommunication systems, PLC, wireless technologies and layer-2 network security. He is the author or co-author of over 100 scientific publications in reviewed journals and international conferences. Prof. Rubinstein is the recipient of the best Master's Thesis award from the University of Florida. He received the IEEE achievement award and he is a co-recipient of NASA's

recognition for innovative technological work. He is also a senior member of the IEEE, a member of the Swiss Academy of Sciences and of the International Union of Radio Science.

Carlo Alberto Nucci was born in Bologna, Italy, in 1956. Degree with honors in Electrical engineering in 1982 from the University of Bologna. Researcher in the Power Electrical Engineering Institute in 1983. Associate professor in the same University in 1992, full professor, chair of Power Systems, in 2000. He is author or co-author of more than 200 scientific papers published on reviewed journals or presented at international conferences. In CIGRE he serves as chairman of Study Committee C4 'System Technical performance'. He is a Fellow of the IEEE and of the IET. His research interests concern power systems transients and dynamics, with particular reference to lightning protection of power lines, system restoration after black-out and smart grids. Since January 2010 he is the Editor in Chief of the Electric Power System Research journal, Elsevier. He is doctor honoris causa of the University Politehnica of Bucharest.

Tutorial T-AM-5: **Electromagnetic Integral Equation Methods used for the Simulation of Power Integrity**

Time : 11:40am–12:20am, Monday, 21 May
Venue : Leo 4
Speaker : Xing Chang Wei, Zhejiang University, China

Abstract

In this talk, we introduce the integral equation method for the simulation of power integrity. The emphasis of this talk is the state-of-the-arts of the integral equation techniques used for the simulation of the power and ground planes. Integral equation technique can greatly reduce the unknown number by using the suitable Green's function to represents the effect of the surrounding environment. This is also its advantage over other numerical methods. Different kinds of Green's functions can be employed, which results in different methods, such as mode/ segment method, image method, electric field integral equation (EFIE), and magnetic field integral equation (MFIE). We also talk about the future developments of the integral equation techniques in the simulation of power and ground planes.

Xing Chang Wei received the B.Sc., M.Sc., and Ph.D. degrees from Xidian University, Xi'an, China, in 1995, 1998 and 2001, respectively, all in Electromagnetic Field and Microwave Technology.
From 2001 to 2010, he was with the Institute of High Performance Computing (IHPC), A*STAR, Singapore, first as a Post-doctoral Research Fellow, and then promoted to Senior Research Engineer. Currently, he is a professor with the Department of Information Science & Electronic Engineering, Zhejiang University. His research interests include analysis of electromagnetic compatibility, electromagnetic wave propagation and scattering, and development of new numerical techniques for electromagnetic computation.

Tutorial T-AM-6: **Using Reverberation Chambers for Actual EMC Tests**

Time : 11:10am – 12:00am, Monday, 21 May
Venue : Aquarius 4
Speaker : F. Leferink, University of Twente, The Netherlands

Abstract

Reverberation chambers are becoming very popular. Major advantages are the high field uniformity, the isotropicity and high field strength with only moderate power. In this tutorial an overview of (flexible wall) reverberation chamber (VIRC, or Vibrating Intrinsic Reverberation Chamber) testing is given. The main advantages and some actual tests carried out on large systems will be shown. By using two VIRCs with a common wall in between shielding effectiveness testing can be performed

very easily: a dynamic range of over 130 dB at 300 MHz, decreasing to 80 dB at 18 GHz, can be achieved using a normal (scalar or vector) network analyser without any additional amplifiers.

Frank Leferink (B.Sc 1984, M.Sc. 1992, PhD 2001, Prof. 2003) has been an employee of THALES Netherlands Since 1984. He is now Technical Authority and responsible for EMC activities within THALES Netherlands. He is manager of the (virtual) Center of Excellence on EMC, comprising the group of more than 100 EMC engineers within the THALES group located at appr. 30 sites in France, United Kingdom, The Netherlands, Italy and Germany.

Since 2003 he is (part-time, full-) professor EMC at the University of Twente. He is acting chair of the Telecommunication and EMC group, with 6 staff and 15 PhD researchers, 7 of them are involved in EMC research. He published over 200 papers. He is teaching EMC and Transmission Media courses, and he is involved in training activities towards professionals. He is chair IEEE EMC Benelux, member of ISC EMC Europe, and associate editor of the IEEE Transactions on EMC. His main interest areas are EMI at PCB and IC level and innovative test techniques, such as reverberation chambers.

Workshop W-AM-1: Future Trends for Automotive EMC Measurements: The Impact of eMobility

Time : 8:50am – 11:10am, Monday, 21 May
Venue : Gemini 2
Organizers : Wolfgang Winter, EMV, Germany
Janet O'Neil, ETS-Lindgren, USA

Abstract

This workshop brings together a number of automotive EMC experts to review the increasingly complex automotive EMC measurement requirements, both current and anticipated, for commercial and military vehicles, in a simple and easy to understand manner.

eMobility is becoming more common in our daily lives. The concept of energy efficient, mobile communications is a reality today with the emergence of hybrid and electric vehicles. In automotive EMC, this means a greater emphasis on the vehicle's electrical drive, battery, power electronics, and communications systems.

This workshop will explain how eMobility impacts traditional automotive EMC measurements and prepares manufacturers, design and test engineers to address these challenges with effective solutions.

Workshop Outline:

W-AM-1.1 EMC Testing of Hybrid and Electric Vehicles – Challenges to Simulate the Li-Ion Battery with External Power Sources
Wolfgang Winter, EMV, Germany

W-AM-1.2 Designing for Reliability of Automotive Electronic Systems
Todd Hubing, Clemson University, USA

W-AM-1.3 Full Vehicle Testing for CISPR 12 and ISO 11451-2 (and equivalent) Automotive EMC Standards
Vince Rodriguez, ETS-Lindgren, USA

Wolfgang Winter (born in 1957 in Dortmund, Germany) received his Master Degree in Geophysics 1984 and his Ph.D. as Dr. rer. nat. at the Cologne University, Faculty of Mathematics and Physics 1996. During his research work and professional career he has been deeply involved in time domain analysis, atmospheric modeling, optics for ultra fast data transmission and RF instrumentation. He began his career in 1984 at Rohde & Schwarz, Germany. In 1994, he was the Managing Director of a software development centre in the UK for RF Test and Measurement Instrumentation and later he was the Chairman or President of several foreign subsidiaries. In

January 2007, he was a Director for emv GmbH in Taufkirchen, focusing on complex EMC projects, antenna measurement systems and RF applications. Since March 2011, he holds the position as a Managing Director at emscreen GmbH, a specialized company for governmental RF shielding applications. He is an invited guest of the VDE 767.3 "high frequency disturbances" committee and a member of the editorial board of the Radioengineering Journal of the Czech and Slovak Technical University and URSI Committees. His technical interests include EMC projects, EMC receiver technology, antenna measurement systems, and complex RF applications.

Janet O'Neil is a customer relations specialist with ETS-Lindgren. Her responsibilities include coordination of the company's technical contributions to industry conferences worldwide. She has over 20 years experience in the RF Microwave and Electromagnetic Compatibility (EMC) industries. She is a member of the Board of Directors of the IEEE Electromagnetic Compatibility (EMC) Society as well as of the Antenna Measurement Techniques Association (AMTA). She is also a member of Subcommittee 1 (Techniques and Development) of ANSI ASC C63®, was chair of the 2007 IEEE International Symposium on EMC in Honolulu, Hawaii, vice-chair of the 2011 IEEE International Symposium on EMC in Long Beach, California, and is the Publications Chair for the IEEE International Microwave Symposium (IMS) 2013 in Seattle, Washington.

Todd H. Hubing (S'82–M'82–SM'93–F'06) Dr. Todd Hubing is the Michelin Professor of Vehicle Electronic Systems Integration at Clemson University. He holds a BSEE degree from MIT, an MSEE degree from Purdue University and a Ph.D. from North Carolina State University. He was an engineer with IBM for 7 years and a faculty member at the University of Missouri-Rolla for 17 years before joining Clemson University in 2006. At Clemson, he teaches classes in vehicle electronics and conducts research related to the integration of electronic systems in automobiles. He is a Fellow of the Applied Computational Electromagnetics Society, a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and a Past-President of the IEEE Electromagnetic Compatibility Society.

Vicente Rodriguez attended Ole Miss, in Oxford MS, where he obtained his B.S.E.E. M.S. and Ph.D. degrees in 1994, 1996 and 1999, respectively. He is currently the Antenna Product Manager of ETS-Lindgren. He has been involved in the RF anechoic design of several chambers, including rectangular and taper antenna pattern measurement chambers, some of which operate from 100 MHz to 40 GHz. Dr. Rodriguez is a Senior Member of the IEEE and several of its technical societies. He is also a Senior Member of the Antenna Measurements Techniques Association (AMTA) and a member of its Board of Directors.

Workshop W-AM-2: Use of the Reverberation Chamber for Wireless Test and Calibration Applications

Time	:	8:50am – 11:10am, Monday, 21 May
Venue	:	Aquarius 4
Organizers	:	Perry F. Wilson, National Institute of Standards and Technology, USA Bryan Sayler, ETS-Lindgren, USA

Abstract
Rooted in the simplicity of its hardware implementation and the elegance of its statistical behavior, the reverberation chamber (RC) has been found to be an effective test environment for a great diversity of applications. Not only in EMC testing has the reverberation chamber been widely utilized, but also in various wireless test and calibration applications. Among the wireless test applications, Multiple Input, Multiple Output (MIMO) is undoubtedly one of the major applications that can make good use of RC test methodology due to MIMO's nature of multi-reflection coinciding with the RC's core concept. Another interesting application arises from the increasing demand of in-

flight wireless access; in such a spacious environment as an airplane, the concept of frequency-stirred RC is implemented to evaluate RF propagation in an aircraft cabin. In addition, using RC for probe calibration and evaluation of antenna efficiency as well as Over the Air (OTA) wireless measurements are also interesting applications. This half day workshop will cover the most updated developments in these applications.

Workshop Outline:

W-AM-2.1 **Introduction to Reverberation Chamber Concept and its Application for Probe Calibration and Antenna Efficiency**
Dennis Lewis, The Boeing Company, USA

W-AM-2.2 **MIMO and Other Wireless Measurements in Reverberation Chambers at NIST**
Perry Wilson, National Institute of Standards and Technology, USA

W-AM-2.3 **Certification of Wireless Devices on Aircraft: Performance Evaluation Using Discrete Frequency Stir Technique**
Kenneth Kirchoff, The Boeing Company, USA

W-AM-2.4 **Over-The-Air Measurement with Reverberation Chambers**
Bryan Sayler, ETS-Lindgren, USA

Perry F. Wilson (S'78-M'82-SM'93-F'05) received his Ph.D. in Electrical Engineering from the University of Colorado in 1983. He has been with the Electromagnetics Division at NIST in Boulder, Colorado since 1999. Dr. Wilson's research has focused on the application of electromagnetic theory to problems in electromagnetic compatibility and metrology. Dr. Wilson is a Fellow of the IEEE, currently a member of the IEEE EMC Society Board of Directors, of URSI Commission B, and of the US IEC TC77B TAG, a former Editor-in-Chief of the IEEE EMC Transactions, and a recipient of the IEEE EMC Transactions Best Paper Award in 2002 and the Technical Achievement Award in 2010.

Bryan Sayler is the Senior Vice-President Systems, Test and Measurement Division, with ETS-Lindgren. He has over 20 years experience developing RF test solutions with ETS-Lindgren. Mr. Sayler is an active member of, and contributes technically to, the leading wireless industry organizations, including the WiMAX Forum®, CTIA – The Wireless Association® and the Wi-Fi Alliance®. Recently he has devoted his considerable expertise to the development of MIMO OTA testing solutions. He holds a BA degree from Southeastern University and an MBA from Baylor University.

Dennis Lewis received his BS EE with honors from Henry Cogswell College and his MS Physics from the University of Washington. Dennis is a member of the IEEE and several of its technical societies including the Microwave Theory and techniques, Electromagnetic Compatibility and the Antennas and Propagations societies. He serves on the IEEE MTT-S subcommittee 11 on microwave measurements. He is a Senior Member of the Antenna Measurements Techniques Association. He is an active member and past chairman of the Technical Advisory Committee for North Seattle Community College. Dennis has worked at Boeing for 23 years and is recognized as an Associate Technical Fellow. He currently has leadership and technical responsibility for the primary RF, Microwave and Antenna Metrology labs. His recent interests include aerospace applications of reverberation chamber techniques and microwave measurement systems and uncertainties.

Kenneth Kirchoff received his BS EE (Cum Laude) from Seattle University and has completed MS EE courses at Columbia University in New York and the University of Washington in Seattle. Kenneth has served on FAA advisory committees as a chairman of technical working groups, advised foreign regulatory bodies such as the MIC in Japan on safety aspects of wireless devices onboard airplanes and currently

serves as a co-chair of the ARINC AEEC Cabin Systems Subcommittee technical working group for wireless systems onboard airplanes. Kenneth has worked at the Boeing Company for 22 years, spending time as an electromagnetic effects engineer on programs such as the 767 Tanker and Connexion by Boeing® and as a systems engineer in cabin systems working on onboard mobile telephony systems. Kenneth currently serves as the principle investigator in 787 Cabin Systems research and development working on such technologies as software defined radio, aircraft wireless infrastructure and synthetic aperture scanning.

Tutorial T-PM-1: **Circuits New requirements of IEC 61000-4-4 Edition 3 – 2012 – Trends for Next Revision of IEC 61000-4-5**

Time : 1:20pm – 1:50pm, Monday, 21 May
Venue : Gemini 1
Speaker : Eric Dudenhoeffer, TESEQ AG, Switzerland

Abstract
IEC 61000-4-4 is one of the most popular EMC standards. Revision 3 to be published in April/ may 2012 sorts out unclearness's from earlier revisions, generator and CDN definitions taking in account new calibration methods, introduces a calibration method for the capacitive coupling clamp, new test setups, and annexes about calibration uncertainty, numerical modelling, etc…IEC 61000-4-5 revision 3.0 maintenance has started, news which may appear in next edition will be presented. The tutorial informs you on the most important news in regard to:

- Generator specification and calibration
- CDN specification and calibration
- Test setups and test procedures
- Measurement uncertainty

Eric Dudenhoeffer was born in 1965. He received a degree of electronics engineering in 1986 and started designing heart defibrillators and ECG monitors. He then joined Schaffner in Germany and spent several years as EMC engineer in the local laboratory proceeding EMC testing and certification works. In 2003 he joined the Schaffner headquarters in Switzerland and took over the engineering management of the conducted transients' product line. He kept this function when the company became TESEQ in 2006. At same time he started participating to standardisation works and joined several committees, including IEC TC77B/ MT 12 who is in charge of IEC 61000-4-2, 4, 5, 9, 10, 12, 18. Since 2011 he is product manager for the Teseq Conducted transients' product line.

Tutorial T-PM-2: **EMC and ESD for Analogue Integrated Circuits**

Time : 1:50pm – 3:20pm, Monday, 21 May
Venue : Gemini 1
Organizers : P. Besse, Freescale Semiconductor, France
K. Abouda, Freescale Semiconductor, France

Abstract
The electronic content is increasing over the years, improving safety and comfort and making our life easier. More and more complex electronic modules have to work together without causing disturbance, or being disturbed by electromagnetic interferences. Severe electrical constraints coming from the system could be directly applied at the integrated circuit level. More and more EMC standards appear to guarantee safe operations of the system. It creates new design constraints at the IC level. Analysis of EMC/ ESD requirements and its impact on the IC design strategy will be studied. Guidelines to select appropriated ESD architecture considering electromagnetic emission and susceptibility constraints of ICs will be detailed. Based on real cases, test methods to investigate root cause of soft failures will be proposed.

Tutorial Outline:

T-PM-2.1 **Introduction**
ESD requirements overview
I C level ESD strategy
Efficient System level ESD protection
Investigation of ESD failure mechanisms
P. Besse, Freescale Semiconductor, France

T-PM-2.2 **EMC requirements**
Basic EMC design rules
Investigation of EMC failure root causes
Common EMC & ESD solutions
Conclusion
K. Abouda, Freescale Semiconductor, France

Patrice Besse received the Master in electronics in 1999 and then the post master of Electromagnetic Compatibility from the Blaise Pascal University of Clermont-Ferrand in 2000. In January 2004, he received the Ph.D. degree in Electronics from the University of Paul Sabatier, Toulouse France. He is currently with the Analog and Mixed Power Division of Freescale Semiconductor in France, where is involved in physical simulation to improve the robustness of integrated circuits during ESD. He holds 12 patents with several pending and he is author or co-author of 22 papers or conference presentations.

Kamel Abouda received his graduate engineer diploma in 1993 from ENIS Tunisia in electronic and electric area, then got a post master in the field of modeling transistor at IXL Bordeaux I (microelectronic research laboratory) in 1994. He has defended a PhD in 1998 at IXL on first integration (mixed design analog + digital) of battery monitoring system in electrical vehicles. Currently, he serves as EMC design expert for analogue products in Freescale semiconductor. He holds 6 patents with several on-going in field of electronics and EMC. Kamel is author of 12 publications with one best paper award at EMC Compo 2011.

Tutorial T-PM-3: **EMC Complaint DC/ DC Converter Design**

Time : 3:40pm – 5:00pm, Monday, 21 May
Venue : Gemini 1
Speaker : Stefan Klein, Würth Elektronik eiSos, Germany

Abstract
DC/ DC converter cause lots of EMI. This tutorial will explain how a DC/ DC converter generates EMI, why a DC/ DC converter generates conducted emission, why the PCB design is important for EMC, and why it is important to make a difference between differential and common mode noise. Ripple voltage and conducted emission will be demonstrated with an oscilloscope and a spectrum analyzer. Different kind of filter topologies will be used to reduce noise on input and output of DC/ DC converters. This tutorial is made for hardware design engineers of power suppliers and employees of EMC-laboratories. They can use this knowledge to develop their own products or to solve EMC problems.

Stefan Klein brings over 12 years experience in electronics. He began to study electrical engineering with focus on micro technologies in 2005. He continued to work as a hardware developer during his studies. During this time he got much of experience in designing power supplies and digital circuits as well the electromagnetic compatibility. He graduated in Electrical Engineering at the University of Applied Sciences in Düsseldorf and received his bachelor degree in 2009. Since 2010 he is working at "Würth Elektronik" eiSos as an "Application

Engineer". Now he shares his experience in EMC-complaint hardware design with Würth Elektronik's customers.

Tutorial T-PM-4: **Modeling and Measurement of Stochastic Electromagnetic Fields in EMI**

Time : 1:20pm – 3:20pm, Monday, 21 May
Venue : Gemini 2
Organizers : Peter Russer, Technische Universität München, Germany
Johannes Anton Russer, Technische Universität München, Germany

Abstract
Stochastic electromagnetic fields play an important role in electromagnetic interference. Their random fluctuations may either originate from thermal noise or from electromagnetic interference originating from specific transmitters. In communications and in most sensorics applications, stochastic electromagnetic signals are interfering signals, degrading the signal to noise plus interference ratio of systems.

In a method- and application oriented presentation this tutorial gives an introduction to the modeling and measurement of stochastic electromagnetic fields in the context of electromagnetic interference. Methods for measuring noise and electromagnetic interference in frequency and time domain will be discussed. The description of noise signals and stochastic electromagnetic fields, methods for modeling noise in distributed electromagnetic systems will be treated.

Tutorial Outline:

T-PM-4.1 **Modeling and Measurement of Stochastic Electromagnetic Fields in EMI**
Peter Russer, Technische Universität München, Germany
Johannes Anton Russer, Technische Universität München, Germany

Peter Russer received the Dipl.-Ing. (M.S.E.E.) degree in 1967 and the Dr. techn. (Ph.D.E.E.) degrees in 1967 and 1971, both from the Vienna University of Technology, Austria. In 1971 he joined the AEG-Telefunken Research Institute in Ulm, Germany, where he realized in 1978 the first optical fiber transmission link for 1 Gbit/s worldwide. From 1981 to 2008 Peter Russer has been Full Professor at the Technische Universität München (TUM), Germany. After his retirement he was appointed Emeritus of Excellence of the TUM. From October 1992 to March 1995 he also has been Director of the Ferdinand-Braun-Institute in Berlin. The current research interests of Peter Russer include electromagnetics, statistical noise analysis, microwave circuits and antennas, and nanoelectronics.

Peter Russer has published five books and more than 700 scientific papers. In 1979 Peter Russer received the NTG award. In 1994 he was elected Fellow of the IEEE. In 2006 he was elected member of acatech. In 2006 he received the IEEE MTT Distinguished Educator Award and in 2009 the EuMA Distinguished Service Award. In 2007 Peter Russer received an honorary Doctor degree from the Moscow University of Aerospace Technologies (MAI). In 2010 he received the Golden Ring of Distinction of the VDE.

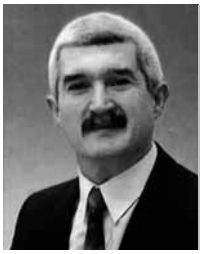
Johannes Anton Russer received his Diplom Ingenieur degree in electrical engineering and information technology from the Universität Karlsruhe, Germany, in 2003, and his Ph.D. degree from the University of Illinois at Urbana-Champaign, USA, in 2010. Since 2007 he has been working for Qualcomm Inc. as an intern. In 2008 Johannes Russer received the second place in the student paper competition of the IEEE MTT-S International Microwave Symposium in Atlanta. Since May 2010 Johannes Russer is working as a postdoctoral research fellow at the Institute for Nanoelectronics of the Technische Universität München. His research interests concern numerical electromagnetics, network methods in electromagnetic field modeling, multiphysics modeling, and multiscale modeling.

Johannes Russer is a member of the IEEE, of the German Informationstechnische Gesellschaft (ITG) and of the Eta Kappa Nu honor society.

Tutorial T-PM-5: **Grounding: The Grounds for EMC Design**
Time : 3:40pm – 5:00pm, Monday, 21 May
Venue : Gemini 2
Speaker : Elya B. Joffe, K.T.M. Project Engineering, Israel

Abstract
The concept of "grounding" is probably among the most important, yet less understood topic of electronic design, often considered as "black magic". Yet – grounding forms an inseparable part of all electronic and electrical designs, from circuit through system up to installation design. Grounding is implemented for EMC and ESD protection, for safety purposes, for lightning and surge protection, etc.

This seminar is intended to shed some light on the fundamental concept of grounding - an essential and inseparable concept in EMC design. No design will be acceptable without it being properly implemented.



Elya B. Joffe is employed by K.T.M. Project Engineering - an engineering consulting company in Israel, since 1987. He currently holds a position of the V.P. of Engineering and works as a Senior EMC engineering Specialist and consultant. Elya holds a B.ScEE in Electrical Engineering from the Ben Gurion University in Israel, is a Registered Professional Engineer and an iNARTE (International Association of Radio and telecommunications Engineer) certified Senior EMC Engineer, ESD Control Engineer and EMC Master Design Engineer. He has published over 30 papers in EMC and EMC-related topics and authored one book. Mr. Joffe is Senior Member of IEEE, and has served as a member of the IEEE EMC Society of the Board of Directors since the year 2000. Elya is the President of the Product Safety Engineering Society of the IEEE and Past President of the EMC Society of the IEEE. Mr. Joffe is a member of IEEE Eta-Kappa-Nu (IEEE-HKN) and of the "dB Society". He also serves as a member of the iNARTE Board of Directors. Mr. Joffe received many awards from the IEEE and EMC Society for his activities.

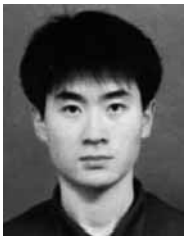
Tutorial T-PM-6: **Metamaterials, Periodic Structures and EBG in EMC/Antenna/RF Designs**
Time : 3:40pm – 5:00pm, Monday, 21 May
Venue : Leo 4
Organizer : Sungtek Kahng, University of Incheon, Korea

Abstract
In this tutorial, the analysis and design methods of FSS, DNG/SNG/AMC and EBG are dealt with and advanced applications to EMC/antenna/RF designs are introduced. Also, we discuss the slow-wave effects of a periodic geometry and the resonant slots (non-metamaterial) of DGS and SRR/CSRR. Last but not least, a number of electromagnetic computational methods are shown to efficiently and accurately predict the scattering and radiation of the aforementioned structures.

Tutorial Outline:

T-PM-6.1 **Basics and Applications of Metamaterials, Periodic Structures, and EBG for Microwave Engineering and Antennas**
Sungtek Kahng, University of Incheon, Korea

T-PM-6.2 **Low-profile and High-directivity Antennas**
Jeongho Ju, Electronics and Telecommunication Research Institute, Korea



Sungtek Kahng received the Ph.D. degree in electronics and communication engineering from Hanyang University, Korea in 2000, with the specialty in radio science and engineering. He is currently with the department of Information and Telecommunication Engineering at the University of Incheon. His research interests include analysis and advanced design methods of microwave components and antennas including metamaterial technologies, MIMO communication and wireless power transfer. He holds several patents concerning EMC solutions and

microwave- and millimeter-wave components. Also, he has provided consultancy for RF system developers and served the Microwave and Antennas/Propagation Research Groups of the Korean Institute of Electromagnetic Engineering and Science, the IEEE APS Seoul Chapter, and conferences of KJMW 2009, KJJC 2009, GSMM 2010, APEMC 2011, ISAP 2011 as the secretary.

Jeongho Ju was with the University of Incheon and got his bachelor and master's degrees from the department of Information and Telecommunication Engineering with the field of specialty in radio science and engineering in 2006 and 2008, respectively. Since 2008, he has been with ETRI, Daejeon, Korea, where he currently works in the antenna research team. His current research interests include passive components, filters, and antenna design based on metamaterials.

Tutorial T-PM-7: **Application of Numerical Inversion of Laplace Transform in EMC Modeling**

Time : 5:00pm – 5:30pm, Monday, 21 May
Venue : Leo 4
Speaker : Qingsheng Zeng, Communications Research Centre, Canada

Abstract

The advancement in electromagnetic compatibility (EMC) has been driving the need to develop efficient techniques for EMC modeling. This tutorial addresses one method based on numerical inversion of Laplace transform (NILT), which overcomes the restrictions in previous approaches, leads to good accuracy in both late and early time, and has a simple algorithm, short calculation time, small required memory size and readily controlled error. To our knowledge, this would be the first time that systematically treats the theory of NILT and its application in EMC modeling. This tutorial highlights how to overcome the restriction that numerical inversion of Laplace transform has high demands on image functions, and places the emphasis on how to extend and apply this method to a variety of cases. The correctness and effectiveness of this work are validated through the comparisons between our results and those published in the literature. Meanwhile, the results that cannot be achieved with the previous approaches are also provided. Moreover, this tutorial presents some applications of the new technique in time domain EMC modeling.

Qingsheng Zeng received his Ph.D. from University of Ottawa, Canada, and is currently a senior research engineer at Communications Research Centre Canada (CRC), Government of Canada. He is an adjunct professor at University of Ottawa, Univerisité du Québec an Outaouais (UQO), and Institut National de la Recherche Scientifique – Centre Energie, Matériaux et Télécommunications (INRS-EMT). He has been pursuing and leading the research projects in CRC and Industry Canada, which have been related to national and international activities. He has been undertaking research and teaching in several fields, including antennas, electromagnetics, optoelectronics, and wireless communications, authored and coauthored 2 book chapters and more than 40 technical papers and reports in these fields. He is the Chair of AP/MTT Joint Chapter of IEEE Ottawa and a senior member of IEEE.

Tutorial T-PM-8: **Model Validation and Accreditation for EMC Simulations**

Time : 3:40pm – 5:00pm, Monday, 21 May
Venue : Aquarius 4
Speaker : F. Schlagenhaufer, International Centre for Radio Astronomy Research (ICRAR)/Curtin University, Australia

Abstract

Modeling electromagnetic fields is widely used in many areas of designing electrical and electronic products and systems. In the past years both hard- and software have become ever more powerful,

and in particular the development of antenna systems or microwave components is hardly imaginable without simulating their electromagnetic characteristics.

Validation of simulation results is an important part of the modeling process, and the proposed tutorial will give both a general outline of this phase and examples.

But the validation of results must also be turned into a transparent and reliable process in order to obtain a formal recognition (accreditation) of a simulation service. This will be the second topic of the tutorial.

Franz Schlagenhaufer obtained a Doctorate in Engineering from the Technical University Hamburg-Harburg, Germany, in 1994.

He is currently a Research Engineer with the International Centre for Radio Astronomy Research at Curtin University of Technology, Perth. His tasks include EMC measurements in the lab and on-site, simulations and training and education.

He is a senior IEEE member, and also active in Australian and international standardization committees.

Workshop W-PM-1: SI and EMC Design for High-speed Differential Channels

Time : 1:20pm – 2:50pm, Monday, 21 May
Venue : Leo 4
Organizer : Tzong-Lin Wu, National Taiwan University, Taiwan

Abstract

The data bandwidth of high speed differential channels in IC, package and PCB are exceeding over 10 Gbps data rates to meet system data bandwidths of mobile and server computers. Signal integrity and EMC modeling and design for multiple Gbps differential channels are becoming critical. This workshop will focus on three main topics: SI/EMI modeling, equalizer design, and common-mode noise mitigation. The fundamental concept and latest progress in this area will be addressed.

Workshop Outline:

W-PM-1.1 A Successive Approach for Simple Models with Equivalent Sources Bearing on Both EMI and SI
Liuji R. Koga, Okayama University, Japan

W-PM-1.2 Equalizer Design for High-speed Differential Channels
Joungho Kim, KAIST, South Korea

W-PM-1.3 Common-mode Noise Mitigation for High-speed Differential Channels
Tzong-Lin Wu, National Taiwan University, Taiwan

Tzong-Lin Wu received the B.S.E.E. and Ph.D. degrees from National Taiwan University (NTU), Taipei, Taiwan, in 1991 and 1995, respectively. He is currently a professor with the Department of Electrical Engineering and Graduate Institute of Communication Engineering, NTU, Taiwan. He was the visiting professor at the Electrical Engineering Department of University of California at Los Angeles (UCLA) in the summer of 2008. His research interests include EMC/EMI and signal/power integrity design for high-speed digital/optical systems.

Dr. Wu received numerous awards for his distinguished achievements and outstanding contribution. He has served as the Chair of the Taipei Section, Institute of Electronics, Information and Communication Engineers (IEICE) from 2007 to 2011, and the Treasurer of Taipei Section, IEEE from 2007 to 2008. He serves as the Board of Directors (BoD) of IEEE Taipei Section from 2009 to 2010. He is elected as a Distinguished Lecturer of IEEE EMC society for the term of 2008 to 2009. Dr. Wu is the General Co-Chair in 2007, TPC Chair in 2010 and 2012 for IEEE EDAPS Conference.

Liuji R. Koga was born in 1945. He received the Doctor of Engineering from Kyoto University on 1972, and he was with the Atomic Energy Institute of Kyoto University. In 1976 he moved to Okayama University and retired from it in 2010. He is currently a Prof. Emeritus of Okayama University.

His research area extends to the nuclear reactor engineering, optoelectronics, laser-sensing of atmospheric gas, as well as EMC. He has ever chaired EMCJ, JAPAN, IEEE EMCS Japan chapter, and the Symposium EMC'09/Kyoto. Now he is a director at Large, EMC Society, IEEE, and is now operating "EM Consulting Ltd." He is also dedicating to explore the careers of college students, and also of post-doctorate researchers.

Joungho Kim received B.S. and M.S. degrees in electrical engineering from Seoul National University, Seoul, Korea, in 1984 and 1986, respectively, and Ph.D degree in electrical engineering from the University of Michigan, Ann Arbor, in 1993. He is currently EECS Department Chair at KAIST. Also, he is director of 3DIC-RC (3DIC Research Center) supported by Hyniz Inc., and SAE-RC (Smart Automotive Electronics Research Center) supported by KET Inc. Since joining KAIST, his research centers on EMC modeling, design, and measurement methodologies of 3D IC, System-in-Package(SiP), multi-layer PCB, and wireless power transfer technology.

He has authored and co-authored over 370 technical papers published at refereed journals and conference proceedings in modeling, design, and measurement of 3D IC, SiP, PCB, and wireless power transfer. He was appointed as an IEEE EMC society distinguished lecturer in a period from 2009-2011. He received Technology Achievement Award from IEEE Electromagnetic Society in 2010. He is also an associated editor of the IEEE Transactions of Electromagnetic Compatibility. He served as a guest editor of the special issue in the IEEE Transactions of Electromagnetic Compatibility for PCB level signal integrity, power integrity, and EMI/EMC in 2010, and also as a guest editor of the special issue in the IEEE Transactions of Advanced Packaging for TSV (Through-Silicon-Via) in 2011.

Workshop W-PM-2: Numerical Testing via Virtual EMC Lab

Time : 2:50pm – 3:20pm, Monday, 21 May
Venue : Leo 4
Speaker : Richard Xian-Ke Gao, A*-STAR Institute of High Performance Computing, Singapore

Abstract:
A system-level modeling method by integrating analytical and numerical methods to analyze conducted and radiated electromagnetic immunity of electronic systems is presented. Through extracting the intrinsic behavioural characteristics from cable, traces and vias on printed circuit board by using the hybrid method, one equivalent circuit model is built which is capable of simulating the transient/AC responses and crosstalk under conducted and/or radiated electromagnetic interference. A computer aided modelling system is developed to help industry engineers utilize the proposed methodology for their EMC design.

Richard Xian-Ke Gao received his Ph. D. degree from National University of Singapore. He worked in different industrial companies, universities and research institutes over 23 years. He is currently the senior scientist with the A*STAR Institute of High Performance Computing (IHPC) in Singapore. He has led a lot of industrial projects and new products development. He is the senior member of IEEE and EMC society. He served as the chairman of IEEE Singapore EMC Chapter during 2010-2011. He was the member of steering committee and served as the publication chair of APEMC 2008 & 19th international Zurich Symposium on EMC. He was the session chair of APEMC 2010. He served as the publication & publicity chair cum session chair of EDAPS 2010. He was the organizaing chair of 2011 IEEE EMC Workshop in Singapore. He is the invited speaker for technical talks in universities and companies.

Dr. Gao was awarded 2nd class national prize of advances of science and technology of China in 1991. He received the FY10 Best Industry Project Award from A*STAR IHPC of Singapore, and

bestowed the 2010 Best Chapter-of-the-Year award from IEEE EMC Society, 2011 Best Chapter in Singapore from IEEE Singapore Section, ABI Scientific Award of Excellence for 2011, and IBC Top 100 Scientists in 2011. He is included in the "Who's Who in Science and Engineering, 2011-2012" and "Who's Who in the World, 2013", Marquis Who's Who of USA.

His main research interests include electromagnetic compatibility (EMC), computational electromagnetic modeling, RF, robust design and optimization methodologies, automatic electric control, and CAD/CAE/CAM.

Workshop W-PM-3: Novel Antenna Measurement Techniques for Commercial and Military Applications

Time : 1:20pm – 3:20pm, Monday, 21 May
Venue : Aquarius 4
Organizer : Vince Rodriguez, ETS-Lindgren, USA

Abstract:
This workshop will present results of recent research involving novel antenna measurement techniques for EMC, spherical near-field and far-field applications. Use of a tapered, anechoic-lined chamber and reverberation chamber to cost effectively enhance antenna measurement capabilities will be presented. An introduction to rectangular and tapered chambers will be presented followed by a discussion on research addressing the novel use of meta-material lenses to improve the performance of these types of chambers. At this point, reverberation chambers will be introduced as a test methodology for determining the radiation efficiency of antennas. Finally, the reverberation chamber concept will be presented to show measurement of wireless coverage onboard commercial aircraft – leading to an effective leaky feeder coaxial antenna solution to the unique RF propagation challenges posed by the aircraft cabin environment.

Workshop Outline:

W-PM-3.1 **Use of a Tapered Chamber for Far-field and Spherical Near-field Antenna Measurements Over an Extended Frequency Range of 200 MHz to 18 GHz**
Vince Rodriguez, ETS-Lindgren, USA

W-PM-3.2 **Large Size, Light Weight Broadband RF Lens for Far Field Measurements**
Serguei Matitsine, Temasek Laboratories, National University of Singapore

W-PM-3.3 **Determining Radiation Efficiency of Antennas in Reverberation Chambers**
Perry Wilson, National Institute of Standards and Technology, USA

W-PM-3.4 **Evaluation of Leaky Feeder Coaxial Antenna Performance Onboard Commercial Aircraft Using Statistical Methods**
Dennis Lewis, Boeing, USA

Vicente Rodriguez attended Ole Miss, in Oxford MS, where he obtained his B.S.E.E., M.S. and Ph.D. degrees in 1994, 1996 and 1999, respectively. He is currently the Antenna Product Manager of ETS-Lindgren. He has been involved in the RF anechoic design of several chambers, including rectangular and taper antenna pattern measurement chambers, some of which operate from 100 MHz to 40 GHz. Dr. Rodriguez is a Senior Member of the IEEE and several of its technical societies. He is also a Senior Member of the Antenna Measurements Techniques Association (AMTA) and a member of its Board of Directors.

Perry F. Wilson (S'78-M'82-SM'93-F'05) received his Ph.D. in Electrical Engineering from the University of Colorado in 1983. He has been with the Electromagnetics Division at NIST in Boulder, Colorado since 1999. Dr. Wilson's research has focused on the application of electromagnetic theory to problems in electromagnetic compatibility and metrology. Dr. Wilson is a Fellow of the IEEE, currently a member of the IEEE EMC Society Board of Directors, of URSI Commission B, and of the US IEC TC77B TAG, a former Editor-in-Chief of the IEEE EMC Transactions, and a recipient of the IEEE EMC Transactions Best Paper Award in 2002 and the Technical Achievement Award in 2010.

Serguei Matitsine graduated with honors from the Moscow Institute of Physics and Technology in 1979 and received his PhD in 1982. From 1982-1984 he held the position of senior researcher at the Institute of Radio-Engineering and Electronics of Russian Academy of Sciences. From 1984 until 1995 he has held several positions including senior researcher, Head of Electromagnetic Laboratory and Deputy Director at the Institute of Theoretical and Applied Electromagnetics of Russian Academy of Sciences.

In 1995 Dr. Matitsine joined the research and development group at Singapore Technologies Aerospace as Technical Director and later holding the position of Chief Engineer. In parallel, since 2001, Dr. Matitsine has also been working at Temasek Laboratories of the National University of Singapore as an Adjunct Senior Principal Research Scientist. He is also on the Board of Directors and a Technical consultant for Matsing Pte Ltd.

His research interests include electromagnetic materials, meta-materials, smart materials, multi-beam antennas, antenna measurement techniques, and most recently, lightweight, large size RF Lenses. He has more than 60 publications in these areas, including four patents.

Dennis Lewis received his BS EE with honors from Henry Cogswell College and his MS Physics from the University of Washington. Dennis is a member of the IEEE and several of its technical societies including the Microwave Theory and techniques, Electromagnetic Compatibility and the Antennas and Propagations societies. He serves on the IEEE MTT-S subcommittee 11 on microwave measurements. He is a Senior Member of the Antenna Measurements Techniques Association. He is an active member and past chairman of the Technical Advisory Committee for North Seattle Community College. Dennis has worked at Boeing for 23 years and is recognized as an Associate Technical Fellow. He currently has leadership and technical responsibility for the primary RF, Microwave and Antenna Metrology labs. His recent interests include aerospace applications of reverberation chamber techniques and microwave measurement systems and uncertainties.

LIST OF TECHNICAL SESSIONS

AP	: Antenna and Propagation
AUTO	: Automotive EMC
BIO	: Biomedical EMC
CEM	: Computational Electromagnetics
COM	: Communication EMC
ESD	: Electrostatic Discharge, Gap Discharge and Transients
HPEM	: High Power Electromagnetics
ICEMC	: 2D and 3D Integrated Circuit (IC) EMC
IEMI	: Intentional Electromagnetic Interference
LIGHT	: Lightning EMC
MS	: EMC Management and Standards
MEAS	: EMC Measurement and Environment
NANO	: Nanotechnology EMC
PE	: Power Electronics EMC
PI	: Power Integrity
PS	: Power Systems and Smart Grid EMC
RC	: Reverberation Chamber
SI	: Signal Integrity
SYS	: System Level EMC and Protection
VAH	: Memorial Session for Professor Rüdiger Vahldieck
WJRH	: Computational Electromagnetics - Retrospective and Outlook [A Tribute to Prof. Wolfgang J. R. Hoefer]
Open Forum-1	: Power Electronics and Smart Grid EMC
Open Forum-2	: Packaging and IC EMC
Open Forum-3	: Signal Integrity and Power Integrity
Open Forum-4	: System EMC
Open Forum-5	: Reverberation Chamber and Antenna
Open Forum-6	: EMC Instrumentation and Material
Open Forum-7	: EMC Methodology and Modeling
Open Forum-8	: EMC Measurment and Environment
RFNANO	: Radio Frequency Nanotechnology

A TRIBUTE SESSION FOR PROF. RÜDIGER VAHLDIECK

10:40am – 1:00pm, Thursday, 24 May 2012, Venue: Leo 4

The special session is in memory of Prof. Rüdiger Vahldieck to honour his devotion and contributions to the Electromagnetics community. Prof. Rüdiger Vahldieck of Zurich, Switzerland, passed away on 21 March 2011 at age 59 after a long and valiant fight with brain cancer. He leaves behind his wife Zorka and his daughter Masha. Rüdiger was born in Heiligenhafen, Germany, on 8 July 1951. He received the Dipl.-Ing. and Dr.-Ing. degrees, both in Electrical Engineering, from the University of Bremen, Germany, in 1980 and 1983 respectively. He accepted the position of Professor of Field Theory at the Eidgenössische Technische Hochschule (ETH) Zurich (Swiss Federal Institute of Technology), first as Leader of the Field Theory Group and subsequently, in 2003, as Head of the Department of Field Theory and Microwave Electronics (IFH). In 2005, he became President of the Research Foundation for Mobile Communications and was elected Head of the Department of Information Technology and Electrical Engineering (D-ITET) of ETH Zurich.

Prof. Vahldieck has been the President and General Chairman of the International Zurich Symposium on Electromagnetic Compatibility (EMC Zurich) from 2003 to 2009, and was General Chair of the 2006 and 2008 APEMC/ EMC Zurich in Singapore and 2007 EMC Zurich in Munich. He has devoted considerable effort to the founding of the Asia-Pacific EMC Symposium. He tirelessly served the IEEE in key leadership roles, notably as a reviewer of several IEEE journals, Associate Editor and Editor-in-Chief of the IEEE Microwave and Wireless Components Letters (2004-2006), Member of the MTT-15 Technical Committee on Field Theory, Chair of IMS TPSC Committee 3, and Chair of the Swiss Joint IEEE MTT, AP, and EMC Societies Chapter. He has been a member of IEEE since 1985, became a Fellow in 1999, and received several outstanding publication awards.

Rüdiger was a passionate sailor and spent whatever time he could find, on his sailboat with his family and friends. He now has departed on his final voyage, leaving behind his loved ones, friends, students, research associates and colleagues to remember him fondly.

KEYNOTE SPEECH

Title : ICT (Information Communication Technology) meets Energy

Dr. Ingo WOLFF, IEEE Life Fellow, President of the Information Technology Society (ITG/VDE), Germany; President/CEO of IMST GmbH, Germany

Time : 11:00am – 11:45am, 22 May 2012

Venue : Gemini 1-2

Abstract

Electrical power supply systems are changing worldwide. Energy plants on the basis of fossil fuels and also atomic energy plants, especially in Germany, more and more are replaced by regenerative green fuel plants like photovoltaic, wind turbine and biological generators. The increasing use of local energy producers and their extensively uncontrolled infeed into the distribution grid demands active management of these facilities. Also, the local infeed into the supply grids can reverse the flow of energy with voltage band violation that is detrimental to grid quality. All these facts result in drastic increases in the complexity of grid control. This also leads to the need for more active protection and control of components fitted both in the distributed energy resources and also within the existing grid infrastructure. As a consequence, greater significance is being attributed to developing new methods for local, automated grid management.

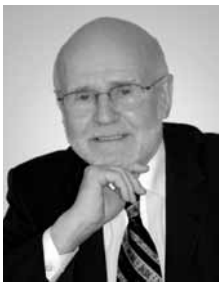
In future, the increasing number of electric vehicles will also put an increasing load on the energy distribution grids, with the resulting need for charging load management in the grid. All these requirements demand far more comprehensive metering and monitoring of the energy grid. Great significance is attributed to the security requirements that encompass all the aspects involved in operational safety, security from attack, and also data protection in terms of privacy.

Energy information networks and systems have to provide all the data necessary for metering and controlling the current and future energy grid. The implementation of an energy information network entails interdisciplinary deployment of know-how referring to energy supply, telecommunication and automation technology. Various aspects have reached differing levels of evolution, with the possibility of transferring corresponding experience. This is based on the assumption of a paradigm shift in the energy supply as such, towards a peer-to-peer architecture in order to take account of increasing local energy production. Know-how transfer between the various disciplines requires a shared understanding, based for example on a classification scheme for putting definitions from various domains in relation to each other.

There are also a variety of upcoming new problems in the area of electromagnetic compatibility coming from the need of building new energy distribution systems and new communication channels as well as the introduction of electrical vehicles into the electrical power supply systems.

In the presentation these upcoming problems, first approaches to solutions and a view of the future development of this new broad field will be discussed.

Biography



Ingo Wolff studied Electrical Engineering at the Technical University Aachen, Germany. He received his Diplom-Engineer degree (Dipl.-Ing.) in 1964, his doctoral degree (Dr.-Ing.) in 1967 and his Habilitation degree in 1970, all from the Technical University Aachen. From 1974 to 2003 he has been a full professor for Electromagnetic Field Theory at the Duisburg University, Duisburg, Germany. In 1999 to 2003 he has been the elected president (rector) of the Duisburg University. He was chairman of the IEEE MTT-S committee 1, Computer Aided Design, from 1992 to 1998 and a member of the IEEE MTT-S committee 15, lectromagnetic Field Theory, from 1990 to 1998. He is a Life Fellow of the IEEE. In 2002 he received the IEEE MTT-S Microwave Career Award.

Since 1992 he is (in parallel to his activities at the Duisburg University) and president (CEO) of IMST GmbH, Kamp-Lintfort, Germany, a privately held research and development company in wireless and microwave technologies.

Since 2009 Ingo Wolff is the chairman of the Information Technology Society (ITG) of the VDE, Germany and a member of the executive committee of the VDE.

KEYNOTE SPEECH

Title : Through Silicon Via (TSV) Design and Measurement for Terabit Data-Bandwidth of 3D IC

Prof. Joungho KIM, Department Chair of Electrical Engineering and Computer Science, Korea Institute of Advanced Science and Technology, Korea

Time : 11:45am – 12:30pm, 22 May 2012

Venue : Gemini 1-2

Abstract

TSV (Through Silicon Via) based 3D IC technology is emerging as the most promising next generation IC technology to overcome the technical and business challenges of the current CMOS process including enlarged leakage current and considerable increase of investment budget. As a result, TSV is becoming the most crucial interconnection structure to determine the performance of the 3D IC. However, in the TSV based 3D IC, signal integrity issues of the TSV are becoming the major design concern due to the high frequency loss, power supply noise, and noise coupling of the TSV, while more than thousand of TSV's as well as vertical and lateral interconnections are routed in a tiny 3D silicon space.

In this presentation, I will introduce the modeling efforts and measurement results of the TSV with respect to high frequency loss, power supply noise, and noise coupling in the 3D IC. In addition, I will present high frequency modeling and measurement results to show the silicon depletion effect, failure mechanism, and thermal impacts on the performance of TSV. Finally, I will propose future TSV structures for over 10 tera-bit scale data-bandwidth for CPU-memory interface in 3D IC.

Biography

Joungho Kim received his Ph.D degree in electrical engineering from the University of Michigan, Ann Arbor, in 1993. In 1994, he joined Memory Division of Samsung Electronics, where he was engaged in Gbit-scale DRAM design. In 1996, he moved to KAIST (Korea Advanced Institute of Science and Technology). He is currently EECS Department Chair at KAIST. Since joining KAIST, his research centers on EMC modeling, design, and measurement methodologies of 3D IC, System-in-Package(SiP), multi-layer PCB, and wireless power transfer technology. He has successfully demonstrated low noise and high performance designs of numerous SiP's for wireless communication applications such as ZigBee, T-DMB, NFC, and UWB. Recently, he started a new research on wireless power transfer technology using magnetic field resonance. He has been one of the co-leaders in a national project, OLEV (Online Electrical Vehicle), for EMI and EMF reduction design. The OLEV was selected as one of the 50 Best Inventions in 2010 by Times Magazine. Recently, he became center director of 3DIC-RC (3D IC Research Center) supported by Hyniz Inc., and SAE-RC (Smart Automotive Electronics Research Center) supported by KET Inc.

He has authored and co-authored over 370 technical papers published at refereed journals and conference proceedings in modeling, design, and measurement of 3D IC, SiP, PCB, and wireless power transfer. Also, he has given more than 174 invited talks and tutorials at the academia and the related industries. He received Outstanding Academic Achievement Faculty Award of KAIST in 2006, Best Faculty Research Award of KAIST in 2008, National 100 Best Project Award in 2009, and KAIST International Collaboration Award in 2010, respectively. Dr. Joungho Kim was the Symposium chair of IEEE EDAPS 2008 Symposium, and is the TPC chair of APEMC 2011. He is appointed as an IEEE EMC society distinguished lecturer in a period from 2009-2011. He received Technology Achievement Award from IEEE Electromagnetic Society in 2010. Currently, he is TPC member of EPEPS (Electrical Performance of Electronic Packaging and System). He is also an associated editor of the IEEE Transactions of Electromagnetic Compatibility. He served as a guest editor of the special issue in the IEEE Transactions of Electromagnetic Compatibility for PCB level signal integrity, power integrity, and EMI/EMC in 2010, and also as a guest editor of the special issue in the IEEE Transactions of Advanced Packaging for TSV (Through-Silicon-Via) in 2011.

KEYNOTE SPEECH

Title : Emerging Technologies for EMC and Electromagnetic Protection

Prof. Wen-Yan YIN, QiuShi Distinguished Professor, Zhejiang University, China

Time : 10:40am – 11:25am, 23 May 2012

Venue : Gemini 1-2

Abstract

The discoveries of new nanomaterial, carbon nano-tube and grapheme, may bring a technological revolution in EMC (Electromagnetic Compatibility) for shielding, protection, EMI mitigation, interconnects in micro-nano-electronics and etc. This talk will introduce the research progresses on emerging technologies for electromagnetic protection at communication systems, complex electromagnetic environment and microelectronics. And in particular, the talk will cover the increasing concerns of EMC and EMI problems in various communication and high power systems, experimental observation of electro-thermo-mechanical breakdown events in some active RF components, such as RF Low noise amplifier, power amplifier and switches, fast simulation of multiphysics-based for capturing EM pulse responses in passive as well as active RF devices in the presence of an electromagnetic pulse, and the Emerging nanomaterial, carbon nanotube and grapheme, for EMC and electromagnetic protection.

Biography

Wen-Yan Yin is the "Qiu Shi" Distinguished Professor at School of Information Technology of Zhejiang University (ZJU), China. He received his M.Sc. degree from Xidian University in 1989 and Ph.D. degree from Xi'an Jiaotong University in 1994. Dr Yin was a Research Fellow with the Department of Electrical Engineering at Duisburg University, granted by the Alexander von Humblodt□Stiftung of Germany from 1996 to 1998. From 1998 to 2005, he was with the National University of Singapore (NUS) as a Research Scientist. From April 2005, he has been with the School of Electronic Information and Electrical Engineering, as a Professor and the Director of the Center for Microwave and RF Technologies (CMRFT) at Shanghai Jiao Tong University.

Dr Yin is pioneering in the fields of electromagnetic compatibility (EMC), electromagnetic protection (EMP) of communication systems, nanotechnology for EMC. He has authored or co-authored over 200 papers published in the international referred journals, one book, and 15 book chapters. Dr. Yin is the IEEE EMC Society Distinguished Lecturer from 2011 to 2012, the Guest Editor of IEEE Trans. Components, Packaging and Manufacturing Technologies from 2011, the Associate Editor of the International Journal of Numerical Modeling of Electronic Networks, Devices and Fields from 2011, and the reviewer of many IEEE Transactions. He is also the General Co-Chair of IEEE EDAPS'2011, Hangzhou, China.

He received the First Class Science and Technology Achievement Award from Shanghai Government of China in 2005 and 2011, the National Technology Invention Award from Chinese Government in 2008, and the Best Paper Award of APEMC'2008.

KEYNOTE SPEECH

Title : Towards Greener, Smarter and More Sustainable Electronic Devices and Networks Utilizing Nanotechnology

Prof. Manos M. TENTZERIS, IEEE Fellow, Georgia Institute of Technology, USA

Time : 11:25am – 12:10pm, 23 May 2012

Venue : Gemini 1-2

Abstract

Nanotechnology and Inkjet-printed flexible electronics and sensors fabricated on paper, plastic and other polymer substrates are introduced as a sustainable ultra-low-cost solution for the first paradigms of Internet of Things, "Smart Skins" and "Zero-Power" applications. The talk will cover examples from UHF up to the millimeter-wave frequency ranges (mmID's), while it willl include the state of the art of fully-integrated wireless sensor modules on paper or flexible polymers and show the first ever 2D sensor integration with an RFID tag module on paper, as well as numerous 3D multilayer paper-based and LCP-based RF/microwave structures, that could potentially set the foundation for the truly convergent wireless sensor ad-hoc networks of the future with enhanced cognitive intelligence and "zero-power" operability through ambient energy harvesting. Examples from wearable (e.g. biomonitoring) antennas and RF modules will be reported, as well as the first integration of inkjet-printed nanotechnology-based sensors on paper and organic substrates. The talk will also present challenges for inkjet-printed high-complexity modules as well as future directions in the area of environmentally-friendly ("green") RF electronics and "smart-house" conformal sensors.

Biography

Manos M. Tentzeris is a Fellow of IEEE, a Professor with School of Electrical and Computer Engineering, Georgia Institute of Technology, USA. He received Ph.D. degrees in Electrical Engineering and Computer Science from the University of Michigan, Ann Arbor, MI. He has published more than 420 papers in refereed Journals and Conference Proceedings, 5 books and 19 book chapters. Dr. Tentzeris has helped develop academic programs in Highly Integrated/Multilayer Packaging for RF and Wireless Applications using ceramic and organic flexible materials, paper-based RFID's and sensors, biosensors, wearable electronics, inkjet-printed electronics, "Green" electronics and power scavenging, nanotechnology, Microwave MEM's, SOP-integrated antennas and adaptive numerical electromagnetics. He is currently the Head of the GT-ECE Electromagnetics Technical Interest Group and has served as the Georgia Electronic Design Center Associate Director for RFID/Sensors research from 2006-2010 and as the Georgia Tech NSF-Packaging Research Center Associate Director for RF Research from 2003-2006. He was the recipient of the 2010 IEEE Antennas and Propagation Society Piergiorgio L. E. Uslenghi Letters Prize Paper Award, the 2010 Georgia Tech Senior Faculty Outstanding Undergraduate Research Mentor Award, the 2009 IEEE Transactions on Components and Packaging Technologies Best Paper Award, the 2009 E.T.S.Walton Award from the Irish Science Foundation, the 2006 IEEE MTT Outstanding Young Engineer Award, the 2006 Asia-Pacific Microwave Conference Award, the 2004 IEEE Transactions on Advanced Packaging Commendable Paper Award, the 2003 NASA Godfrey "Art" Anzic Collaborative Distinguished Publication Award, the 2003 IBC international Educator of the Year Award, the 2003 IEEE CPMT Outstanding Young Engineer Award, the 2002 International Conference on Microwave and Millimeter-Wave Technology Best Paper Award, the 2002 Georgia Tech-ECE Outstanding Junior Faculty Award, the 2001 ACES Conference Best Paper Award and the 2000 NSF CAREER Award and the 1997 Best Paper Award of the International Hybrid Microelectronics and Packaging Society. He was the TPC Chair for IEEE IMS 2008 and the Chair of the 2005 IEEE CEM-TD Workshop and the Vice-Chair of the RF Technical Committee (TC16) of the IEEE CPMT Society. He is the founder and chair of the RFID Technical Committee (TC24) of the IEEE MTT Society. He is the Associate Editor of IEEE Trans. on Microwave Theory and Techniques, IEEE Trans. on Advanced Packaging and International Journal on Antennas and Propagation. He has given more than 100 invited talks to various universities and companies all over the world. He is a member of URSI-Commission D, a member of MTT-15 committee, an Associate Member of EuMA, a Fellow of the Electromagnetic Academy and a member of the Technical Chamber of Greece. Prof. Tentzeris is one of the IEEE MTT-S Distinguished Microwave Lecturers from 2010-2012.

Technical Sessions – Tuesday Morning, 22 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
8:40am – 10:20am	**ICEMC1: Topical Meeting on 2D and 3D Integrated Circuit (IC) EMC** Chairs: Prof. Sonia Ben Dhia, France Prof. Adrijan Baric, Croatia	**PS1: Topical Meeting on Power Systems and Smart Grid EMC** Chairs: Dr. Lock Kai Sang, Singapore Prof. Khalid Mohd Nor, Malaysia	**CEM1: [Special Session] Advanced Modeling, Simulation and Design of SI/ PI/ EMI** Chairs: Prof. Hideki Asai, Japan Prof. Junwei Lu, Australia	**ESD: [Special Session] ESD, Gap Discharge and Transients** Chairs: Prof. Ken Kawamata, Japan
8:40am	TU-AM-ICEMC1-1 **Near-Field Scan State of the Art and Standardisation** John Shepherd[1], Christian Marot[2], Bertrand Vrignon[1], Sonia Ben Dhia[3] [1]Freescale Semiconductor, France [2]EADS IW, Toulouse, France [3]LAAS-CNRS, INSA-Toulouse, Toulouse, France	TU-AM-PS1-1 (30mins) **EMC Design for the Built Environment** (Topical Meeting Keynote) Kai Sang Lock PQR Technologies Pte Ltd, Singapore	TU-AM-CEM1-1 **Transient Simulation of Multilayered Power Distribution Network Based on Block-Type Alternating Direction Implicit Scheme** Tadatoshi Sekine, Tomoki Ishimaru, Hideki Asai Shizuoka University, Japan	TU-AM-ESD-1 **Observation of Electromagnetic Wave in a HDD Enclosure by ESD Injection** Takayoshi Ohtsu, Taro Takai, Kazuyuki Tanitsuji, Ken Minami, Shogo Imai, Hiromichi Fujikawa Suzuka National College of Technology, Japan
9:00am	TU-AM-ICEMC1-2 **Generic IC EMC Test Specification** Thomas Steinecke[1], Michael Bischoff[2], Frank Brandl[2], Carsten Hermann[2], Frank Klotz[1], Felix Mueller[3],Wolfgang Pfaff[2], Markus Unger[1] [1]Infineon Technologies AG, Germany [2]Robert Bosch GmbH Germany [3]Continental Automotive GmbH Germany	TU-AM-PS1-2 **Synchronised Power Quality Monitoring System using Global Positioning System (GPS)** F.P.Mohamed[1], W. H.Siew[1], K.Liu[2], S.S.Strachan[1] [1]University of Strathclyde, United Kingdom [2]Mediatek, United Kingdom	TU-AM-CEM1-2 **Impedance Calculation of Power and Ground Planes by Using Imaging Methods** De-Cao Yang, Xing-Chang Wei Zhejiang University, China	TU-AM-ESD-2 **Influence of Electrode Size for Electromagnetic Field Radiation due to Micro Gap Discharge in Spherical Electrode** Ken Kawamata[1], Shigeki Minegishi[2], Osamu Fujiwara[3] [1]Hachinohe Institute of Technology, Japan [2]Tohoku Gakuin University, Japan [3]Nagoya Institute of Technology, Japan
9:20am	TU-AM-ICEMC1-3 **EMC Standards at IC Level - Status of IEC and Technical Goals of the SEISME Project** Christian Marot[1], Etienne Sicard[2] [1]EADS Innovation Works, France [2]INSA/ GEI, France	TU-AM-PS1-3 **An Unified Power Quality Conditioner for Load Sharing and Power Quality Improvement** Kian Hoong Kwan, Kuan Tak Tan, Ping Lam So Nanyang Technological University, Singapore	TU-AM-CEM1-3 **A New Solution and Its Estimation Method for Slot-crossing Signals to Reduce ISI-increased Crosstalk** Yu-Jen Chang[1], Chiu-Chih Chou[1], Hao-Hsiang Chuang[1], Cheng-Nan Chiu[2], Tzong-Lin Wu[1] [1]National Taiwan University, Taiwan [2]Da-Yeh University, Taiwan	TU-AM-ESD-3 **Influence of Approach Speed of Grounded Electrode on ESD from Charged Metal** Takahiro Yoshida, Noriaki Masui Tokyo University of Science, Japan
9:40am	TU-AM-ICEMC1-4 **IC-EMC Model Extension Based on Internal Impulse Response Function** Shih-Yi Yuan, Jiun-Jia Huang, Chia-Yuan Hsu, Shry-Sann Liao, Chi-Chin Tang, Haw-Yu Wu Feng Chia University, Taiwan	TU-AM-PS1-4 **Application of Computational Intelligence for Diagnosing Power Quality Disturbances** Mohamed Fuad Faisal[1], Azah Mohamed[2] [1]Distribution Division TNB, Malaysia [2]Universiti Kebangsaan Malaysia, Malaysia	TU-AM-CEM1-4 **Near-Field Intensity Prediction Model at Maximum Transferred Power Frequency in Mutual-coupled Rectangular Coils for WPT System** Sunkyu Kong[1], Jonghoon J. Kim[1], Laehyuk Park[2], Unkyoo Park[2], Jiseong Kim[1], Joungho Kim[1] [1]KAIST, Korea [2]LS Cable & System Ltd., Korea	TU-AM-ESD-4 **Investigation on the Effect of Parasitic Inductance at Connector Contact Boundary on Electromagnetic Radiation** Yu-ichi Hayashi, Kazuki Matsuda, Takaaki Mizuki, Hideaki Sone Tohoku University, Japan
10:00am	TU-AM-ICEMC1-5 **Black-Box Modelling of Conducted Electromagnetic Emissions by Adjustable Complexity Support Vector Regression Machines** Vladimir Ceperic[1,2], Georges Gielen[2], Adrijan Baric[1] [1]University of Zagreb, Croatia [2]K. U. Leuven, Belgium		TU-AM-CEM1-5 **Systematic Analysis for Static and Dynamic Drops in Power Supply Grids of 3-D Integrated Circuits** Zaw Zaw Oo[1], En-Xiao Liu[1], Joseph Romen Cubillo[2], Er-Ping Li[1] [1]Institute of High Performance Computing, Singapore [2]Institute of Microelectronics, Singapore	

Technical Sessions – Tuesday Afternoon, 22 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
1:30pm – 3:30pm	**ICEMC2: Topical Meeting on 2D and 3D Integrated Circuit (IC) EMC** Chairs: Prof. Fabian Vargas, Brazil Dr. Thomas Steinecke, Germany	**PS2: Power Systems and Smart Grid EMC** Chairs: Dr. Wah Hoon Siew, UK Prof. Ener Salinas, Sweden	**WJRH1: [Special Session] Computational Electromagnetics - Retrospective and Outlook** [A Tribute to Prof. Wolfgang J. R. Hoefer] Chairs: Dr. Iftikhar Ahmed, Singapore Prof. Poman So, Canada	**MEAS1: EMC Measurements** Chairs: Mr. Ghery S. Pettit, USA Prof. Rong Zeng, China
1:30pm	TU-PM-ICEMC2-1 **A New Current Sensor Based on the Miller Effect Highly Immune to EMI** Orazio Aiello, Franco Fiori Politecnico di Torino, Italy	TU-PM-PS2-1 **Adaptive Voltage Slew Control Used to Limit the Magnitude of Broadband Conducted Noise Emissions for Buck Derived DC-DC Converters** T.C. Lim, H. Muir, S.J. Finney, B.W. Williams University of Strathclyde, UK	TU-PM-WJRH1-1 **A History of Time Domain Electromagnetics- A Voyage Back in Time** Wolfgang J. R. Hoefer Institute of High Performance Computing (IHPC), A*STAR, Singapore	TU-PM-MEAS1-1 **Chip-level Calibration Method Using Improved NFA on CPPs and MPs for the NFS Standardization** Pil-Soo Lee[1,2], Chang-Gyun Kim[1], Jae-Kyung Wee[1], Boo-Gyun Kim[1], Jae-Hoon Choi[2], Soon-il Yeo[3], Chang Won Jung[4] [1]Soongsil university, Korea; [2]Hynix Semiconductor Inc., Korea; [3]Electronics & Telecommunications Research Institute, Korea; [4]Seoul National University of Technology, Korea
1:50pm	TU-PM-ICEMC2-2 **Characterizing Integrated Circuit Susceptibility with On-Chip Sensors** Alexandre Boyer[1], Sonia Ben Dhia[1], Christophe Lemoine[1], Bertrand Vrignon[2] [1]LASS-CNRS, France; [2]Freescale Semiconductor, France	TU-PM-PS2-2 **EMI Noise Testing and Diagnosis for Photovoltaic Inverter** Yinghua Dong, Chenhui Niu, Meiying Liu, Jingsheng Huang State Grid Electric Power Research Institute, China	TU-PM-WJRH1-2 **Application of the Transmission Line Matrix (TLM) Method to EMC Problems** Peter Russer, Johannes A. Russer Technische Universitat Munchen, Germany	TU-PM-MEAS1-2 **A Novel and Accurate Approach for Highly-Directive Radiated Disturbance Measurements** Zhou Lei[1], Chen Daosheng[1], Deng Linxiang[1], Yan Wei[2] [1]Jiangsu Institute of Metrology, China [2]Nanjing Normal University, China
2:10pm	TU-PM-ICEMC2-3 **Electromagnetic Susceptibility Analysis of ICs using DPI Method with Consideration of PDN** Bo Pu, Jae Joong Lee, Sang Keun Kwak, So Young Kim, Wansoo Nah , Sungkyunkwan University, Korea	TU-PM-PS2-3 **Harmonic Distortion in Power Stations Due to Ferroresonance** Dieter Braun[1], Maurizio Delfanti[2], Mirko Palazzo[1], Riccardo Zich[2] [1]ABB Switzerland Ltd., Switzerland [2]Politecnico di Milano, Italy	TU-PM-WJRH1-3 **TLM: A Robust Tool for Electromagnetics-based Optimization** Mohamed H. Bakr, John W. Bandler, Natalia K. Nikolova McMaster University, Canada	TU-PM-MEAS1-3 **Planar Material Sample Fixture Characterization and Application for EMI Shielding Effectiveness Evaluations** Yueyan Shan[1], Ping Li[2], Junhong Deng[3] [1]National Metrology Centre (NMC), Singapore [2]Singapore Polytechnic, Singapore [3]TUV SUD PSB Pte Ltd, Singapore
2:30pm	TU-PM-ICEMC2-4 **Novel Method to Identify Electrical Mechanisms Responsible for Functional Failures During Direct Power Injection "DPI"** Kamel Abouda, Patrice Besse, Thierry Laplagne Freescale Semiconductor, France	TU-PM-PS2-4 **Basic Connections and Strategies of Isolated Phase-Shifting Transformers for Multipulse Rectifiers: A Review** Jiaopu Wen, Haihong Qin, Shishan Wang, Bo Zhou Nanjing University of Aeronautics and Astronautics, China	TU-PM-WJRH1-4 **Development of LTCC-Based Super-Compact Multi-Layered CRLH Transmission Lines And Broadband Applications** Yasushi Horii Kansai University, Japan	TU-PM-MEAS1-4 **Influence of Meteorological Parameters on the EM Environment of UHVDC Transmission Line in High Altitude** Lei Liu[1], Min Li[1], Ruihai Li[1], Zhanqing Yu[2], Zhihong Liu[1], Rong Zeng[2] , Xiangshi Liu[3] [1]China Southern Power Grid, China; [2]Tsinghua University, China; [3]China State Grid Company, China
2:50pm	TU-PM-ICEMC2-5 **Degradation of Signal Integrity due to Package Common Mode Resonance Caused by External Conductive Noise in Power Supply System** Tohlu Matsushima, Rikiya Asai, Taiki Nishimoto, Osami Wada Kyoto University, Japan	TU-PM-PS2-5 **A Modeling Method and EMTP Simulations of an Inverter Surge** Asha Shendge, Naoto Nagaoka Doshisha University, Japan	TU-PM-WJRH1-5 **Some Recent Developments in Fundamental Implicit FDTD Schemes** Ding Yu Heh, Eng Leong Tan, Wei Choon Tay Nanyang Technological University, Singapore	TU-PM-MEAS1-5 **Extension of Site Attenuation for Radiated Emission Test Site Evaluation above 1 GHz** Atsuya Maeda[1], Hiroyuki Shimanoe[2], Masaru Sudo[2], Shuichi Kobayashi[3] [1]VCCI Council, Japan; [2]Fujitsu General EMC Laboratory Ltd., Japan; [3]Voluntary EMC Laboratory Accreditation Center Inc. (VLAC), Japan
3:10pm	TU-PM-ICEMC2-6 **Immunity Modelling of Electronics Board** Oussama Alilou[1], Vincent Fontaine[2], Christian Marot[3] [1]Serma Ingenierie, France [2]Airbus, France; [3]EADS Innovation Works, France	TU-PM-PS2-6: **Reduction of High-Frequency Transient Overvoltages in Power Stations with Generator Circuit-Breakers** Dieter Braun[1], Maurizio Delfanti[2], Mirko Palazzo[1], Riccardo Zich[2] [1]ABB Switzerland Ltd., Switzerland; [2]Politecnico di Milano, Italy		

Open Forum Sessions – Tuesday Afternoon, 22 May 2012

Time	Foyer @Leo 4	
1:30pm – 3:30pm	**Open Forum-1: System EMC** Chairs: Dr. Zaw Zaw Oo, Singapore	**Open Forum-2: Signal Integrity and Power Integrity** Chairs: Dr. Mark Tan, Singapore
	TU-PM-FORUM1-1 **An Unity PF Controlled Rectifier Driving a Shunt DC Motor for Power Quality Application** Ali I. Maswood, Essam Al-Ammar, E.Firmansyah Nanyang Technological University, Singapore	TU-PM-FORUM2-1 **From Galilean Covariance to Gauge Conditions: A Thermodynamic Insight to Signal Integrity** Loïc Rondot[1], Vincent G. Mazauric[1], P. F. Wendling[2] [1]Schneider Electric, France, [2]Magsoft Corporation, USA
	TU-PM-FORUM1-2 **Spectrum Analysis of Switched-Capacitor Mode DPWM Generator with Spread-Spectrum Clocking Circuit** Young-Kyun Park, Ji-Hoon Lim, Jae-Kyung Wee, Inchae Song Soongsil University, Korea	TU-PM-FORUM2-2 **Improving the High-frequency Performance of Integrated EMI Filter with Multiple Ground Layers** Hui-Fen Huang, Liang-Yong Deng South China University of Technology, China
	TU-PM-FORUM1-3 **The Reduction Method for Radiation Noise from Power Supply Layers in PCB** Hitoshi Takakura, Shinichi Sasaki Saga University, Japan	TU-PM-FORUM2-3 **A Constructal H Shaped Power Distribution Network for EBG Structure Power Plane** Hui Fen Huang, Shi Yun Liu, Yan Zhang South China University of Technology, China
	TU-PM-FORUM1-4 **Diversity and Summation of Large Number of Energy Saving Lighting** Roelof B. Timens[1], Frederik J. K. Buesink[1], Vladimir Cuk[2], J. F. G. Cobben[2], F. B. J. Leferink[1,3] [1]University of Twente, The Netherlands, [2]Eindhoven University of Technology, The Netherlands, [3]Thales Nederland B.V., The Netherlands	TU-PM-FORUM2-4 **Spiral Bridge for Wideband Simultaneous Switching Noise Suppression and Good Signal Integrity in Partitioned Planes** Tong-Hao Ding[1], Yu-Shan Li[1], Dong-Chu Jiang[2], Yong-Zhe Qu[1], Xu Yan[1] [1]Xidian University, China; [2]Hunan City University, China
	TU-PM-FORUM1-5 **Using Field-to-Wire Coupling Technique in Optimization of Energy Harvesting Devices** Houriyeh Shadmehr, Marco Mussetta, Francesco Grimaccia, Moris Gualdoni, A. Gandelli, Riccardo E. Zich Politecnico di Milano, Italy	TU-PM-FORUM2-5 **Study of Signal Integrity and Radiated Emission of Single Ended and Differential High Speed Digital Signals across a Split Plane** Lin Biao Wang, Kye Yak See, Wei-Shan Soh, Kang Rong Li, Jun Wu Zhang, Tengiz Svimonishvili Nanyang Technological University, Singapore
	TU-PM-FORUM1-6 **A Reconfigurable Beam Shape Patch Array Antenna (RBS-PA) for WiMAX and WiFi Applications** M. Jusoh[1], M. Faizal[1], M. F. Malek[1], M. R. Kamarudin[2], M. R. Hamid[2] [1]Universiti Malaysia Perlis, Malaysia [2]Universiti Teknologi Malaysia, Malaysia	TU-PM-FORUM2-6 **System Power Integrity Impact by Package Power/ Ground Balls Assignment and Decoupling Capacitors** Cheng-Hsun Lin[1], Chen-Chao Wang[2], Hung-Yu Wang[1] [1]National Kaohsiung University of Applied Sciences, Taiwan [2]Advanced Semiconductor Engineering, Inc., Taiwan
	TU-PM-FORUM1-7 **A Design of the Node System of Wireless Sensor Net for Ancient Building Fire Prevention** Geng Shuqin, Yang Hongyan, Liu Chen, Hou Ligang Hou, Wang Jinhui Beijing University of Technology, China	TU-PM-FORUM2-7 **A Generalized Equivalent Cable Bundle Method for Modeling Crosstalk of Complex Cable Bundles with Multiple Excitations** Liangliang Liu[1], Zhuo Li[2], Minghui Cao[1], Changqing Gu[1] [1]Nanjing Uni. of Aeronautics & Astronautics, China; [2]Southeast University, China
	TU-PM-FORUM1-8 **Transient Thermal Analysis of Global Interconnects based on Transmission Lines** Qing Shang, Xiaochun Li, Junfa Mao Shanghai Jiao Tong University, China	TU-PM-FORUM2-8 **EMI Study on Stripline with Split Reference Plane** Junxin Min, Wei Bai, Xuequan Yu, Lin Yang, Yadong Bai, Yan Zhou Huawei Technologies Co. Ltd, China

Technical Sessions – Tuesday Afternoon, 22 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
3:50pm – 6:10pm		**PE1: [Special Session] Power Electronic EMC** Chairs: Prof. Henglin Chen, China Prof. Johannes A. Russer, Germany	**WJRH2: [Special Session] Computational Electromagnetics - Retrospective and Outlook** [A Tribute to Prof. Wolfgang J. R. Hoefer] Chairs: Dr. Iftikhar Ahmed, Singapore Prof. Eng Leong Tan, Singapore	**MEAS2: [Special Session] Time Domain Measurement of Electromagnetic Interference** Chairs: Prof. Peter Russer, Germany Dr. Stephan Braun, Germany
3:50pm		TU-PM-PE1-1 **Model and Simulation on Common Mode Radiation of a Flyback Power Supply** Junping He, Yuan Gao, Kejian Ji Shenzhen Graduate School, Harbin Institute of Technology, China	TU-PM-WJRH2-1 **Printed-Circuit Antennas for Ultra-Wideband Monitoring Applications** Marjan Mokhtaari, Jens Bornemann University of Victoria, Canada	TU-PM-MEAS2-1 **Electromagnetic Interference Analysis using an Embedded Phase-Lock Loop** Shih-Yi Yuan[1], Yu-Lun Wu[1], Richard Perdriau[2], Shry-Sann Liao[1], Hao-Ping Ho[1] [1]Feng-Chia University, Taiwan; [2]ESEO – GRACE, France
4:10pm		TU-PM-PE1-2 **Interaction between Passive Common Mode Noise Cancellation and Conservative Passive Filtering** Martin Schmidt, Juergen Stahl, Manfred Albach Friedrich-Alexander-University Erlangen-Nuremberg, Germany	TU-PM-WJRH2-2 **Conformal and Multi-Scale Time-Domain Methods: From Tetrahedral Mesh to Meshless Discretisation** Christophe Fumeaux[1], Thomas Kaufmann[1], Dirk Baumann[2], Maciej Klemm[3] [1]The University of Adelaide, Australia; [2]ETH Zurich, Switzerland; [3]University of Bristol, UK	TU-PM-MEAS2-2 **Time-Domain Surface Scan Method** Mart Coenen[1], Tom Gierstberg[1], Arthur van Roermund[2], Anton de Koning[2], Teis Coenen[2] [1]EMCMCC, The Netherlands [2]Eindhoven University of Technology, The Netherlands
4:30pm		TU-PM-PE1-3 **EMI Suppression for Single-Phase Grid-Connected Inverter based on Chaotic SPWM Control** Hong Li[1], Trillion Q. Zheng[1], Zhong Li[2], Fenglan Wang[1] [1]Beijng Jiaotong University, China [2]FernUniversitat in Hagen, Germany	TU-PM-WJRH2-3 **Mortar Boundary Elements for the EFIE Applied to the Analysis of Scattering by PEC Junctions** Kristof Cools University of Nottingham, UK	TU-PM-MEAS2-3 **Integrated Active Miniature Sensors for Electro-Magnetic Near Field Measurement** Andreas Thiede[1], Nasir Uddin[2], Ahmed Sanaa Awny[3] [1]University Paderborn, Germany; [2]SSB-Electronic GmbH, Germany; [3]IHP microelectronics GmbH, Germany
4:50pm		TU-PM-PE1-4 **Design Theory and Implementation of Planar EMI Filter Based on Annular Integrated Inductor-Capacitor Unit** Shishan Wang, Chenchen Xu, Haihong Qin Jiangsu Key Laboratory of New Energy Generation and Power Conversion, China	TU-PM-WJRH2-4 **Time Domain Modeling: From Nano-electronics to Nano-photonics** Iftikhar Ahmed, Erping Li Institute of High Perofrmance Computing, Singapore	TU-PM-MEAS2-4 **Characterisation and Modelling of Near-Field Radiated Emissions in the Time-Domain** Adam K. Jastrzebski[1],Yang Liu[2], Blaise Ravelo[2] [1]University of Kent, UK [2]Technopole du Madrillet, France
5:10pm		TU-PM-PE1-5 **Equivalent Parallel Capacitance Cancellation of Integrated EMI Filter Using Coupled Components** Hui-Fen Huang, Mao Ye, Shi-Yun Liu South China University of Technology, China	TU-PM-WJRH2-5 **Performance Evaluation of a Mode-Stirred Reverberation Chamber Using the Finite Difference Time Domain (FDTD) Simulation** Jong-Sung Kim[1], Raj Mittra[2] [1]Kyungsung University, South Korea [2]Pennsylvania State University, USA	TU-PM-MEAS2-5 **A Time-Domain System for the Measurement of Non-Stationary EMI up to 40 GHz** Christian Hoffmann[1], Hassan Hani Slim[1], Peter Russer[2] [1]GAUSS INSTRUMENTS GmbH, Germany; [2]Technische Universität München, Germany
5:30pm				TU-PM-MEAS2-6 **Requirements and Solutions for Emission Measurements in Time-Domain according to International EMC Standards** Stephan Braun[1], Peter Russer[2] [1]GAUSS INSTRUMENTS GmbH, Germany; [2]Technische Universität München, Germany
5:50pm				TU-PM-MEAS2-7 **Real-time Ambient Noise Cancellation for EMI Measurements on Open Area Test Sites** Arnd Frech[1], Peter Russer[2] [1]GAUSS INSTRUMENTS GmbH, Germany; [2]Technische Universitat Munchen, Germany

Open Forum Sessions – Tuesday Afternoon, 22 May 2012

Time	Foyer @Leo 4	
3:50pm – 5:50pm	**Open Forum-3: Power Electronics and Smart Grid EMC** Chairs: Dr. Zaw Zaw Oo, Singapore	**Open Forum-4: Packaging and IC EMC** Chairs: Dr. Dongying Li, Singapore
	TU-PM-FORUM3-1 **Smoothing Transformer as Effective Differential Mode Filter** Juergen Stahl, Rene Junghaenel, Martin Schmidt, Manfred Albach Friedrich-Alexander-University Erlangen-Nuremberg, Germany	TU -PM-FORUM4-1 **EMI Study of High-speed IC Package Based on Pin Map** Xuequan Yu, Yadong Bai, Yan Zhou, Wei Bai, Lin Yang, Junxin Min Huawei technologies CO. LTD, China
	TU -PM-FORUM3-2 **Conducted EMC Prediction for a Power Converter with SiC Components** Eliana Rondon[1], Florent Morel[1], Christian Vollaire[1], Moises Ferber[1], Jean-Luc Shanen[2] [1]Université de Lyon, France, [2]G2Elab, (CNRS UMR5529) INPG/ UJF, France	TU -PM-FORUM4-2 **A Software Technique for EMI Optimization** Shih-Yi Yuan, Wei-Bing Su, Hao-Ping Ho Feng-Chia University, Taiwan
	TU -PM-FORUM3-3 **Review of Transmission Planning with Large-scale Wind Power Integration** Xiaodan Cui, Wei Li, Xiancheng Ren, Feng Xue, Yongjie Fang State Grid Electric Power Research Institute, China	TU-PM-FORUM4-3 **Relations of Machine Codes and EMI Behaviours** Shih-Yi Yuan, Wei-Bing Su, Bo-Chia Tang, Yung-Chien Chang, Fu-Kai Chang, Jen-Wei Liu, Hao-Ping Ho, Shry-Sann Liao Feng-Chia University, Taiwan
	TU-PM-FORUM3-4 **Effect of Humidity on Transmission Lines' Power Frequency Electric Field Measurements** He Wang-ling[1,2], Wan Bao-quan[2], Pei Chun-ming[2], Zhang Jian-gong[1,2], He Jun-jia[1] [1]Huazhong University of Science and Technology, China [2]State Grid Electric Power Research Institute, China	TU-PM-FORUM4-4 **EMC Susceptibility Study of Low-dropout Voltage Regulator Using a Test Chip** Wu Jian-fei[1], Li Jian-cheng[1], Shen Rong-jun[1], A. Boyer[2], Etienne Sicard[2], S. Ben Dhia[2] [1]NUDT, China [2]INSA de Toulouse, France
	TU-PM-FORUM3-5 **Aggregated Conducted Interferences Generated by Group of Asynchronous Drives with Deterministic and Random Modulation** Robert Smolenski[1], Jacek Bojarski[1], Adam Kempski[1], Jaroslaw Luszcz[2] [1]University of Zielona Gora, Poland [2]Gdansk University of Technology, Poland	TU-PM-FORUM4-5 **The Evaluation Flow for EMC Behavior of RF ICs** Yin-Cheng Chang[1,2], Bing-Yi Wang[2], Shawn S. H[2]. Hsu, Yen-Tang Chang[3], Chiu-Kuo Chen[3], Ying-Zong Juang[1], Hsu-Chen Cheng[1], Da-Chiang Chang[1] [1]National Applied Research Laboratories, Taiwan; [2]National Tsing Hua University, Taiwan; [3]Ministry of Economic Affairs, Bureau of Standards, Metrology and Inspection, Taiwan
	TU-PM-FORUM3-6 **Reduction of Common-Mode Voltage Generated by Voltage-Source Inverter using Proper PWM Strategy** Chaiyan Jettanasen King Mongkut's Institute of Technology Ladkrabang, Thailand	TU-PM-FORUM4-6 **A Novel EBG Structure with Embedded Meander Bridge for Broadband Suppression of SSN** Yajing Han, Zhaowen Yan, Yansheng Wang, Toyobur Rahman Beihang University, China
	TU-PM-FORUM3-7 **Research on Differential Mode Conducted EMI in Power Converter** Kexin Wei, Bin Liang Tianjin University, China	TU-PM-FORUM4-7 **Special Domain Decomposition Method with Modal Decomposition for Efficient Electrical Modeling of Multilayer Packages and PCBs** En Xiao Liu, Er Ping Li A*STAR Institute of High Performance Computing, Singapore
	TU-PM-FORUM3-8 **Analysis of Passive Interference on Radio Station from UHVDC Power Transmission Lines above Lossy Ground** Zhibin Zhao, Xiang Cui North China Electric Power University, China	TU-PM-FORUM4-8 **A Binary Front-End Robust to EMI-Induced Errors** Calogero Bona, Franco Fiori Politecnico di Torino, Italy

Technical Sessions – Wednesday Morning, 23 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
8:40am – 10:20am	**ICEMC3: Topical Meeting on 2D and 3D Integrated Circuit (IC) EMC** Chairs: Prof. Shih-Yi Yuan, Taiwan Dr. Kamel Abouda, France	**IEMI: [Special Session]-IEMI and HEMP Threats, Interaction, Protection and Standards** Chairs: Dr. William A. Radasky, USA Prof. Cui Meng, China	**BIO1: Biomedical EMC** Chairs: Prof. Jianqing Wang, Japan Prof. Kye Yak See, Singapore	**MS: EMC Management and Standards** Chairs: Dr. Wee Jin Koh, Singapore Prof. Francesca Maradei, Italy
8:40am	WE-AM-ICEMC3-1 **Low-Jitter Frequency-Modulated PLL** Thomas Steinecke Infineon Technologies AG, Germany	WE-AM-IEMI-1 **The Application of IEC 61000-2-10 to Establish E1 HEMP External Conductor Protection Specifications** William A. Radasky Metatech Corporation, USA	WE-AM-BIO1-1 **SAR Evaluation Based on Required BER Performance for 400 MHz Implant BANs** Sho Aoyama, Daisuke Anzai, Jianqing Wang Nagoya Institute of Technology, Japan	WE-AM-MS-1 **Radiated EMI Coupling Analysis Between High-Speed Modules and Receiving Antennas of Mobile Devices** Han-Nien Lin, Jia-Li Chang, Chung-Wei Kuo , Feng-Chia University, Taiwan
9:00am	WE-AM-ICEMC3-2 **Dynamic Internal Impedance and Current Activity Estimation for Software-Related IC-EMC Model** Shih-Yi Yuan, Jiun-Jia Huang, Shry-Sann Liao, Chia-Yuan Hsu, Ting Wei Yeh , Feng Chia University, Taiwan	WE-AM-IEMI-2 **Characterization of Shielding Effectiveness of Metallic Frustum Cone-Like Cabin with One Coaxial Feeding Monopole Antenna Illuminated by an HEMP** Jian Wang[1], Qing-Qing Zhang[1], Wen-Yan Yin[1,2] [1]Shanghai Jiao Tong University, China [2]Zhe Jiang University, China	WE-AM-BIO1-2 **EMI Filter Design to Improve Electromagnetic Immunity of Hearing Aid Devices** Agustiar, Wei-Shan Soh, Kye-Yak See, Kang-Rong Li Nanyang Technological University, Singapore	WE-AM-MS-2 **New Requirements in the Treatment of Measurement Instrumentation Uncertainty in accordance with CISPR 16-4-2 Edition 2** Jens Medler Rohde & Schwarz GmbH & Co. KG, Germany
9:20am	WE-AM-ICEMC3-3 **Design of Charge Pump with Very Low Conducted Emission Controlling the Majority Carrier Injection** Kamel Abouda, Eric Rolland Freescale Semiconductor, France	WE-AM-IEMI-3 **The Method for Evaluating the Probability of Failures of Digital Devices Under the Influence of Short Electromagnetic Pulses** Yuri V. Parfenov[1], William A. Radasky[2], Boris A. Titov[1], Leonid N. Zdoukhov[1] [1]Joint Institute for High Temperatures, Russian [2]Metatech Corporation, USA	WE-AM-BIO1-3 **Computation of In Situ Electric Field in the Brain During Transcranial Magnetic Stimulation** Xi Lin Chen[1], Valero De Santis[2], Nicolas Chavannes[1], Niels Kuster[2] [1]Schmid and Partner Engineering AG, Switzerland [2]IT'IS Foundation, Switzerland	WE-AM-MS-3 **Investigation of EFT Test Setup for Rack Mounted Equipment by Numerical Simulations** Spartaco Caniggia[1], Francesca Maradei[2] [1]EMC Consultant, Italy [2]Sapienza University, Italy
9:40am	WE-AM-ICEMC3-4 **On-Chip Intra Decoupling Measurements for Integrated Magnetic Thin Film** Wataru Kodate, Yasushi Endo, Masahiro Yamaguchi Tohoku University, Japan	WE-AM-IEMI-4 **Recent Trends in High Power Microwave Source Research: Multispectral and Phase Coherent Solutions** Edl Schamiloglu University of New Mexico, USA		WE-AM-MS-4 **Electromagnetic Compatibility Design Management Challenges on Downtown Line (DTL) Project** Michael Chu, Boon Toon Loi Land Transport Authority, Singapore
10:00am	WE-AM-ICEMC3-5 **Characterizations of FPGA Chip Electromagnetic Emissions Based on GTEM Cell Measurements** King Lee Chua[1], Mohd Zarar Bin Mohd Jenu[1], Chee Seong Fong[2], See Hour Ying[2] [1]Universiti Tun Hussein Onn Malaysia, Malaysia [2]Altera Corporation (M) Sdn. Bhd., Malaysia	WE-AM-IEMI-5 **Numerical Study of Deposition of Energy of Active Denial Weapon in Human Skin** Yu Chen, Cui Meng Tsinghua University, China		

Technical Sessions – Wednesday Afternoon, 23 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
1:30pm – 3:30pm	**ICEMC4: Topical Meeting on 2D and 3D Integrated Circuit (IC) EMC** Chairs: Prof. Fabian Vargas, Brazil Mr. Christian Marot, France	**HPEM: HighPower Electromagnetics** Chairs: Dr. William Radasky, USA Prof. Wen-Yan Yin, China	**BIO2: Biomedcial EMC** Chairs: Prof. Tzong-Lin Wu, Taiwan Dr. Richard Xian-Ke Gao, Singapore	**AP1: Antenna for EMC** Chairs: Prof. Todd Hubing, USA Prof. Xingchang Wei, China
1:30pm	WE-PM-ICEMC4-1 **Design for High EMC Immunity of an Alternator Voltage Regulator Integrated Circuit** Kamel Abouda, Yean Ling Teo, Eric Rolland, Benoit Alcouffe Freescale Semiconductor, France	WE-PM-HPEM-1 **Prediction of Shielding Effectiveness of Some Metallic Structrures on Ship Platform** Qi-Feng Liu[1,4], Wen-Yan Yin[2], Jiong-Cheng[4], Jing-Wei Liu[3], Sheng-quan Zheng[1,4] [1]Science and Technology on EMC Laboratory, China [2]Shanghai Jiao Tong University, China [3]Wuhan Wuda Jucheng Strengthening Industrial Co. Ltd, China [4]China Ship Development and Design Center, China	WE-PM-BIO2-1 **Specific Absorption Rate of Inductively Powered Brain Implanted Circuits** Ahmed Ibrahim AL-Kalbani, Mehmet R. Yuce, Jean-Michel Redoute Monash University, Australia	WE-PM-AP1-1 **Modified Bayesian Optimization Algorithm for EMC Complex System Design** Bui Van Ha[1], , M. M. Maglio[1],M. Mussetta[1], P. Pirinoli[2], R. E. Zich[1] [1]Politecnico di Milano, Italy [2]Politecnico di Torino, Italy
1:50pm	WE-PM-ICEMC4-2 **Bandgap Circuitry with High Immunity to Harsh EMC Disturbances** Yuan Gao, Kamel Abouda, Alexis Huot-Marchand Freescale Semiconductor, France	WE-PM-HPEM-2 **Susceptibility Analysis of Wideband RF Receiving Channel in the Presence of an Electromagnetic Pulse (EMP)** Jing Jin[1], Meng-Lin Zhai[2], Wen-Yan Yin[1,2] [1]Zhejiang University, China [2]Shanghai Jiao Tong University, China	WE-PM-BIO2-2 **Calculation of the SAR Distribution in Human Heads from Mobile Phone Radiation Based on FDTD Algorithm** Xueying Lu, Yingxuan Chen, Cui Meng Tsinghua University, China	WE-PM-AP1-2 **A Novel FSS Based on Hybrid Boundary Condition Cavity** Gaole Dai, Wei Jin, Xingchang Wei, Erping Li Zhejiang University, China
2:10pm	WE-PM-ICEMC4-3 **Configurable Platform for SoC Combined Tests of TID Radiation, Aging and EMI** Juliano Benfica[1], Letícia Bolzani Poehls[1], Fabian Vargas[1], José Lipovetzky[2], Ariel Lutenberg[2], Sebastián García[2] [1]Catholic University - PUCRS, Brazil [2]Universidad de Buenos Aires, Argentina	WE-PM-HPEM-3 **Receiver Protective Circuit Design with High Power Handling Based on Scattering Parameters Analysis** Esfandiar Mehrshahi, Mohammad Malekshahi Shahid Beheshti University, Iran	WE-PM-BIO2-3 **Approaching Direction Detection of Human Arm using Human Body Communication Technology** Keigo Kagimoto, Daisuke Anzai, Jianqing Wang Nagoya Institute of Technology, Japan	WE-PM-AP1-3 **Gain Enhancement of Air Substrates at 5.8GHz for Microstrip Antenna Array** Mohd Tarmizi Ali, Hajar Ja'afar, S. Subahir, A.L.Yusof Universiti Teknologi Mara, Malaysia
2:30pm	WE-PM-ICEMC4-4 **A Pad ICIM Model for EMC Immunity Simulation** Wei Mao[1], Weiying Li[1], Yu Tian[1], Bertrand Vrignon[2], John Shepherd[2], Richard Wang[1] [1]Freescale Semiconductor, China [2]Freescale Semiconductor, France		WE-PM-BIO2-4 **Development of Magnetic Shielding System for Breast Hyperthermia Inductive Heating** Thanaset Thosdeekoraphat, Chanchai Thongsopa Suranaree University of Technology, Thailand	WE-PM-AP1-4 **H2QL: A Novel Hybrid Antenna** Erwin B. Daculan University of San Carlos, Philippines
2:50pm	WE-PM-ICEMC4-5 **Behavioral ESD Protection Modeling to Perform System Level ESD Efficient Design** Fabrice Caignet, Nicolas Monnereau, Nicolas Nolhier, Marise Bafleur LAAS-CNRS, France			WE-PM-AP1-5 **A Microwaves based Simulation Study for Enhanced Oil Recovery** Muhammad Mohsin Rehman, Mahmoud Meribout The Petroleum Institute, UAE

Open Forum Sessions – Wednesday Afternoon, 23 May 2012

Time	Foyer @ Leo 4	
1:30pm – 3:30pm	**Open Forum-5: EMC Measurement and Environment** Chairs: Dr. Mark Tan, Singapore	**Open Forum-6: EMC Instrumentation and Material** Chairs: Dr. Chua Eng Kee, Singapore
	WE-PM-FORUM5-1 **Analysis of the Correlation between Antenna Gain and SAR Levels inside the Human Head Model at 900MHz** M. H. Mat[1], M. F. b. A. Malek[1], A. Omar[2], M. S. Zulkefli[1], S. H. Ronald[1] [1]Universiti Malaysia Perlis, Malaysia [2]Politeknik Kota Bharu, Malaysia	WE-PM-FORUM6-1 **Research on Microwave Properties of Fe/Al2O3 Composites** Zeng GuoXun, Zhang HaiYang, Chen YiMing, Xiongxuan GuangDong University of Technology, China
	WE-PM-FORUM5-2 **Reducing Compliance Uncertainty with AMN Measurements** Mart Coenen[1], Arthur van Roermund[2] [1]EMCMCC, The Netherlands [2]Eindhoven University of Technology, The Netherlands	WE-PM-FORUM6-2 **Shielding Performance of EBG Structures on The Surface of A Computer Enclosure with Finite Thickness** Jiangling Dou, Dan Yang, Cheng Liao Southwest Jiaotong University, China
	WE-PM-FORUM5-3 **A New Technique to Obtain a Specific Electromagnetic Field at a Given Time** J. Benoit, C. Chauvière, P. Bonnet Université Blaise Pascal, France	WE-PM-FORUM6-3 **E-field Generation Setup for UWB-SP Sensor Calibration** Yan Youjie[1], Liu Xiaolong[1], Jiang Tingyong[1,2], Chen Jin[1], Li Penghui[1], Liu Ying[1] [1]Northwest Institute of Nuclear Energy Technology, China [2]Tsinghua University, China
	WE-PM-FORUM5-4 **Theoretical and Experimental Study of Feed for the Monocone** Ting-yong Jiang[1], You-jie Yan[2], Xiao-long Liu[2], Jin Chen[2], Peng-hui Li[2] [1]Tsinghua University, China [2]Northwest Institute of Nuclear Energy Technology, China	WE-PM-FORUM6-4 **Investigation of Parameters Dispersion in Narrow Gap Electrostatic Discharge** Fangming Ruan[1], Yang Meng[1], Zhou Feng[2], Wang Huaiyu[1], Ning Zhuan[1] [1]Guizhou Normal University, China [2]Metrology Center of Communication, China
	WE-PM-FORUM5-5 **Survey and Analysis of Public Rish Perception on Electromagnetic Field of Power Transmission Project** Yuan Ni, Xiong Wu, Baoquan Wan, JianGong Zhang, ChunMing Pei State Grid Electric Power Research Institute, China	WE-PM-FORUM6-5 **A Novel Electromagnetic Interference Source Identification Method** Zhao Yang[1], Donglin Su[1], Yan Liu[1], Xiaohong Gao[2] [1]Beijing University of Aeronautics and Astronautics, China [2]AVIC Shaanxi Aircraft Industry (Group) Corporation Ltd., China
	WE-PM-FORUM5-6 **Investigating the Effects of Impulse Excitations on Instrumented Electro-explosive Devices** Rakesh Kichouliya, T. Devender, V V Ramasarma, V G Borkar Research Centre Imarat, India	

Technical Sessions – Wednesday Afternoon, 23 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
3:50pm – 5:50pm	**SI-1: Signal Integrity** Chairs: Dr. Peng Zhen, USA Prof. Arif Ege Engin, USA	**PS3: Power Systems and Smart Grid EMC** Chairs: Prof. King Jet Tseng, Singapore Prof. Jinliang He, China		**MEAS3: EMC Testing** Chairs: Dr. Perry Wilson, USA Dr. Mart Coenen, The Netherlands
3:50pm	WE-PM-SI1-1 **Analysis of IR-Drop in 3-D IC Packaging using a Non-Conformal Domain Decomposition Method** Yang Shao, Zhen Peng, Jin-Fa Lee The Ohio State University, USA	WE-PM-PS3-1 **Design and Implementation of Stand-alone Smart Grid Employing Renewable Energy Resources on Pulau Ubin Island of Singapore** Fan Yang[1], Ville Rimali[1], Markson Tang[1], Chem Nayar[2] [1]Daily Life Renewable Energy, Singapore [2]Curtin University, Australia		WE-PM-MEAS3-1 **Numerical Analysis of Effects of Grounded Benches on the Field Distribution in Immunity Testing** Vicente Rodriguez ETS-Lindgren, USA
4:10pm	WE -PM-SI1-2 **Verification of Common-Mode-Current Prediction Method Based on Imbalance Difference Model for Single-Channel Differential Signaling System** Tohlu Matsushima[1], Osami Wada[1], Tetsushi Watanabe[2], Yoshitaka Toyota[3], Liuji R. Koga[3] [1]Kyoto University, Japan [2]Industrial Technology Center of Okayama Prefecture, Japan [3]Okayama University, Japan	WE-PM-PS3-2 **Field Testing for Observation of Seasonal Influence on Grounding Device at Impulse Condition** Jinliang He[1], Jinpeng Wu[1], Bo Zhang[1], Shaofeng Yu[2], [1]Tsinghua University, China [2]Zhejiang Electric Power Test and Research Institute, China		WE-PM-MEAS3-2 **Assembled PCB EMC Test Methods** Mart Coenen[1], Tom Gierstberg[1], Arthur van Roermund[2] [1]EMCMCC, The Netherlands [2]Eindhoven University of Technology, The Netherlands
4:30pm	WE -PM-SI1-3 **Impacts of EMI Filter on High Speed Interconnects for Digital Circuits Design** Weng-Yew Chang, Richard[1], Kye-Yak See[2], Wei-Shan Soh[2], Yew-Huat Ong[2], Wenjun Huang[1] [1]DSO National Laboratories, Singapore [2]Nanyang Technological University, Singapore	WE-PM-PS3-3 **Singapore's Intelligent Energy System Pilot Project** Eng Kiat Chan, Jim Ho Sim, Kian Hoong Kwan Energy Market Authority, Singapore		WE-PM-MEAS3-3 **Study of Impact of Equivalent Series Inductance on High-Speed Board Emissions** Kang-Rong Li, Kye-Yak See, Wei-Shan Soh Nanyang Technological University, Singapore
4:50pm	WE -PM-SI1-4 **Insertion of Parallel RL Circuits into Power Distribution Network for Simultaneous Switching Current Reduction and Power Integrity** Kengo Iokibe, Yusuke Yano, Yoshitaka Toyota Okayama University, Japan	WE-PM-PS3-4 **Radio Interference and Audible Noise of the UHVDC Test Line under High Altitude Condition** Feng Tian, Zhanqing Yu, Rong Zeng Tsinghua University, China		WE-PM-MEAS3-4 **Split Width Effect of Ground Patterns on FM-Band Cross-Talks between Two Parallel Signal Traces of Printed Circuit Boards** Michihira Iida[1], Tsuyoshi Maeno[1], Jianqing Wang[2], Osamu Fujiwara[2] [1]Denso Corporation, Japan [2]Nagoya Institute of Technology, Japan
5:10pm	WE -PM-SI1-5 **Virtual Ground Fence: A Methodology for GHz Power Filtering on Printed Circuit Boards** Arif Ege Engin, Jesse Bowman San Diego State University, USA	WE-PM-PS3-5 **A Low SNR Approach to Substation Communication using Powerline for EMI Reduction** Rajeshwari L Itagi, Vittal K Panduranga, Sripati U Acharya National Institute of Technology, Karnataka, India		WE-PM-MEAS3-5 **Differences in Quality Factor Estimation in Frequency and Time Domain** Vignesh Rajamani, Charles F. Bunting, James C. West Oklahoma State University, USA
5:30pm	WE -PM-SI1-6 **Analysis on Decoupling Capacitor Placement Associated with Power and Return Plane Bounce** Mark I. Montrose Montrose Compliance Services, USA			

Open Forum Sessions – Wednesday Afternoon, 23 May 2012

Time	Foyer @Leo 4	
3:50pm – 5:50pm	**Open Forum-7: EMC Methodology and Modeling** Chairs: Dr. Dongying Li, Singapore	**Open Forum-8: Reverberation Chamber and Antenna** Chairs: Mr. Huapeng Zhao, Singapore
	WE-PM-FORUM7-1 **Comparison of Different Optimization Techniques in Microstrip Filter Design** R.E. Zich, M. Mussetta, F. Grimaccia, A. Gandelli, H.M. Linh, G. Agoletti, M. Bertarini, L. Combi, P.F. Scaramuzzino, A. Serboli Politecnico di Milano, Italy	WE-PM-FORUM8-1 **Performance Comparision of Source Stirring Reverberation Chamber and Mechanical Stirring's** Ding Jianjin, Guo Enquan, Zhang Chuxin, Xiao Ning Shaanxi Hitec Electronic Co.Ltd., China
	WE-PM-FORUM7-2 **Improved Optimization Algorithm for Frequency Selective Surface** Ho Manh Linh, Marco Mussetta, Francesco Grimaccia, Riccardo E. Zich Politecnico di Milano, Italy	WE-PM-FORUM8-2 **Computing Total Scattering Cross Section from 3-D Reverberation Chambers Time Modeling** Ibrahim El Baba[1,2], Sébastien Lalléchère[1,2], Pierre Bonnet[1,2], Jaume Benoit[1,2], Françoise Paladian[1,2] [1]Clermont University, France; [2]CNRS, France
	WE-PM-FORUM7-3 **Novel Frequency Selective Surfaces with Compact Structure and Ultra-Wideband Response** Wanlu Li[1], Tong Zhang[2], Guohui Yang[1], Qun Wu[1], Jun Hua[3] [1]Harbin Institute of Technology, China; [2]Columbia University, China; [3]Science and Technology on Communication Information Security Control Laboratory, China	WE-PM-FORUM8-3 **Out-of-Band Gain Prediction of Blade Antennas for EMC Purpose** Wang Lu[1], Koh Wee Jin[2], Lee Yee Hui[1] [1]Nanyang Technological University, Singapore [2]DSO National Laboratories, Singapore
	WE-PM-FORUM7-4 **Simulate the Variability of Equipment with the MKME** BREANT Maxime[1], MAURICE Olivier[1], GAO XIAN-KE Richard[2] [1]GERAC, Electromagnetisme, France [2]A*STAR IHPC, Singapore	WE-PM-FORUM8-4 **Impact of PCB Ground Plane Size on Dual-Band Antenna Performance** Zhang Lin, See Kye Yak, Zhang Yue Ping Nanyang Technological University, Singapore
	WE-PM-FORUM7-5 **Bulk Current Injection Test Modeling using an Equivalent Circuit for 1.8V Mobile ICs** SangKeun Kwak, JeongMin Jo, SeokSoon No, HyeSook Lee, Wansoo Nah, SoYoung Kim Sungkyunkwan University, Korea	WE-PM-FORUM8-5 **Multi Band Compact Bow-Tie Slot Antenna for WLAN Applications** Dushyantt Garg and Shweta Srivastava Birla Institute of Technology, India
	WE-PM-FORUM7-6 **Lethality Assessment of Multiple Electromagnetically Projectile Radiators under Oblique Incidences** Tian Zhang, Wen-Yan Yin Zhejiang University, China	WE-PM-FORUM8-6 **A Time Domain Analysis of Ellipsoidal Reflector Antennas Illuminated by Transient-step Feed Radiation** Shih-Chung Tuan[1], Hsi-Tseng Chou[2] [1]Oriental Institute of Technology, Taiwan; [2]Yuan-Ze University, Taiwan
	WE-PM-FORUM7-7 **Analysis of the Electromagnetic Fields Inside Building Structure using the Subgrid FDTD Method** Qun Wu, Shaoqing Zhang, Tongyu Ding Harbin Institute of Technology, China	
	WE-PM-FORUM7-8 **Modeling of Microwave Plasma Resonant Cavity** Sachin Umbarkar, N M Singh, J O Chandle, H A Mangalvedekar, Ayush Saxena Veermata Jijabai Technological Institute, India	

Technical Sessions – Thursday Morning, 24 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
8:40am – 10:20am	**SI-2: Signal Integrity** Chairs: Dr. Yao-Jiang Zhang, USA Dr. Boping Wu, USA	**PE2: [Special Session] Power Electronics EMC** Chairs: Dr. Henglin Chen, China Prof. Manos M. Tentzeris, USA	**CEM2: EMC Analysis** Chairs: Dr. Christophe Fumeaux, Australia Prof. Ole C. Thomsen, Denmark	**BIO3: [Special Session]-Human Safety and Dosimetery in Wireless Communications** Chairs: Prof. Peter Leung, China Prof. Brian Chan, China
8:40am	TH-AM-SI2-1 **Studies of TEM Mode Assumption on Via Holes in Via Modelings** Yao-Jiang Zhang[1], Shenhui Jing[2], Jun Fan[1] [1]Missouri University of Science and Technology, USA [2]Southeast University, China	TH-AM-PE2-1 **A Simulation Platform of Switched-Mode Power Supplies for EMI Filter Design** Changbeng Zheng, Chen Chen, Henglin Chen Zhejiang University, China	TH-AM-CEM2-1 **Conducted Interferences of Power Converters with Parametric Uncertainties in the Frequency Domain** Moisés Ferber[1,3], Christian Vollaire[1], Laurent Krähenbühl[1], Jean-Louis Coulomb[2], João Antonio Vasconcelos[3] [1]Université de Lyon, France; [2]Université de Grenoble, France; [3]UFMG, Brasil	TH-AM-BIO3-1 **Analysis of Millimeter Wave Radiation to Human Body using Inhomogeneous Multilayer Skin Model** Kwok Hung Chan, Sai Wing Leung, Yin Liang Diao, Yun Ming Siu, Kai Tat Ng City University of Hong Kong, China
9:00am	TH-AM-SI2-2 **Measurement Analysis and Improvement Technique of Signal Integrity for High-Speed Connectors** Han-Nien Lin[1], Yu-Chieh Huang[1], Ming-Shan Lin[2], Tzu-Wen Kung [1]Feng Chia University, Taiwan [2]Section of EMC Bureau of Standards, , Metrology and Inspection,Taiwan	TH-AM-PE2-2 **Analysis of EMF Noise from the Receiving Coil Topologies for Wireless Power Transfer** Jonghoon Kim, Hongseok Kim, Mijoo Kim, Seungyoung Ahn, Jiseong Kim, Joungho Kim KAIST, Korea	TH-AM-CEM2-2 **Cole-Cole vs Debye Models for the Assessment of Electromagnetic Fields inside Biological Tissues Produced by Wideband EMF Sources** Silvano Cruciani[1], Valerio De Santis[2], Mauro Feliziani[1], Francesca Maradei[3] [1]University of L'Aquila, Italy [2]IT'IS Foundation, Switzerland [3]Sapienza University, Italy	TH-AM-BIO3-2 **Performance Study of Electromagnetic Protective Sheets for Wireless Communication Systems** Ming-Shing Lin, Chuang-Hao Huang, Chung-I G. Hsu National Yunlin University of Science & Technology, Taiwan
9:20am	TH-AM-SI2-3 **Reducing Printed Circuit Board Emissions with Low-Noise Design Practices** Arthur T. Bradley, Jennine Fowler, Brian Yavoich, Stephen Jennings NASA Langley Research Center, USA	TH-AM-PE2-3 **Considerations of Harmonic and Torque Ripple in a Large Power Doubly Salient Electro-magnet Motor Drive** Haihong Qin[12], Jiaopu Wen[1], Bo Zhou[1], Henghuai Xue[3] [1]Nanjing University of Aeronautics and Astronautics, China [2]Jiangsu Nicetown Electrical Equipment Group, China [3]Jiangsu Weifan Intelligent Electrical Technology Co., Ltd, China	TH-AM-CEM2-3 **Efficient Analysis of Transient Responses of Some Antenna Arrays in the Presence of High-Power Electromagnetic Pulses (HP-EMP)** Wei Luo[1], Wen-Yan Yin[1,2], Ming-Da Zhu[1], Jun-Fa Mao[1], Jian-Yao Zhao[2] [1]Shanghai Jiao Tong University, China [2]Zhejiang University, China	TH-AM-BIO3-3 **Modelling the SAR and Thermoregulatory Response During Far-field RF Exposure** Ilkka Laakso, Akimasa Hirata Nagoya Institute of Technology, Japan
9:40am	TH-AM-SI2-4 **Analytical Calculation of Conduction and Displacement Current Contributions in PCB Return Current Paths** Sebastian Müller, Renato Rimolo-Donadio, Xiaomin Duan, Heinz-D. Brüns, Christian Schuster Technische Universitat Hamburg-Harburg, Germany	TH-AM-PE2-4 **Analysis of High Frequency Effects in Three Phase EMI Filters** Gundars Asmanis, Aivis Asmanis, Leonids Ribickis Riga Technical University, Latvia	TH-AM-CEM2-4 **Research on EMI Reduction of Multi-stage Interleaved Bridgeless Power Factor Corrector** Qingnan Li, Ole C. Thomsen, Michael A. E. Andersen Technical University of Denmark, Denmark	TH-AM-BIO3-4 **SAR in Children from Exposure to Wireless Local Area Networks (WLAN)** R P Findlay, P J Dimbylow Health Protection Agency, UK
10:00am	TH-AM-SI2-5 **Barbed Transmission Lines for Crosstalk Suppression** Boping Wu[1], Tingting Mo[2] [1]Intel Corporation, USA [2]Shanghai Jiaotong University, China	TH-AM-PE2-5 **Optimization Design of Current Loop for Permanent Magnet Synchronous Servo System** Jun Liu[1], Haiyun Han[12], Haihong Qin[12], Jiaopu Wen[2], Deming Zhu[2] [1]Shanghai Dianji University, China [2]Nanjing University of Aeronautics and Astronautics, China		TH-AM-BIO3-5 **Exposure Assessment and Dosimetry for Epidemiology on the Mobile Phone Use** Masao Taki[1], Kanako Wake[2] [1]Tokyo Metropolitan University, Japan [2]National Institute for Information and Communications Technology, Japan

Technical Sessions – Thursday Morning, 24 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
10:40am – 13:00pm	**NANO: Nanotechnology for EMC** Chairs: Dr. Junhong Deng, Singapore Dr. Ping Li, Singapore	**SYS1: System Level EMC** Chairs: Prof. Frank Leferink, The Netherlands Dr. Hongmei Fan, China	**VAH: Memorial Session for Professor Rüdiger Vahldieck** Chairs: Prof. Er-Ping Li, Singapore Prof. Wolfgang J. R. Hoefer, Singapore	**MEAS4: Emission Measurements** Chairs: Prof. Mohd Zarar Mohd Jenu, Malaysia Mr. Mark Terrien, USA
10:40am	TH-AM-NANO-1 **Circuit Modelling of Multilayer Graphene Nanoribbon (MLGNR) Interconnects** Yuan Fang, Wen-Sheng Zhao, Xu Wang, Feng Jiang, Wen-Yan Yin Zhejiang University, China	TH-AM-SYS1-1 **Tri-Band Frequency Selective Band-Stop Shield Using Screen Printing Technique** Lin Biao Wang[1], Kye Yak See[1], Budiman Salam[2], Albert Chee Wai Lu[2], Jun Wu Zhang[1], Svimonishvili Tengiz[1] [1]Nanyang Technological University, Singapore, [2]Singapore Institute of Manufacturing Technology, Singapore	TH-AM-VAH-1 **Opening Remarks of Memory Session** Er-Ping Li Institute of High Performance Computing, Singapore Wolfgang J. R. Hoefer Institute of High Performance Computing, Singapore	TH-AM-MEAS4-1 **Identifying Smart Conducting Materials for Wi-Fi Electromagnetic Interference Shielding** Whamid Al-shabib, Daryoush Habibi, Zonghan Xie, Xiaoli Zhao Edith Cowan University, Australia
11:00am	TH-AM-NANO-2 **EMI Shielding Evaluations of Carbon Nanotube Based Coatings and Applications** Ping Li[1], Yueyan Shan[2], Lie Liu[3], Junhong Deng[4], Ong Guat Choon[1], Xijiang Yin[1] [1]Singapore Polytechnic, Singapore, [2]A*STAR National Metrology Centre (NMC), Singapore, [3]Temasek laboratories, Singapore, [4]TUV SUD PSB Pte. Ltd., Singapore	TH-AM-SYS1-2 **Shielded Cable Modeling in PSpice for Shielding Effect Analysis** Kelin Jia[1], Rajeev Thottappillil[1], Georg Bohlin[2] [1]KTH-Royal Institute of Technology, Sweden [2]Bombardier transportation Sweden AB, Sweden	TH-AM-VAH-2 **On the Physical Nature of Radiating Volume and Surface Modes in Spherical Dielectric Resonators** Ingo Wolff IMST GmbH, Germany	TH-AM-MEAS4-2 **Improving Compliance and Pre-compliance Emissions Measurement Throughput and Accuracy Using Digital IF Receiver Architectures** Mark Terrien Agilent Technologies, USA
11:20am	TH-AM-NANO-3 **Graphite Nano-Platelet-Based Composites for Microwave Absorbing Small Enclosures** Alessandro D'Aloia, Alessio Tamburrano, Marcello D'Amore, Maria Sabrina Sarto Sapienza University of Rome, Italy	TH-AM-SYS1-3 **Reduction of Power Plane Resonances using EBG Structures to Decrease Common Mode Current** Olga Tereshchenko[1], Frits Buesink[1], Frank Leferink[12] [1]University of Twente, The Netherlands [2]Thales Nederland B.V., The Netherlands	TH-AM-VAH-3 **Finite-Difference Time-Domain Method Based on Telegraph Equations and Its Applications to Modelling of Large-Scale Grounding Systems** Feng Xu[1], Ke Wu[2] [1]Nanjing University of Posts and Telecommunications, China, [2]Universite de Montreal, Canada	TH-AM-MEAS4-3 **Development of a Waveguide Microwave Power Sensor Calibration System at NMC** Yu Song Meng, Yueyan Shan, Hoon Neo National Metrology Centre, Singapore
11:40am	TH-AM-NANO-4 **High Permittivity and Shielding Effectiveness of Microwire Composites with Optical Transparency** Lie Liu[1], Zhi Hong Yang[1], Ling Bing Kong[1], Ping Li[2], Ce Huang Poo[2] [1]Temasek Laboratories, Singapore [2]Singapore Polytechnic, Singapore	TH-AM-SYS1-4 **An Analytical Approximation for Evaluating Impact of Skew Length on Radiated Emission from Differential Signal Pairs** Hongmei Fan[1], Xiaoxia Zhou[1], Alpesh Bhobe[2], Jinghan Yu[1], Hailong Zhang[1], Philippe Sochoux[2] [1]Cisco Systems (China) R&D Co., Ltd, China [2]Cisco Systems, Inc., USA	TH-AM-VAH-4 **Reduced Order Models in Computational Electromagnetics (In Memory of Ruediger Vahldieck)** G. Fotyga, P. Kowalczyk, L. Kulas, K. Nyka, J. Podwalski, M. Mrozowski Gdansk University of Technology, Poland	TH-AM-MEAS4-4 **Design and Calibration of Wideband TEM-Cell for Material Characterization** See Khee Yee, Ahmed Mohammed Yahya Sayegh, Alireza Kazemipour, Mohd Zarar Mohd Jenu Universiti Tun Hussein Onn Malaysia, Malaysia
12:00pm	TH-AM-NANO-5 **Performance Investigation of a Uni-planar Compact Electromagnetic Bandgap (UC-EBG) Structure for Wide Bandgap Characteristics** M. S. Alam, M. T. Islam, N. Misran Universiti Kebangsaan Malaysia, Malaysia	TH-AM-SYS1-5 **Average Transmission Cross Section of Aperture Arrays in Electrically Large Complex Enclosures** Umberto Paoletti, Takashi Suga, Hideki Osaka Hitachi Yokohama Research Laboratory, Japan	TH-AM-VAH-5 **Imaging of Incoherent Sources of Radiation** Johannes A. Russer, Peter Russer Technische Universität München, Germany	TH-AM-MEAS4-5 **Numerical Simulations for Site VSWR with Consideration of Diffracted Wave of Pyramidal Electromagnetic Wave Absorber** Takahiro Aoyagi[1], Koji Takizawa[2], Hiroshi Kurihara[2] [1]Tokyo Institute of Technology, Japan [2]TDK Corporation, Japan
12:20pm			TH-AM-VAH-6 **A Scattered Field Formulation of the Time-Domain Radial Point Interpolation Method using Radial Perfectly Matched Layers** Thomas Kaufmann, Christophe Fumeaux The University of Adelaide, Australia	TH-AM-MEAS4-6 **Analysis of EMI Effect on Flash Memory IC** Han-Nien Lin[1], Chung-Wei Kuo[1], Chiu-kuo Chen[2], Jay-San Chen[2] [1]Feng-Chia University, Taiwan [2]Bureau of Standards, Metrology & Inspection, Taiwan
12:40pm			TH-AM-VAH-7 **Mode-Matching Design of Substrate-Integrated Waveguide Couplers** Zamzam Kordiboroujeni[1], Jens Bornemann[1],Thomas Sieverding[2] [1]University of Victoria, Canada, [2]Mician GmbH, Germany	

Technical Sessions – Thursday Afternoon, 24 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
1:30pm – 3:50pm	**RC: [Special Session] Reverberation Chamber Testing** Chairs: Mr. Huapeng Zhao, Singapore Prof. Andrea Cozza, France	**SYS2: System EMC Simulation** Chairs: Prof. James L. Drewniak, USA Dr. HyunHo Park, Korea	**LIGHT: Lightning** Chairs: Prof. Farhad Rachidi, Switzerland Prof. Yoshihiro Baba, Japan	**AP2: Antenna and Propagation** Chairs: Prof. Wenxing Li, China Prof. Donglin Su, China
1:30pm	TH-PM-RC-1 **A Probabilistic Approach to Susceptibility Measurement in a Reverberation Chamber** Emmanuel Amador, Christophe Lemoine, Philippe Besnier IETR UMR CNRS 6164, INSA Rennes, France	TH-PM-SYS2-1 **Design of Multiple Power Domains Based on Ground Separation Technique for Low-Noise and Small-Size Module** Dong-Ho Lee[1], Young-San Shin[1], Chang-Gyun Kim[1], Jin-Ho Song[1], Jae-Kyung Wee[1], Jeong-Min Lee[2], Jae-Soo Seol[2] [1]Soongsil University, Korea [2]Agency for Defence Development, Korea	TH-PM-LIGHT-1 **Lightning Surges on an Overhead Wire in the Presence of Corona: FDTD Simulation of Wagner et al.'s Experiment** Thang Huu Tran[1], Yoshihiro Baba[1], Naoto Nagaoka[1], Akihiro Ametani[1], Jun Takami[2], Shigemitsu Okabe[2], Vladimir A. Rakov[3] [1]Doshisha University, Japan; [2]Tokyo Electric Power Company, Japan; [3]University of Florida, USA	TH-PM-AP2-1 **Electromagnetic Analysis of PD Detection in GIS Systems** Alessandro Tacchini[1], Daniel Grossi[1], Luca Vincetti[2], Moreno Maini[2], Stefano Serra[3], Matteo Fattori[3], Leonardo Sandrolini[4] [1]Reggio Emilia Innovazione scarl, Italy; [2]University of Modena and Reggio E., Italy; [3]Techimp Systems srl, Italy; [4]University of Bologna, Italy
1:50pm	TH-PM-RC-2 **Controlling the State of a Reverberation Chamber by means of a Random Multiple-Antenna Stirring** Andrea Cozza[1], Wee Jin Koh[2], Yew Seng Ng[2], Yong Yeh Tan[2] [1]SUPELEC- Univ Paris-Sud – CNRS, France [2]DSO National Laboratories, Singapore	TH-PM-SYS2-2 **Robust Approach for Prediction of Electromagnetic Radiation from Phaseless Magnetic Near-Field Data** Wei-Jiang Zhao[1], Hark Byeong Park[2], Mark Tan[1], Hyun Ho Park[2], E. X. Liu[1], Eakhwan Song[2], E. P. Li[1] [1]Institute of High Performance Computing, Singapore [2]Samsung Electronics, Korea	TH-PM-LIGHT-2 **From a Single Approach for A380 Transfer Functions Determination to In-flight Lightning Measurements** Dominique Lemaire[1], Jean François Boissin[1], Fabien Garrido[1], Gilles Peres[2], Franck Flourens[1] [1]EVAA-EVY-EYDV AIRBUS, France [2]EADS IW, France	TH-PM-AP2-2 **A Design of Rotman Lens for Phase Antenna Array** Wan Chen[1], Jiahui Fu[1], Qun Wu[1],Jun Hua[2] [1]Harbin Institute of Technology, China [2]Science and Technology on Communication Information Security Control Laboratory, China
2:10pm	TH-PM-RC-3 **Comparison on the Test Results Between Reverberation Chamber and Anechoic Chamber** Bo Zhang[1], Zhiyong Yuan[2], Jinliang He[1] [1]Tsinghua University, China [2]China Southern Power Grid, China	TH-PM-SYS2-3 **Analysis of the Current Distribution Induced on a Victim Wire by a Differential Voltage Source Applied onto a Twisted Pair Cable** Charles Jullien[12], Philippe Besnier[2], Michel Dunand[1], Isabelle Junqua[3] [1]Université Européenne de Bretagne, France [2]Safran Engineering Services, France [3]ONERA The French Aerospace Lab, France	TH-PM-LIGHT-3 **An Investigation of Incoming Lightning Surges from a Communication Line** Shohei Takeshita, Akihiro Ametani, Naoto Nagaoka, Yoshihiro Baba Doshisha University, Japan	TH-PM-AP2-3 **Analysis of Radiation Efficiency Effects on UWB MIMO Tree-Antenna Positioning** M Jusoh[1], M. F. Jamlos[1], M.R. Kamarudin[2], H. Harun[2] [1]Universiti Malaysia Perlis, Malayasia [2]Universiti Teknologi Malaysia, Malaysia
2:30pm	TH-PM-RC-4 **Study of the Effect of Chamber Shape and Loading Position on Reverberation Chamber Performance** Yong Cui, Song Yu Wang, Yu Mao Beijing Jiaotong University, China	TH-PM-SYS2-4 **Development of a Virtual Lab for EMC Application** Wang Binfang[1], Yik Hou Meng[2], Lim Boon Hui[2], Gao Xian Ke Richard[1], Zhao Huapeng[1], Li Er Ping[1] [1]Institute of High Performance Computing, Singapore [2]Hewlett-Packard Singapore Pte Ltd., Singapore	TH-PM-LIGHT-4 **EMC based Lightning Protection Systems for Instrumentation Systems of Geothermal Power Plant** Djoko Darwanto[1], Twi Sevon Rumdy[2], Deny Hamdani[1] [1]Institut Teknologi Bandung, Indonesia [2]Chevron Geothermal Indonesia Ltd, Indonesia	TH-PM-AP2-4 **A CPW-fed Anti-interference UWB Antenna using a Stepped Impedance Stub Loaded Pentagon Resonator** Yingsong Li, Wenxing Li, Si Li, Chengyuan Liu, Tao Jiang Harbin Engineering University, China
2:50pm	TH-PM-RC-5 **Hybrid Numerical Modelling of Reverberation Chambers** Huapeng Zhao[1], Zhongxiang Shen[2], Erping Li[1] [1]Institute of High Performance Computing, Singapore [2]Nanyang Technological University, Singapore	TH-PM-SYS2-5 **Modeling and Co-Simulation of I/O Interconnects for On-Chip and Off-Chip EMI Prediction** SangKeun Kwak, Jeongmin Jo, SoYoung Kim Sungkyunkwan University, Korea	TH-PM-LIGHT-5 **Grounding Characteristics of a Wind Turbine Measured Immediately after Its Undergrounding** Kazuo Yamamoto[1], Junichi Niihara[3], Shunichi Yanagawa[2] [1]Kobe City College of Technology, Japan; [2]Shoden Co., Japan; [3]Doshisha University	TH-PM-AP2-5 **UWB Microstrip Antenna Based On Circular Patch Topology With Stepped Feedline And Partial Ground Plane** Mohd Aizat Sulaiman, Mohd. Tarmizi Ali, Idnin Pasya Ibrahim, Nurulazlina Ramli, Hafiza Alias Universiti Teknologi MARA Malaysia , Malaysia
3:10pm	TH-PM-RC-6 **Sensing Coupling Paths in an Equipment** Andrea Cozza[1], Charlie Galle[2], Jean-Pierre Brasile[2], Christian Carel[2] [1]SUPELEC- Univ Paris-Sud – CNRS, France [2]Thales Communications S.A., France	TH-PM-SYS2-6 **Signal Integrity Aware TSV Positioning** Ligang Hou, Shu Bai, Jinhui Wang, Xiaohong Peng, Shuqin Geng Bejing University of Technology, China	TH-PM-LIGHT-6 **On the Characteristics of Lightning Currents in the Steel Reinforced Concrete Buildings due to Lightning Strike** Vishwanath Hegde[1], Vinoda S. Kumbar[2] [1]MCE Hassan, India [2]VTU Belgaum, India	TH-PM-AP2-6 **Designing Septum Polarizer with Additional Blade** Mohsen Jafari Chashmi, Esfandiar Mehrshah, Zahra Soltani Shahid Beheshti University, Iran
3:30pm	TH-PM-RC-7 **Experimental Research on Immunity Test Method Using Reverberation Chamber and Relevance with Other Platform** Qingguo Wang, Rui Jia, Erwei Cheng Mechanism Engineering College, China		TH-PM-LIGHT-7 **Transient Grounding Characteristics at a Wind Turbine with Counterpoise** Junichi Niihara[1], Akihiro Ametani[1], Kazuo Yamamoto[2] [1]Doshisha University, Japan [2]Kobe City College of Technology, Japan	TH-PM-AP2-7 **An Aperture Coupled Microstrip Antenna (ACMSA) with Orientations of Patch Slot** Suzilawati Muhamud Kayat, Mohd Tarmizi Ali, Mohd Khairul Mohd Salleh Universiti Teknologi MARA, Malaysia

Technical Sessions – Thursday Afternoon, 24 May 2012

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
4:10pm – 5:50pm	**COM: Communication EMC** Chairs: Dr. Weijiang Zhao, Singapore Dr. Franz Schlagenhaufer, Australia	**PS4: Low Frequency EMC** Chairs: Prof. David W. P. Thomas, UK Prof. Jaroslaw Luszcz, Poland	**CEM3: Time Domain** Chairs: Prof. Jens Bornemann, Canada Prof. Qun Wu, China	**AUTO: Automotive EMC** Chairs: Prof. Shih-Yi Yuan, Taiwan Prof. Anders Larsson, Singapore
4:10pm	TH-PM-COM-1 **Out-of-Band Conducted Susceptibility Measurement and Analysis of VHF/ FM Communication System** Shi Zhao Fan[1], Nicholas Adi Wibowo[1], Eng Leong Tan[1], Wee Jin Koh[2], Weilun Kwek[2] [1]Nanyang Technological University, Singapore [2]DSO National Laboratories, Singapore	TH-PM-PS4-1 **Harmonics Attenuation of Nonlinear Loads due to Linear Loads** Muhyaddin J. H. Rawa, David W. P. Thomas, Mark Sumner The University of Nottingham, UK	TH-PM-CEM3-1 **FDTD Modeling of Electromagnetic Wave Scattering from a Non-Penetrable Wedge** Mehmet Alper Uslu, Levent Sevgi Doğuş University, Turkey	TH-PM-AUTO-1 **Study of the Use of an EMI Suppression Bead in 6-Pulse Rectifier DC Traction Substation** Helen Di Yu, Maya Petkova, Zongyi Shao Network Rail, UK
4:30pm	TH-PM-COM-2 **UWB NGD Circuit for Time-Delay Reduction** B. Ravelo[1], A. K. Jastrzebski[2] [1]Graduate School of Engineering ESIGELEC, France [2]University of Kent, UK	TH-PM-PS4-2 **Forced Power Oscillation Analysis based on EEAC Theory** Zhaowei Li, Yongjie Fang, Wei Li, Fusuo Liu, Wei Jiang State Grid Electric Power Research Institute, China	TH-PM-CEM3-2 **A Cloud and Parallel Computation System for IC Electromagnetic Compatibility Modelling and Optimization** Boyuan Zhu, Hengxu Li, Junwei Lu Griffith University, Australia	TH-PM-AUTO-2 **The Electromagnetic Compatibility of Wireless Inductive Automotive Battery Chargers and LF Animal RFID Tags** James McLean, Robert Sutton TDK R&D Corp., USA
4:50pm	TH-PM-COM-3 **A Hybrid Technique for EMI Prediction and Channel Modeling inside an Enclosed Space** V.P. Bui, W. J. Zhao, B. F. Wang, E. P. Li Institute of High Performance Computing, Singapore	TH-PM-PS4-3 **An Analysis of Harmonics from LED Lamps** Sohel Uddin, Hussain Shareef, Azah Mohamed, M A Hannan Universiti Kebangsaan Malaysia, Malaysia	TH-PM-CEM3-3 **Design & EM Simulation of On-chip Transformer Baluns for RF Power Amplifiers** Hashim Raza Khan[1], Faiza Zafar[1], Abdul Raheem Qureshi[1], Qamarul Wahab[1,2] [1]NED University of Engineering and Technology, Pakistan [2]Linköping University, Sweden	TH-PM-AUTO-3 **Reduced Models for the EMC Analysis of High Speed Railway Systems** Alberto Dolara, Moris Gualdoni, Sonia Leva, H. Shadmehr, Riccardo E. Zich Politecnico di Milano, Italy
5:10pm	TH-PM-COM-4 **NGD Circuit using a Microwave Amplifier for the Signal Integrity Improvement** B. Ravelo[1], A. K. Jastrzebski[2] [1]Graduate School of Engineering ESIGELEC, France [2]University of Kent, UK	TH-PM-PS4-4 **Voltage Harmonic Distortion Measurement Issue in Smart-Grid Distribution System** Jaroslaw Luszcz[1], Robert Smolenski[2] [1]Gdansk University of Technology, Poland [2]University of Zielona Gora, Poland	TH-PM-CEM3-4 **Time Domain Analysis of Waves in Layered Lossy Dispersive Media** Penghui Chen[1], Xiaojian Xu[1], Qingsheng Zeng[2], Mustapha C.E. Yagoub[2] [1]Beihang University, China [2]University of Ottawa, Canada	TH-PM-AUTO-4 **Electromagnetic Environment of Future Military Vehicles** Anders Larsson[1], Tomas Hurtig[2] [1]National University of Singapore, Singapore [2]Swedish Defence Research Agency, Sweden
5:30pm	TH-PM-COM-5 **Contactless Energy Transfer in Adverse Environment using Rectennas** Bui Van Ha, M.M. Maglio, R.E. Zich Politecnico di Milano, Italy			

IEEE TOPICAL SYMPOSIUM ON RADIO FREQUENCY NANOTECHNOLOGY

22 - 23 MAY, 2012

Meeting Room: Aquarius 3

Tuesday Morning, 22 May 2012

Time	Aquarius 3
8:30am – 10:30am	**NANO-1** **Chairs:** Dr. Erping Li, Singapore Dr. Johannes Russer, Germany
8:30am	TU-AM-NANO 1-1 **Radio-Frequency Nanoelectronics – Bridging the Gap between Nanotechnology and R.F. Engineering Applications** (Invited DML talk) Luca Pierantoni Università Politecnica delle Marche, Ancona, Italy
9:10am	TU-AM-NANO 1-2 **Integrated Antennas for RF Sensing, Wireless Communications and Energy Harvesting** (Invited) Peter Russer, Johannes Russer, Giuseppe Scarpa, Paolo Lugli and Wolfgang Porod Technical Universityof Munich, Germany
9:40am	TU-AM-NANO 1-3 **Technical Issues and Recent Progress on Graphene-based RF MOSFET** (Invited) Byung Jin Cho Korea Advanced Institute of Science and Technology (KAIST), Daejeon ,Korea
10:10am	TU-AM-NANO 1-4 **Coupled Maxwell and Schrodinger Approach for Simulation of Nano-devices** Iftikhar Ahmed, Eng Huat Khoo and Er-ping Li Institute of High Performance Computing, A*STAR, Singapore
	10:30-10:40am Tea Break
10:40am – 12:30pm	**Opening Ceremony @Gemini 1-2** **Plenary Talk 1: ICT (Information Communication Technology) meets Energy** Dr. Ingo Wolff IEEE Life Fellow, President of the Information Technology Society (ITG/ VDE), Germany, President/ CEO of IMST GmbH, Kamp-Lintfort, Germany **Plenary Talk 2: Through Silicon Via(TSV) Design and Measurement for Terabit Data-Bandwidth of 3D IC** Prof. Joungho Kim Department Chair of Electrical Engineering and Computer Science, Korea Institute of Advanced Science and Technology, Korea

Tuesday Afternoon, 22 May 2012

Time	Aquarius 3
1:30pm – 3:30pm	**NANO-2** **Chairs:** Dr. Din Ping Tsai, Taiwan Dr. Seng-Tiong Ho, USA
1:30pm	TU-PM-NANO 2-1 **Plasmonic Nano-Lasers with Directional Output for Integration in Plasmonic-Photonic Integrated Circuit** (Invited) Seng-Tiong Ho[1], Xi Chen[1], Qian Wang[2], Yingyan Huang[3] [1]Northwestern University, USA; [2]Data Storage Institute, A*STAR, Singapore; [3]OptoNet Inc. Evanston, USA
2:00pm	TU-PM-NANO 2-2 **Blinking of Plasmonic Hotspots on Laser-treated AgOx Thin Film** (Invited) Ming Lun Tseng[1], Pin Chieh Wu[1], Yao-Wei Huang[1], Min-Kai Hsiao[2], Hsin Wei Huang[1], Hao Ming Chen[1], Yu Lim Chen[1] , Cheng Hung Chu[1], Nien-Nan Chu[5], You Je He[1], Chia Min Chang[1], Wei Chih Lin[1], Ding-Wei Huang[1], Hai-Pang Chiang[2], Ru-Shi Liu[1], Greg Sun[4], Din Ping Tsai[1,3,5] [1]National Taiwan University, Taiwan; [2]National Taiwan Ocean University, Taiwan; [3]National Applied Research Laboratories, Taiwan; [4]University of Massachusetts, Boston, USA; [5]Research Center for Applied Sciences, Academia Sinica, Taiwan
2:30pm	TU-PM-NANO 2-3 **Cu-Based Horizontal Plasmonic Waveguide Components for Silicon Integrated Nanoplasmonics** Shiyang Zhu, G. Q. Lo, and D. L. Kwong Institute of Microelectronics, A*STAR, Singapore
2:50pm	TU-PM-NANO 2-4 **Miniaturized RF Slotted-Slit-Microstrip Antenna on Meta-surface** Kush Agarwal[1], Nasimuddin[2], A. Alphones[1] [1]Nanyang Technological University, Singapore; [2]Institute of Infocomm Research, A*STAR, Singapore
3:10pm	TU-PM-NANO 2-5 **Microwave and THz Detection Device using Bi-Layer Graphene FET** A. M. Mahjoub[1], N. Aoki[1], K. Miyamoto[1], T. Omatsu[1], J. P. Bird[2], D.F. Ferry[3], K. Ishibashi[4], Y. Ochiai[1] [1]Chiba University, Japan; [2]University at Buffao; The State University of New York, USA; [3]The Arizona State University, Tempe, AZ, USA; [4]Institute of Physical and Chemical Research, Japan
	3:30-3:50pm Tea Break
3:50pm – 5:40pm	**NANO-3** **Chairs:** Dr. Maki Suemitsu, Japan Dr. Dominique Baillargeat, Singapore
3:50pm	TU-PM-NANO 3-1 **Inkjet-Printed Nanotechnology-enabled RFID, IoT and "Zero-Power" Wireless Sensor Nodes** (Invited) Manos M. Tentzeris Georgia Institue of Technology, USA
4:20pm	TU-PM-NANO 3-2 **Nanomaterials for Thermal Management in Electronics** (Invited) Yong Ken Tye, Ng Geok Ing, Subramaniam Arulkumaran Nanyang Technological University, Singapore CINTRA CNRS/ NTU/ THALES, Singapore
4:40pm	TU-PM-NANO 3-3 **Silicon Polarization Independent Circuit for Wavelength-Agile Integrated Receiver** Chao Li[1], Huijuan Zhang[1], Shiyi Chen[1], Jing Zhang[1], Ning Duan[2], Mingbin Yu[1], G. Q. Lo[1] [1]Institute of Microelectronics, A*STAR, Singapore; [2]National Metrology Center, Singapore
5.00pm	TU-PM-NANO 3-4 **Well-confined and Low-loss Plasmon Modes Synthesized with Doped Graphene Sheets** Gan Choon How, Chu Hong Son and Erping Li Institute of High Performance Computing, A*STAR, Singapore
5.20pm	TH-AM-NANO 3-5 **Optical Switch through Optical Gradient Force** Hong Cai, L. Ding, J. F. Song, M. B. Yu and G. Q. Lo Institute of Microelectronics, A*STAR, Singapore

Wednesday Morning, 23 May 2012

Time	Aquarius 3
8:40am – 10:20am	**NANO-4** **Chairs:** Dr. Ze Xiang Shen, Singapore Dr Eng Huat Khoo, Singapore
8:40 am	WE-AM-NANO 4-1 **RF Nanopackaging based on Carbon-Nanostructures** (Invited) W.L. Chow[1, 2], C.C. Yap[1, 2], D. Tan[1, 2], M. Shakerzadeh[2], M.K. Samani[2], C. Brun[1, 3], E.H.T. Teo[1, 4], D. Baillargeat[1] and B.K. Tay[1, 2] [1] CINTRA CNRS/ NTU/ THALES, Singapore; [2] Nanyang Technological University, Singapore ; [3] Université de Limoges/ CNRS, Singapore; [4] Temasek Laboratories, Singapore
9:10am	WE -AM-NANO 4-2 **Graphene: An Ideal Material for Fundamental Research and Applications** (Invited) Ze Xiang Shen, Da Zhan, Jiaxu Yan and Linfei Lai Nanyang Technological University, Singapore
9:40am	WE -AM-NANO 4-3 **Growth Kinetic Studies of Graphene on Cu Foils** Emmanuelle Pichonat, R. Fleurier, D. Vignaud, H. Happy IEMN CNRS UMR, France
10:00am	WE -AM-NANO 4-4 **Computational Quantum Electrodynamics: Simulation of Electromagnetic Fields and Nanostructures interaction** Xue-Cang Zhang[1], Erping Li[1,2] [1]Zhejiang University, Hangzhou China [2]Institute of High Performance Computing, A*STAR, Singapore
	10:20 – 10:40 am Tea Break
10:40am – 12:30pm	**NANO-5** **Chairs:** Dr. Ai Qun Liu , Singapore Dr. Zhengtong Liu, Singapore
10:40am	WE -AM-NANO 5-1 **A Tunable Nano/ Micromachined Metamaterials** (Invited) Ai Qun Liu Nanyang Technological University, Singapore
11:10am	WE -AM-NANO 5-2 **Efficient Modelling of Passive Metal-Insulator-Metal Waveguide Components Using Circuit Theory** Dongying Li, Erping Li Institute of High Performance Computing, A*STAR, Singapore
11:30am	WE-AM-NANO 5-3 **A Thermal Silicon-Nitride Slot Waveguide Biosensor** Xiaoguang Tu, Junfeng Song, Tsung-Yang Liow, Mi Kyoung Park, Jessie Quah Yiying, Jack Sheng Kee, Mingbin Yu, and Guo-Qiang Lo Institute of Microelectronics, A*STAR, Singapore
11:50am	WE-AM-NANO 5-4 **Switching Optical Forces using Plasmonics Vortex** E. H. Khoo, I. Ahmed, Erping Li Institute of High Performance Computing, A*STAR, Singapore
12:10pm	WE-AM-NANO 5-5 **Red-shifting the Responsivity of Ge Waveguide Photodetector by Localized Stresso** Liang Ding, T.-Y. Liow, M. B. Yu, and G.-Q. Lo Institute of Microelectronics, A*STAR, Singapore

Wednesday Afternoon, 23 May 2012

Time	Aquarius 3
1:30pm – 3:30pm	**NANO-6** **Chairs:** Dr.Yukio Kawano, Japan, Dr. Iftikhar Ahmed, Singapore
1:30 pm	WE-PM-NANO 6-1 **High Efficiency CW THz Source by Nano-antenna Incorporated Photomixing** (Invited) Teng Jing Hua Institute of Material Research, A*STAR, Singapore
2:00pm	WE-PM-NANO 6-2 **Nanoscale THz Sensors and Imagers** (Invited) Yukio Kawano Tokyo Institute of Technology, Japan
2:30pm	WE-PM-NANO 6-3 **Integrated In-band Optical Signal-to-noise Ratio Monitor** Lianxi Jia, Song Junfeng, Liow Tsung-Yang, Yu Mingbin, Patrick Lo Institute of Microelectronics, A*STAR, Singapore
2:50pm	WE-PM-NANO 6-4 **High Performance Graphene Field-effect Transistors with Extremely Small Access Length using Self-aligned Source and Drain Technique** Myung-Ho Jung, Goon-Ho Park, Tomohiro Yoshida, Hirokazu Fukidome, Tetsuya Suemitsu, Taiichi Otsuji, Maki Suemitsu Tohoku University, Japan
3:10pm	WE-PM-NANO 6-5 **Effect of Low Permittivity Dielectric Materials on Microstrip Antenna at Terahertz Frequency** Kumud Ranjan Jha[1], G. Singh[2] [1]Shri Mata Vaishno Devi University, India; [2]Jaypee University of Information Technology, India
	3:30-3:50pm Tea Break
3:50pm – 5:50pm	**NANO-7** **Chairs:** Dr. Teng Jing Hua, Singapore Dr. Dongying Li, Singapore
3:50 pm	WE-PM-NANO 7-1 **The Features and Limitations of Nanoscale Imaging with the Veselago/ Pendry Superlens** (Invited) Wolfgang J. R. Hoefer Institute of High Performance Computing, A*STAR, Singapore
4:10pm	WE-PM-NANO 7-2 **Resonance Lineshape Manipulation in Silicon Feedback Microring Coupled MZI** Xianshu Luo, Junfeng Song, Mingbin Yu, and Guo-Qiang Lo Institute of Microelectronics, A*STAR, Singapore
4:30pm	WE-AM-NANO 7-3 **High Efficiency Optical Switches Using Silicon-on-insulator Technology** Junfeng Song[1,2], X. S. Luo[1], X. G. Tu[1], L. X. Jia[1], T. Y. Liow[1], M. B. Yu[1], G. Q. Lo[1] [1]Institute of Microelectronics, A*STAR, Singapore; [2]Jilin University, China
4:50pm	WE-PM-NANO 7-4 **Designing Carbon-Nanotube-Based Millimeter to Sub-millimeter Antennas** Pierre Franck, Dominique Baillargeat, Beng Kang Tay Nanyang Technological University Singapore CINTRA CNRS/ NTU/ THALES, UMI 3288, Singapore
5:10pm	WE-PM-NANO 7-5 **Ge/ Si Avalanche Photodetector by Selective Epitaxial Growth** Ning Duan, Tsung-Yang Liow, Andy Eu-Jin Lim, Liang Ding and G. Q. Lo Institute of Microelectronics, A*STAR, Singapore
5:30pm	WE-PM-NANO 7-6 **Heterogeneous Si/ III-V Integration for Optical Interconnect** Qian Wang[1], Doris Keh Ting Ng[1], Yadong Wang[1], Yongqiang Wei[1], Jing Pu[1], Payam Rabiei[1], Seng Tiong Ho[1,2] [1]Data Storage Institute, A*STAR, Singapore; [2]Northwestern University, USA

Thursday Morning, 24 May 2012

Time	Gemini 1
10:40am – 12:20pm	**NANO: Nanotechnology for EMC** Chairs: Dr. Junhong Deng, Singapore Dr. Ping Li, Singapore
10:40am	TH-AM-NANO-1 **Circuit Modelling of Multilayer Graphene Nanoribbon (MLGNR) Interconnects** Yuan Fang, Wen-Sheng Zhao, Xu Wang, Feng Jiang, Wen-Yan Yin Zhejiang University, China
11:00am	TH-AM-NANO-2 **EMI Shielding Evaluations of Carbon Nanotube Based Coatings and Applications** Ping Li[1], Yueyan Shan[2], Lie Liu[3], Junhong Deng[4], Ong Guat Choon[1], Xijiang Yin[1] [1]Singapore Polytechnic, Singapore [2]A*STAR National Metrology Centre (NMC), Singapore [3]Temasek laboratories, Singapore [4]TUV SUD PSB Pte. Ltd., Singapore
11:20am	TH-AM-NANO-3 **Graphite Nano-Platelet-Based Composites for Microwave Absorbing Small Enclosures** Alessandro D'Aloia, Alessio Tamburrano, Marcello D'Amore, Maria Sabrina Sarto Sapienza University of Rome, Italy
11:40am	TH-AM-NANO-4 **High Permittivity and Shielding Effectiveness of Microwire Composites with Optical Transparency** Lie Liu[1], Zhi Hong Yang[1], Ling Bing Kong[1], Ping Li[2], Ce Huang Poo[2] [1]Temasek Laboratories, Singapore [2]Singapore Polytechnic, Singapore
12:00pm	TH-AM-NANO-5 **Performance Investigation of a Uni-planar Compact Electromagnetic Bandgap (UC-EBG) Structure for Wide Bandgap Characteristics** M. S. Alam, M. T. Islam, N. Misran Universiti Kebangsaan Malaysia, Malaysia

OPTIONAL TOURS

About Singapore

Singapore is a bustling cosmopolitan city populated with high-rise buildings and landscape gardens, with a population of about five million people. Brimming with a harmonious blend of culture, cuisine, arts and architecture, Singapore is a dynamic city that's rich in contrast and colour. In fact, you can even say that Singapore embodies the finest of both East and West.

Discover the old world charm by exploring the island's key historical landmarks or memorials, and embarking on a heritage trail and enjoy the sights and sounds at various cultural precincts, notably Chinatown, Little India and Kampong Glam. If you prefer the bright city lights, then you'll be delighted to know that there are numerous shopping malls, museums, and dining and entertainment hotspots to choose from. Get into the thick of the shopping action at the iconic Orchard Road stretch, or party the night away at the Clarke Quay or Boat Quay areas, both of which offer a myriad selection of nightlife activities.

Singapore is also a gourmet's paradise with an incredible multifarious offering of food – day or night, there will always be something to whet your appetite. With a range of dining options from Peranakan to Chinese, Indian to Malay, fusion and more, you'll be spoilt for choice.

Beyond the history, culture, people, shopping and food, there are many more facets to Singapore's thriving cityscape for you to discover. And these can only be experienced as you immerse yourself in the exploration of this once fishing village turned cosmopolitan city. For more details and booking, please approach the Conference Secretariat at the Registration Desk (Outside Gemini 2), Level 1.

Optional Tour Program

Date	Tours	Start Time	End Time
Mon, 21 May	Morning at the Zoo	8:00am	12:00pm
Tues, 22 May	Night Out at Chinatown with Trishaw Ride	6:00pm	10:00pm
Wed, 23 May	City Tour	8:30am 1:30pm	12:00pm 5:00pm
Thur, 24 May	Universal Studios Singapore	8:30am	12:00pm

22 May 2012, Tuesday

Night Out at Chinatown with Trishaw Ride
Departs at 6:00pm
Returns at 10:00pm

Experience an old-fashioned "limousine" ride through Chinatown Heritage Centre and discover the historical beginnings of early Chinese immigrants in this now vibrant area. This three-wheeler was a popular means of transportation in old Singapore and though no longer used now, remains a strong icon of Singapore's rich cultural history.

The evenings come alive with the hustle and bustle of the Night Market where local vendors sell everything from fashion items to handicrafts and souvenirs. Enjoy dinner in one of the local restaurants then hop onto a "limousine" for a ride from Chinatown to Clarke Quay. Then transfer onto a bumboat for a short cruise along the Singapore River to enjoy the views of beautifully refurbished godowns and colonial buildings vying for attention with modern skyscrapers of Singapore's financial district.

Price: S$71/ adult & $43/ child

To make a tour booking, or enquire for more information, please contact the Symposium Secretariats by email at emcsingapore@cma.sg or call (65) 6336 2328.

- Travel Agent reserves the right to cancel the tour should the minimum numbers of participants not be fulfilled.
- All tours, packages & prices are subjected to change in the coming months without prior notice.
- Due to unforeseen circumstances, the sequence of itinerary may subject to changes or alternative sightseeing s being substituted without prior notice.

TECHNICAL EXHIBITION

Operations/ Event Schedule

Exhibition Dates & Time	:	22 May 2012 9:00am – 5:30pm 23 May 2012 9:00am – 5:30pm 24 May 2012 9:00am – 3:00pm
Exhibitor Registration	:	21 May 2012 3:00pm – 5:00pm 22 May 2012 8:30am – 4:00pm
Booth Build-Up	:	21 May 2012 8:00am – 2:00pm (Official Contractor: Pico Art) 21 May 2012 2:00pm – 8:00pm (Exhibitor Move-In)
Exhibition Tear-Down	:	24 May 2012 4:00pm – 6:00pm

TECHNICAL TALKS AT THE EXHIBITION

Tuesday Afternoon, 22 May 2012

Time	Exhibition Hall
1:30pm – 2:30pm	Exhibition Talk-1: **Radiated Emission Analysis – Passing the Limits** Klaus Krohne CST South East Asia Pte Ltd, Singapore
2:30pm – 3:00pm	Exhibition Talk-2: **Virtual EMC Tests in CST STUDIO SUITE** Marco Kunze CST AG, Germany
3:00pm – 3:30pm	Exhibition Talk-3: **Using a FFT-based Receiver Increases Speed of CISPR 16 Compliant EMI Measurement** Jens Medler Rohde & Schwarz, Singapore
3:30pm – 4:00pm	Exhibition Talk-4: **ProfiShield - A Lighter and Unique Shielding Technology** Chng Jhuning ST Electronics, Singapore
4:00pm – 4:30pm	Exhibition Talk-5: **Introducing the N9038A MXE EMI Receiver** Mark Terrien Agilent Technologies, USA
4:30pm – 5:00pm	Exhibition Talk-6: **Conveniently Boost Your Test Efficiency and Confidence with the New EMCenter** Bryan Sayler ETS-Lindgren, USA
5:00pm – 5:30pm	Exhibition Talk-7: **Introduction to EMC for Functional Safety** Deng Junhong TÜV SÜD PSB Pte Ltd, Singapore

Wednesday Morning, 23 May 2012

Time	Exhibition Hall
10:00am – 10:30am	Exhibition Talk-1: **Multi-Tone Radiated Immunity EMC Testing** Mike Alferman AR RF/Microwave Instrumentation, USA

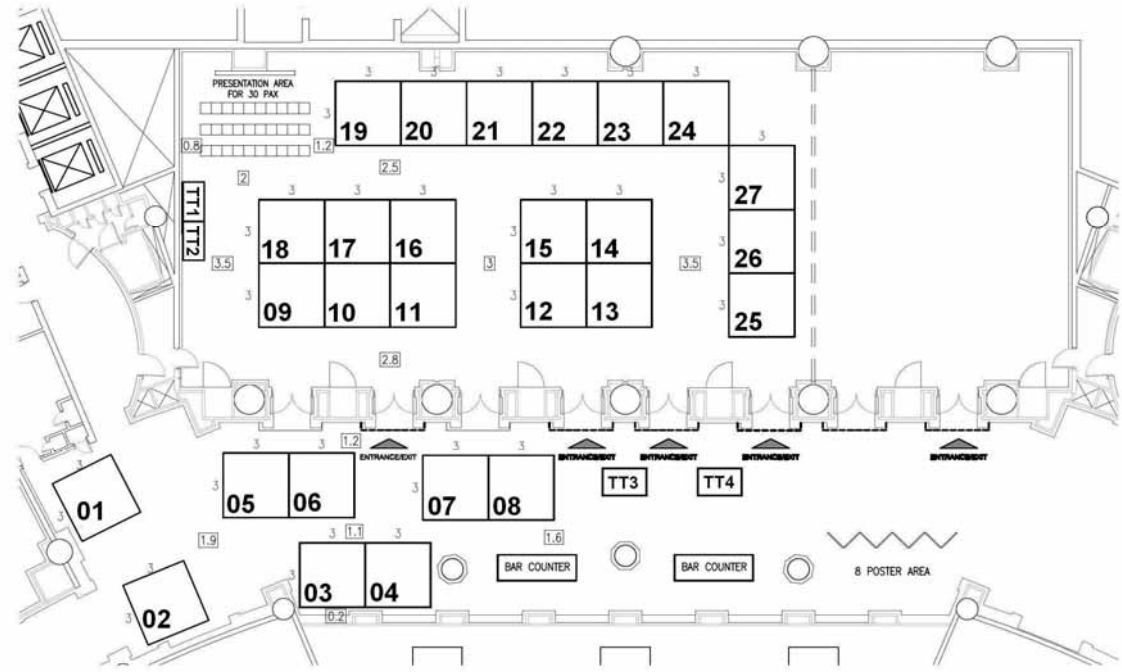
Wednesday Afternoon, 23 May 2012

Time	Exhibition Hall
1:30pm – 2:00pm	Exhibition Talk-1: **New Solutions for Multi-Beam Antennas and Antennas Measurement Systems** Michael Matytsine Matsing Pte Ltd, Singapore
2:00pm – 2:30pm	Exhibition Talk-2: **Practical Cable Harness Modelling in FEKO** Madelé van der Walt FEKO (EM Software & Systems – S.A. (Pty) Ltd.), South Africa
2:30pm – 3:00pm	Exhibition Talk-3: **Introduction to Wurth Electronics** Kelvin Chan Wurth Electronics Singapore Pte. Ltd., Singapore
3:00pm – 3:30pm	Exhibition Talk-4: **EMI Shielding & Thermal Management Solutions** To be advised TennVac/TennMax America Inc., Greater China/USA
3:30pm – 4:00pm	Exhibition Talk-5: **Test Your Embedded Design with The World First Mixed Domain Oscilloscope** Peter Chen Tektronix, Singapore
4:00pm – 4:30pm	Exhibition Talk-6: **RF & Microwave Simulation Using Comsol Multiphysics (Software)** Cathy Sun i-Math Pte Ltd, Singapore
4:30pm – 5:00pm	Exhibition Talk-7: **The PSDC Shared Services Centre** Tan Swee Guat PSDC (Penang Skills Development Centre), Malaysia

EXHIBITORS

LIST OF EXHIBITORS

S/N	Organization Name	Booth No.
1	Agilent Technologies	17 & 18
2	AR AF/Microwave Instrumentation	25 & 26
3	CST – Computer Simulation Technology	7 & 8
4	EM TEST	15
5	ETS-Lindgren	9 & 10
6	FEKO	23
7	Huber + Suhner Singapore	12
8	i-Math Pte Ltd	24
9	IEEE EMC Society	Table Top 3
10	Institute of High Performance Computing	Table Top 4
11	Jiangsu Roxie Application of Electronic Institute Co., Ltd	27
12	JS Denki Pte Ltd	4
13	Matsing Pte Ltd	13
14	Penang Skills Development Centre (PSDC)	2
15	Quantel Private Limited	20
16	Riken Environmental Systems Co., Ltd	14
17	Rohde & Schwarz	21 & 22
18	Safety & EMC	Table Top 1
19	ST Electronics	3
20	Tektronix	1
21	TennVac/TennMax America Inc.	16
22	TESEQ	5 & 6
23	TÜV SÜD PSB Pte Ltd	11
24	Würth Elektronik	19
25	Zhejiang University	Table Top 2



Booth Layout in Exhibition Hall - Leo 1 – 3

Agilent Technologies

Agilent's electronic measurement business provides standard and customized electronic measurement instruments and systems, monitoring, management and optimization tools for communications networks and services, software design tools and related services that are used in the design, development, manufacture, installation, deployment and operation of electronics equipment and communications networks and services.

Contact person : Ms. Rebecca Teo
URL : www.agilent.com

rf/microwave instrumentation

AR RF/ Microwave Instrumentation

At AR, there's no substitute for quality. It's the foundation of our business and the AR value that's recognized around the globe. It's one of the key reason AR has become the worldwide leader in EMC, Wireless and beyond. AR products do more, last longer, work harder and make your job easier. And that gives you a fierce competitive edge. Only AR delivers innovative technology, advanced design, quality build and workmanship, mismatch capability, durability and longevity, less cost watt for watt and a worldwide support network that's here for you today and tomorrow.

AR RF/ Microwave Instrumentation manufacturers and distributes:

- RF amplifiers 1 – 50,000 watts, dc – 1 GHz
- Microwave amplifiers, 1 – 16,000 watts, 0.8 – 45 GHz
- Antennas, up to 15,000 watts input power, 10 kHz – 50 GHz
- RF Conducted Immunity Test Systems
- EMC/ RF Test Systems
- Hybrid Power Amplifiers
- EMC test accessories and software

Contact Person : Mr. Douglas Shepherd
URL : www.arworld.us

CST

CST Computer Simulation Technology

CST develops and markets high performance software for the simulation of electromagnetic fields in all frequency bands. Its success is based on the implementation of leading edge technology in a user-friendly interface. CST's customers are market leaders in industries as diverse as Telecommunications, Defense, Automotive, Electronics, and Medical Equipment. Today CST employs 190 sales, development, and support personnel, and enjoys a market share of over 30% in high frequency 3D EM simulation.

CST STUDIO SUITE is the culmination of many years of research and development into the most accurate and efficient computational solutions for electromagnetic designs. It comprises CST's tools for the design and optimization of devices operating in a wide range of frequencies - static to optical. Analyses may include thermal and mechanical effects, as well as circuit simulation. CST STUDIO SUITE benefits from an integrated design environment which gives access to the entire range of solver technology. System assembly and modeling facilitates multi-physics and co-simulation as well as the management of entire electromagnetic systems. CST STUDIO SUITE can offer considerable product to market advantages such as shorter development cycles, virtual prototyping before physical trials, and optimization instead of experimentation.

Contact person : Dr. Klaus Krohne
URL : www.cst.com

EM TEST

EM TEST is the leading manufacturer and supplier of high class, fully compliance EMC testing and measurement equipments for the electronics industry in automotive, telecom, medical, industrial electronics, avionics & military sectors. We offer outstanding expertise in EMC and our solutions and know-how in testing susceptibility and measuring emissions through our equipments are recognised worldwide. Our customers count on EM TEST for quality and performance. And we pledge to never let them down. The EM TEST "Performance" represents our total commitment to providing solutions that do the job ... often, beyond our customers' expectations. With EM TEST there's no guessing, no trial & error, no disappointments. That's not just a promise, it's a guarantee!

Contact person : Mr Brendon Lim
URL : www.emtest.com

ETS-Lindgren

ETS-Lindgren is a leading manufacturer of turn-key systems and components for EMC, RF, EMP, wireless and acoustic testing. Our RF shielded enclosures and anechoic chambers are designed for testing a wide variety of products, from mobile handsets to full size aircraft. Our popular components include antennas, turntables, field probes, monitors, positioners, RF and EMP/ HEMP/ IEMI power protection filters as well as RF and microwave absorber - including the new flexible FlexSorb™ absorber. Innovative software offered includes TILE!™ for automated EMC test lab management and EMQuest™ for fully automated 2- and 3-D antenna pattern measurement. Services provided include expert calibration at our A2LA accredited calibration lab and wireless testing at our CTIA Authorized Test Lab (CATL). Chamber relocation and absorber retrofit services are available upon request. Based in Cedar Park, Texas, ETS-Lindgren has ISO 9001:2000 certified facilities in North America, Europe and Asia.

Contact Person : Mr Alex Yeo
URL : www.ets-lindgren.com

FEKO

FEKO® is a comprehensive computational electromagnetics code (CEM code) that is used widely in the telecommunications-, automobile-, space- and defence-industries. FEKO® offers several solution techniques (MoM, MLFMM, PO, GO Ray Launching, UTD and FEM) under a single licence. Hybridisation of these techniques enables the efficient analysis of a very broad spectrum of EM problems e.g. 3D antenna design, antenna placement on electrically large structures, microstrip-antennas, microstrip-circuits, EMC, biomedical and scattering. With the MLFMM, and the true hybridisation of the solvers, FEKO® is considered the global market leader for antenna placement analysis. FEKO® has a well-established global distribution and technical support network with subsidiary companies in North America, Europe, China and representatives in 8 other countries. EMSS (www.emss.co.za) was started in 1994 as an engineering company consulting in general electromagnetic problems.

Contact Person : Bernice Swarts
URL : http:/ / www.feko.info/

Huber + Suhner Singapore

The Huber + Suhner group is a leading global supplier of components and systems for electrical and optical connectivity. Our customers in telecommunications, industrial applications and transportation appreciate that we are specialists with detailed knowledge of practical applications. We offer technical expertise in radio frequency technology, fibre-optics, cables and polymers under one roof, thus providing a unique basis for continual innovation focused on the needs of our customers all over the world. OUR MOTTO is: <<EXCELLENCE IN CONNECTIVITY SOLUTIONS>>. At the heart of our offering is a broad range of products that can be relied on to meet high quality standards, backed up by flexible, dependable services with fast response times worldwide. We concentrate on complex applications that allow us to stand out by adding value with special product features, customer-specific innovations, engineering and other services.

Contact Person : Ong Tun Hee
URL : http://www.hubersuhner.com.sg

i-Math Pte Ltd

Incorporated in 2001, i-Math is dedicated to deliver innovative high precision mathematical and control solutions to the Educational, R&D, Engineering and Manufacturing industries in the ASEAN Region. Our mission is to provide a unique 'state-of-the-art' solution for customers to increase their productivity and efficiency.

The Sole Distributor In the South East Asia Region for Comsol Inc, the developer of Comsol Multiphysics that provides software solutions for multiphysics modeling and finite element analysis in discipline of the Structural Mechanics, Hi and Low Frequency Electromagnetics, Heat Transfer, MEMS, Acoustics, and more.

Contact person : Ms. Clara Phua
URL : www.imath-asia.com

IEEE EMC Society

IEEE EMC Society is one of the 39 societies under IEEE, which is a recognized and respected technical professional association providing services in the field of electromagnetic compatibility engineering, technology, and innovation for the betterment of society and the preferred professional development source for our members. EMC society fosters the development and facilitates the exchange of scientific and technological knowledge in the discipline of electromagnetic environmental effects and electromagnetic compatibility, and promotes literary, educational and professional aspects thereof, that benefits both in the profession and humanity.

URL : http://www.emcs.org

Institute of High Performance Computing

The Electromagnetic Compatibility (EMC) group at the Institute of High Performance Computing (IHPC), A*STAR is devoted to explore and develop the advanced electrical and electromagnetic modeling, design and analysis algorithms and techniques for leading-edge applications in high-speed electronics, integrated circuits & their packaging systems, wireless communication, and bio-electromagnetic engineering. The EMC group strengthens its core capabilities through dedicated R&D, alliance and collaborations with leading research organizations and universities world-wide. It is also committed to collaborate and perform value-added R&D with international industrial companies.

URL : http://www.ihpc.a-star.edu.sg

Jiangsu Roxie Application of Electronic Institute Co., Ltd

Roxie is a professional company occupied in research, production, construction, technical consulting service and imports & exports. Our experienced team of experts is committed to the research and design of absorbing materials, electromagnetic compatibility and the prevention of information leakage, etc.

Our products are widely used in the fields of electromagnetic protection, confidential communication, electromagnetic pollution purification and microwave anechoic chamber; and are compliant to the ISO9001 quality product standards. Our absorbing materials include antiradar coating, radar absorbing patch, pyramidal absorbing material, flatted absorbing material and EMC composite absorbing material. And shielding materials include shielded door, cut-off waveguide window, electro conductive rubber strip, shielded window, shielded belt, filter and shielded room. Also, we design, produce and install the shielded room using RCS reduction and microwave absorbing materials.

Contact Person : Wu Zhiming
URL : www.roxie.cn

JS DENKI PTE LTD

JS Denki Pte Ltd established in Singapore on August 2002 as a leading system integrator with the core business in supplying, installing as well as to providing services support of the EMC test equipments and system across China & Asia pacific region. JS Denki provides the most effective EMC solutions that deliver the best value of the expectation to the customers, with excellence in the configuration and delivery of systems by integrating products from established world-leading suppliers. JS Denki is a 100% EMC test & measurement Solution Company. We are fully committed in EMC field as we are having a very experienced & professional team of EMC engineers, who can offer you the technical support & the valuable advice on EMC field of solution. JS Denki started its Malaysia branch in Sep 2004. The office is located in Kuala Lumpur & Penang. JS Toyo Corporation started its operation officially in China in May 2008.

Contact person : Mr. Seah Kwee Hock
URL : http://www.jsdenki.com.sg

MATSING PTE LTD

A Singapore based manufacturer of the world's lightest, large size RF Lenses with applications in Antenna Measurement Solutions, Luneburg Lenses and Multi-beam Antennas. Using patented meta-materials and manufacturing techniques, Matsing manufactures large size, light weight convex Lenses ideal for real-time far-field zone antenna measurements in a confined space. The Matsing large size Luneburg Lenses are extremely lightweight and have applications as multi-beam antennas for various industries. Our measurement facilities provide a unique cost and space effective solution for far-field antenna measurements. We additionally manufacture anechoic chambers as well as instrumentation, software and devices providing a complete solution for antenna testing. We supply our measurement facilities to government, businesses and research institutions across the globe.

Contact person : Leonid Matytsine
URL : www.matsing.com

PSDC

The PSDC (Penang Skills Development Centre) was established in 1989 and is the first tripartite, industry-led skills training and education centre in Malaysia. In line with its commitment to support the growth and development of the industries, the Centre provides high-end Shared Services facilities and promotes fundamental design and development (D&D) activities to meet the current needs and demands. As such, the PSDC houses Malaysia's first 10m Semi-Anechoic Electromagnetic Compatibility (EMC) Lab, complete with high-end testing equipment and infrastructure. The lab has been officially accredited as ISO/IEC 17025 compliant by the American Association for Laboratory Accreditation (A2LA) and is now an internationally-recognised EMC laboratory. With this accreditation, the PSDC is set to support more D&D activities in the electrical and electronics sector, not only those located domestically but also regionally and internationally.

Contact Person : Tan Swee Guat / Tan Eng Keat
URL : www.psdc.org.my

Quantel Private Limited

Quantel Pte Ltd, incorporated in Singapore 23 years' ago, is a premium solution provider for EMC immunity and emission, both conducted and radiated. With 10 branches span across South East Asia and India, our sales and support teams are right at the factory door steps to understand and serve your design and compliance needs for EMC. This time round, two of our top of the lines brands, Haefely and PMM, will showcase their latest innovations. First we have Haefely AXOS setting a new bench mark for compact immunity system. With 7 inch high resolution touch screen display, Haefely AXOS embodied the most economical and efficient compact test solution in the market. PMM will provide us the opportunity to be up close with their next revolution digital lighting fast time domain EMI Receiver. Another new introduction from PMM is the 18GHz receiver unit – the only full compliant receiver directly connected to the antenna. So look out for our booths!

Contact Person : Mr Eric Yip
URL : www.quantel.com.sg

RIKEN ENVIRONMENTAL SYSTEM Co., Ltd.

Riken Environmental System Co., Ltd

Riken Environmental System provides advanced anechoic chambers that meet international standards.Our company has an excellent track record of delivering large-scale anechoic chambers and companies around the world have high expectations of our performance. We meet those expectations by providing optimum anechoic chambers designed through a comprehensive process that leverages our long years of expertise in advanced electromagnetic wave absorber technology, high precision simulation technology and shielding technology.

Contact person : Mike Ong
URL : http://www.riken-kankyo.com/en/index.html

ROHDE&SCHWARZ

Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. It has approx. 8400 employees and achieved a net revenue of € 1.6 billion (US$ 2.2 billion) in fiscal year 2010/2011 (July 2010 to June 2011). Company headquarters are in Munich, Germany.

Contact person : Tong Wen Shi
URL : www.rohde-schwarz.com

安全与电磁兼容
SAFETY & EMC

SAFETY & EMC Magazine

SAFETY & EMC magazine started the first publication from twenty one years ago, it is the unique official publication (CN 11-3452/TM, ISSN 1005-9776) synthetically introducing the safety and EMC technology of electronic and electric industry at present in China, which is supervised by Ministry of Industry and Information Technology of PRC and sponsored by China Electronic Standardization Institute (CESI). SAFETY & EMC is a bimonthly publication with a cohesive, innovative and professional workforce. Until now, its readers are more 500'000. Most of them are engineers, teachers and students; however, there are a lot of marketing and purchasing personnel becoming its faithful readers. SAFETY & EMC is with a deep core of understanding of this industry, its column arrangement is subject to professional and technical features, for instance, *Certification & Marks, Standard & Application, Testing & Measurement, Electromagnetic Interference Suppression Technology, Material Application in EMC, Professional Research, EMC Classroom, Conference Release, New Products, Company Profile* and so on.

Contact Person : Xie Hong
URL : www.semc.cesi.cn

ST Electronics

ST Electronics (Singapore Technologies Electronics Limited), the electronics arm of ST Engineering, delivers innovative system solutions to government, commercial, defence, and industrial customers worldwide. With a presence in more than 20 countries, ST Electronics markets its solutions to more than 100 countries internationally. It specializes in the design, development and integration of advanced electronics and communications systems, such as broadband radio frequency and satellite communication, e-Government solutions, information communications technologies and IT, rail and traffic management, real-time command and control, modelling and simulation, interactive digital media, intelligent building management and information security.

ST Electronics (Info-Comm Systems) Pte Ltd, a wholly owned subsidiary of ST Electronics, is a leading Information Communications Technologies (ICT) solutions provider in the Asia-Pacific region. ST Electronics (Info-Comm Systems)'s EMC Services and Consulting team has been providing electromagnetic compatibility (EMC) services, innovative products and solutions that go beyond its customer's expectations. The team constantly explores the latest technological developments in the EMC field to provide the best solutions suited for its extensive customer base, ranging from the defence, government agencies to commercial and industrial sectors.

Contact person : Estelle Chin
URL : www.stee.stengg.com

Tektronix

For more than sixty five years, engineers have turned to Tektronix for test, measurement and monitoring solutions to solve design challenges, improve productivity and dramatically reduce time to market. Tektronix is a leading supplier of test equipment for engineers focused on electronic design, manufacturing, and advanced technology development. Headquartered in Beaverton, Oregon, Tektronix serves customers worldwide and offers award-winning service and support. Stay on the leading edge at www.tektronix.com.

Contact person : Evan Sun
URL : www.tektronix.com

TennVac/TennMax America Inc.

TennVac/TennMax is specializing in turn-key solution for EMI Shielding & Thermal Management Solutions with the following technologies:

A. EMI Shielding:
   a. FIP (Form-In-Place) Gasket
   b. PVD (Physical Vapor Deposition)
   c. Pcan (Metalized Injection Molded Gaskets to replace traditional metal gaskets)
   d. PFcan (Metalized Formed Plastic Film attached directly to a PCB via conductive adhesive
   e. Various EMI gaskets such as Extruded, Sheet stock, Over-molding…
B. Thermal Management
   a. Thermal Simulation Service
   b. Heatpipe Module
C. Thermal Interfacial Material
D. Environmental Seal & Metal Fabrication:
   a. Environmental Seal
   b. Metal Fabrication

Contact Person : Timothy Liu
URL : www.tennvac.com

TESEQ

Teseq is a global supplier of Electromagnetic Compatibility (EMC) systems and solutions. We design, deliver and sell instrumentation, systems and application software for EMC emission and immunity testing in a broad range of industries. Our cutting-edge solutions provide manufacturers with the reliable, standards-compliant test results needed to quickly bring their products to market.

Contact person : Lim Kok Hwee
URL : www.teseq.com

TÜV SÜD PSB

TÜV SÜD PSB was originally established in 1971 as the Engineering Services Division of the Singapore Institute of Standards and Industrial Research (SISIR). Today, it is a one-stop integrated solution provider, offering testing, inspection, product certification and management system certification services, with operations in Singapore, Thailand, Indonesia, Malaysia, Vietnam and Philippines. Being an established and internationally recognized testing body, its test reports and product certification marks are well-accepted by manufacturers, third-party buyers and government authorities worldwide and our laboratories are accreditated under the Singapore Laboratory Accreditation Scheme (SINGLAS). It is a wholly owned subsidiary of TÜV SÜD. TÜV SÜD PSB can help customers obtain the necessary certifications for their products, such as CB, CE, FCC, VCCI, PSE, BSMI, ACA, IC, IDA, eK etc, as well as Bluetooth product qualification. Industries we can support include:

- Information technology equipment
- Telecommunication products
- AV & home appliance products
- Medical equipment
- Automotive accessories & vehicles
- Lighting equipment & accessories
- Railway systems equipment
- Installation accessories & connection devices

Contact person : Mr Lim Cher Hwee
URL : http://www.tuv-sud-psb.sg

Würth Elektronik

The Würth Elektronik with headquarters in Niedernhall, Germany, has 6,753 employees worldwide and generated global sales of about € 698 million in 2011. With 16 production sites worldwide, Würth Elektronik is one of the most successful companies within the Würth Group. Würth Elektronik is a leading manufacturer of electromechanical components such as connectors, switches, assembly technique and power elements, and Europe's largest manufacturer of passive components. More than 300 sales representatives worldwide make up a direct sales network that is unique in this industry: Local Design in support, all catalogue products in stock and samples free of charge is the promise to our customers, all design kits have free lifelong refill. Our design guide "Trilogy of Connectors" is unique in this industry. Our sales force supports from design-in to mass production. Würth Elektronik operates production plants in Germany, the Czech Republic, Bulgaria, the U.S., Mexico, Taiwan and China.
Würth Elektronik operates internationally with its four company areas in various markets:

- Circuit Boards
- Intelligent Systems
- Passive Components
- Electromechanical Components

Contact Person : Mr Sebastian Tan

URL : www.we-online.com

Zhejiang University (Radio Frequency & Nanoelectronics Research Center)

The 21st century ushered in the era of nano-electronics and nano-photonics, which are the enabling technologies for extra-low power consumption and ultra-high performance communication networks, computing, aerospace and automotive. The Radio Frequency & Nanoelectronics Research Centre (RFNE) at Zhejiang University was founded in 2010 and aims to devote the research and development in the fields of EMC; 3D Integrated Circuits(IC) and their system integrations and Graphene based Radio Frequency nanoelectronic devices.

URL : www.isee.zju.edu.cn

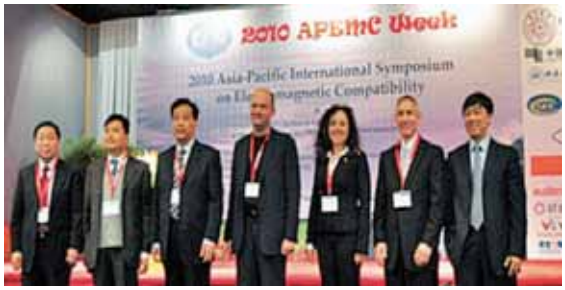
ASIA-PACIFIC SYMPOSIUMS ON ELECTROMAGNETIC COMPATIBILITY (APEMC)

With the great success of EMC Zurich in Singapore in 2006 initiated a broad discussion amongst the Asia-Pacific EMC community. There was a general consensus of combining the many scattered EMC events in the region to form a major EMC Symposium similar in quality to EMC in Europe or to the IEEE EMC Sympsoum in the States. It was agreed that such a Symposium be an annual event moving among the different countries of the region also offering an industrial exhibition to address the needs of industry.

As a result of our deliberations the 2008 Asia-Pacific EMC (APEMC) Sympsoium has been taken place in Singapore, May 19-22, 2008. This is a major step towards a high-quality, international Asia-Pacific EMC Symposium addressing the needs of a rising EMC community in the region, fostering its link to the world and promoting excellence among its members. It now became one of the major EMC events in the world in parallel to IEEE EMC in States and Euro-EMC in Europe.

The Technical Program Committee (TPC) consists of the well-know EMC and RF experts and scientists with adequate representatives all over the world which ensure the high quality of the Symposium. The 2010 and 2011 APEMC was held in China and Korea respectively, with the 2012 APEMC returning to its founding place, Singapore.

2008 APEMC in Singapore



2010 APEMC in Beijing, China

2011 APEMC in Jeju Island, Korea

2008 APEMC IN SINGAPORE

The 2008 Asia-Pacific EMC Symposium (APEMC) was held in conjunction with the 19th International Zurich Symposium and Technical Exhibition on Electromagnetic Compatibility (EMC-in-Singapore 2008), under the theme "The Gateway to Emerging Technology," from May 19 to 22, 2008 at the Singapore SUNTEC International Convention and Exhibition Center. This event addressed the needs of a rapidly rising EMC community in the region while promoting excellence and warm relationship amongst the EMC community and members. The conference chair was Dr. Er-Ping Li, an IEEE Fellow from the Singapore National Research Institute of High Performance Computing (IHPC). With the Singapore fabulous organizing team, the conference was a resounding success. The 2008 APEMC laid down the Asia-Pacific EMC foundation and identity, and it will continue from this point onwards.

The Symposium attendance was over 540 delegates from 31 countries making this a truly global conference, with an increase in the number of delegates from the Asia-Pacific region as compared to EMC-in-Singapore 2006. A technical exhibition was held concurrently with the Symposium, with 34 exhibitors within 1000 square meters of floor space.

The general organization of the Symposium had a focus on high quality technical papers by speakers from all over the world. A total of 320 papers were received and 194 papers were selected for oral presentations.

Spanning over three days, the Symposium offered a total of 39 well attended oral technical sessions (inclusive three Topical Meetings on Integrated Circuit EMC), using four parallel tracks and three Open Forum poster sessions. On top of these high quality technical sessions, there were two plenary talks by renowned experts in the morning of May 21. The first by Professor Dr.-Ing Thomas Weiland of Technical University of Darmstadt, Germany, followed by Professor Raj. Mittra from Penn State University, USA.

A total of 7 workshops and tutorials sessions were conducted one day prior to the Symposium. These workshops and tutorials were hosted by 26 international specialists whom introduced participants to the latest developments in the fields of EMC and Signal Integrity, Circuit Board EMC Design, Reverberation Chambers, EMC and Modern Power Electronic Systems, RF Biological Effects, as well as System Level EMC Design and Control. These workshops and tutorials alone were well attended with 228 participants and provided some groundwork for the three days of regular EMC technical sessions that were to follow.

The IEEE EMC Society together with the other cooperating societies provided technical co-sponsorship. The Symposium also received sponsorship from TESEQ, EM TEST and Computer Simulation Technology (CST). The IEEE EMC Society had eight board members in attendance, Elya Joffe, Todd Hubing, John Norgard, Francesca Maradei, Kimball Williams, Takeo Yoshino, Don Heirman and Mark Montrose. The IEEE EMCS booth in the exhibit hall received 10 new members, all from Asia. As a result of the conference, we hope to create several new chapters in Asia.

The Symposium closed with an IEC ACEC EMC Workshop organized by the IEC Asia-Pacific Regional Centre (IEC-APRC) the evening of May 22, 2008. Speakers include Dr. William Radasky, Donald Heirman, and Professor Michel Ianoz.

2010 APEMC IN BEIJING, CHINA

The 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) was held from April 12 to 16, 2010 at the Beijing International Convention Center with the theme of "EMC Harmonizes the World." This event addressed the needs of a rapidly rising EMC community in the Asia-Pacific region while promoting excellence and warm relationships amongst the EMC community. The 2010 APEMC Symposium was lead by the president, Professor Jinliang He, an IEEE Fellow from Tsinghua University in Beijing. Professor He also received the IEEE EMC Society's Technical Achievement Award at the recent 2010 IEEE International Symposium on EMC held in Fort Lauderdale, Florida. With the fabulous Chinese organizing team, APEMC 2010 was a resounding success. APEMC 2010 has further strengthened the Asia-Pacific EMC foundation and extended its influence worldwide. The Symposium has been the largest EMC event in China, providing an opportunity to bridge the EMC community in China and the World.

Over 700 delegates from 43 countries and regions, including 300 foreign delegates outside Mainland China, attended this event, which makes the APEMC a truly global conference. In addition, 68 exhibitors were co-located with the APEMC 2010.

The Symposium committee invited the former President of the IEEE Electromagnetic Compatibility Society, Professor Todd Hubing of Clemson University in the USA, to be the Chairman of the Technical Program Committee (TPC), and another 67 global well-known experts to be TPC members.

The general organization of the Symposium had a focus on high quality technical papers by speakers from all over the world. A total of 578 papers were received; of these, 432 papers were selected for oral and poster presentations. Spanning over three days, the Symposium offered a total of 61 well attended oral technical sessions, based on six parallel technical tracks and six Open Forum poster sessions. On top of these high quality technical sessions, there were four plenary talks by renowned experts on the morning of April 13 and 14. The first was given by Dr. Wang Jing, from the China TD Forum, followed by Professor Niels Kuster, from the Swiss Federal Institute of Technology Zurich, Dr. Bruce Archambeault, from IBM, and Professor Wang Zhihua, from Tsinghua University, China.

In conjunction with the technical sessions, a total of 11 workshops and seven tutorials sessions were conducted, which were organized by 44 internationally renowned EMC specialists. Eighteen Special Sessions were organized by famous EMC experts and one Industry Forum "Emission Measurements – Novel and Alternative Methods" was organized by Dr. Stephan Braun of GAUSS Instruments GmbH, Germany. Two topical meetings were presented, including a "Topical Meeting on Lightning Protection" by Professor Vladimir A. Rakov of the University of Florida, USA, Dr. S. Yokoyama of the Central Research Institute of Electric Power Industry (CRIEP), Japan, and Professor Farhad Rachidi of Swiss Federal Institute of Technology – Lausanne, Switzerland. The second presentation was "Topical Meeting on Advanced Research in EMC of ICs" by Dr. Sonia Ben Dhia of INSA de Toulouse, France, and Dr. Thomas Steinecke of Infineon, France.

The IEEE EMC Society, together with several other cooperating Societies, provided technical co-sponsorship. The Symposium also received sponsorship from China EPRI, China Southern Power Grid Technology Research Center (CSG TRC), China NSFC, Henan Pinggao Electric Co., AR RF/MICROWAVE INSTRUMENTATION, China State Grid Electric Power Research Institute, Lightning Protection Center of Guangdong Province, Chinese Society for Electrical Engineering (CSEE), and the IEEE Singapore EMC Chapter.

2011 APEMC IN JEJU ISLAND, KOREA

The 2011 Asia-Pacific EMC Symposium (2011 APEMC) was held in Jeju Island in Korea from May 16th to 19th, 2011 at the Ramada Plaza Jeju Hotel. Jeju Island has very beautiful and peculiar landscape with rich cultures and fabulous facilities. APEMC 2011 provided an excellent opportunity to exchange their expertise and to build up friendship for the members of the EMC community of the Asian-Pacific region as well as other regions of the world.

The Symposium chair was Dr. Jeong-Ki Pack, a professor in Chungnam National University, Daejeon, Korea, and the Korean Institute of Electromagnetic Engineering and Science (KIEES) and the Radio Research Agency (RRA) in Korea were the organizers of the Symposium.

This Symposium was sponsored by Korea Communications Commission (KCC), Korea Radio Promotion Association (KRPA), Electronics and Telecommunications Research Institute (ETRI), Automotive Parts Technology Support Center (APTSC), Korea Marine Equipment Research Institute (KMERI), Korea Electric Power Corporation (KEPC), Korea Tourism Organization (KTO), Jeju Convention & Visitors Bureau, Electromagnetic Compatibility Society (EMCS), Institute of Electrical and Electronics Engineers (IEEE), IEEE Seoul Section EMC Chapter, IEEE Seoul Section AP Chapter, IEEE Seoul Section MTT Chapter, and IEEE Seoul Section GRS Chapter.

Over 375 people from 20 countries from Asia, Europe, Australia, and North Americas attended this Symposium. The technical exhibition was held concurrently with the Symposium with 16 exhibitors. Two invaluable plenary speeches were presented at the opening ceremony: first by Prof. Todd H. Hubing from Clemson Univ., USA, about "Ensuring the Electromagnetic Compatibility of Safety Critical Automotive Systems," followed by Prof. Masao Taki from Tokyo Metropolitan University, Japan, about "EMF Health Issues: Perspective of Risk Analysis and Risk Management." During the plenary speech session, a lot of experts from all over the world asked numerous questions.

The Technical Program Committee (TPC), which consists of 36 international TPC members from all over the world and 41 local TPC members specifically from Korea, has diligently worked to ensure the technical quality of the papers presented at the conference. The technical program was divided into 6 categories such as tutorials, plenary speeches, technical paper sessions, special paper sessions, poster paper sessions, and workshops. The 26 tutorials covered 10 topics by 27 speakers. Two outstanding speakers made fantastic presentations during the plenary speech session. While 72 papers were presented in the technical paper sessions, the 50 papers for the 10 special paper sessions were given to many attendees. 25 posters were introduced. 4 workshops for 4 topics on current hot topics were held. Project meeting of IEC SC77C was successful.

Total 165 papers from the technical, poster, and special paper sessions on the 23 technical topics were submitted from 20 different countries from Asia, Europe, and North America. The 115 papers for the technical and poster sessions and the invited 50 papers for the 10 special paper sessions were submitted respectively. Each paper was reviewed by the 76 qualified reviewers and the final decisions regarding the technical papers and programs were made at the TPC meeting. Paper submissions covered a wide range of EMC-related topics. The most popular topics include Sources of Electromagnetic Interference, EMC Management, EMC Measurement Techniques, System-Level EMC and PCB EMC, Antenna and Propagation Issues, Electronic Packaging and Integration EMC, Power Integrity (PI) and Signal Integrity (SI), Computational Electromagnetics, Semiconductor EMC etc.

IEEE SINGAPORE EMC CHAPTER

IEEE Singapore EMC Chapter, founded in 2001, is one of the successful affiliations of the IEEE Electromagnetic Compatibility Society which is the world's largest organization dedicated to the development and distribution of information, tools and techniques for tackling electromagnetic interference as well as promoting the electromagnetic immunity level. Singapore EMC Chapter aims to build a diversified platform to foster the exchange, dissemination and development of scientific and technological knowledge on electromagnetic compatibility in education and industry. The chapter currently has more than 40 members from industry, universities and research institutes.

On 26 April 2001, IEEE Singapore EMC chapter was officially launched by the founding chairs A/P See Kye Yak and Dr. Er-Ping Li. Since its humble establishment, the Chapter has been active to promote EMC awareness in Singapore and Asia-Pacific region over the period of more than a decade. The remarkable achievements are that two high quality international EMC Symposiums – the 17th international Zurich Symposium on EMC co-organized in Singapore in 2006, and the first Asia-Pacific Symposium on EMC (APEMC) hosted in Singapore in 2008; and the ASEAN EMC Colloquium 2006; the USA NARTE EMC Certification Examination held in Singapore, firstly outside of USA; EMC workshop in 2009 and 2011, respectively; EMC Contest in 2010. The chapter has also sponsored international conferences technically and/or financially as well as IEEE Singapore student branches throughout the years.

The Singapore EMC chapter values and serves its members not only by continuously organizing various technical seminars, Distinguished Lecturers (DLs) talks, workshops, both of academia and industrial nature, and also organizing social events such that family day and annual dinners for chapter members and their family members: i.e., the first IEEE Region 10 EMC Chapter Chairs Retreat in Singapore in 2006; Chapter's Family Day in 2010 and 2011, respectively.

The chapter successfully won twice the **"Most-Improved-Chapter"** bestowed by the IEEE EMC Society in 2005 and 2007, respectively. In 2010, the Singapore EMC chapter is presented the **"Chapter-of-the-Year Award"** by the IEEE EMC Society which has more than 70 chapters globally then, and the **"Best Chapter in 2011 Award"** from IEEE Singapore Section which has 27 different society chapters in 2011.

Looking forward - the Singapore EMC Chapter will continue its humble but persistent commitment to serve its members, the societies and the communities.

The Past and Present Chairs of IEEE Singapore EMC Chapter

Prof. Kye Yak SEE
Chair, 2001 - 2004

Prof. Er-Ping LI
Chair, 2005 - 2007

The Late Dr. Ban Leong OOI
Chair, 2008

Dr. Richard Xian-Ke GAO
Chair, 2010 - 2011

Dr. Enxiao LIU
Chair, 2009 & 2012

IEEE Singapore EMC Chapter Website: *http://ewh.ieee.org/r10/singapore/emcs/*

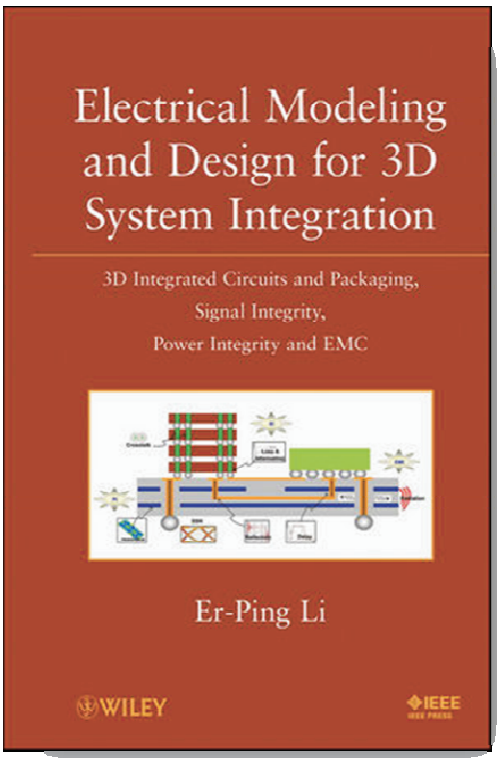
New Book

ELECTRICAL MODELING AND DESIGN FOR 3D SYSTEM INTEGRATION

3D Integrated Circuits , PCB and Packaging, Signal Integrity, Power Integrity and EMC

Published by Wiley-IEEE Press , New York, USA, 2012

New advanced methods for electromagnetic and electrical modeling and design for complex integrated electronic systems



This book sets forth tested and proven state-of-the-arts of electromagnetic and electrical modeling methodologies for analyzing signal/power integrity and electromagnetic compatibility (EMC) in large complex interconnects, multilayer packages, integrated circuits, and printed circuit boards. In addition to popular full-wave electromagnetic computational methods, the book presents new, efficient modeling methods, offering engineers, researchers, and students the most advanced tools for analyzing and designing large complex chip, package and systems.

It begins with a comprehensive review of the current modeling methodology, and then guide readers through: 1) the macromodeling technique; 2) the fast scattering-matrix method with novel boundary modeling technique; 3) two- and three-dimensional integral equation methods; 4) the physics-based algorithm --- for fast and efficient modeling of signal/power integrity and EMC in high-speed interconnects, and multilayer packages and printed circuit boards with multiple vias; and 5) the equivalent circuit modeling of through-silicon vias in 3D IC.

About the Author

Dr ER-PING LI is a Principal Scientist and Director of Electronics and Photonics Department at the Institute of High Performance Computing, A*STAR, Singapore. He also holds an appointment as Chair Professor at Zhejiang University, China. He is a Fellow of the IEEE and a Fellow of the Electromagnetics Academy. He has received numerous awards and honors in recognition of his professional work for the IEEE and other professional bodies. Dr. Li is a pioneer in the modeling and simulation for signal/power and EMC in integrated circuits and electronic systems packaging. He has chaired or spoken at numerous international conferences and universities, and has also served as editor to several IEEE Transactions.

Note: The author acknowledges the contribution to this book by Drs. Wei Xingchang, Liu Enxiao, Zhang Yaojiang, and Zaw Zaw Oo.

Order online at websites such as **Amazon** and **Wiley** for hardcopies, & **Skoob** for digital versions.

ISBN-10: 0470623462 **ISBN-13**: 978-0470623466 **Hardcover**: 384 pages
Publisher: Wiley-IEEE Press; 1st edition (April 3, 2012)

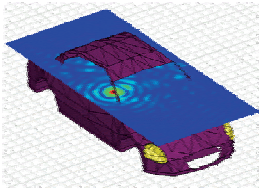
EMC RESEARCH GROUP AT A*STAR IHPC

The Electromagnetic Compatibility (EMC) group at the Institute of High Performance Computing (IHPC), A*STAR is devoted to explore and develop the advanced electrical and electromagnetic modeling, design and analysis algorithms and techniques for leading-edge applications in high-speed electronics, integrated circuits& their packaging systems, wireless communication, and bio-electromagnetic engineering. The EMC group strengthens its core capabilities through dedicated R&D, alliance and collaborations with leading research organizations and universities world-wide. It is also committed to collaborate and perform value-added R&D with international industrial companies.

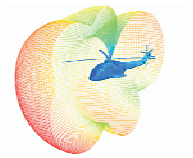
Core Competencies

EMC Modeling & Analysis for Large Platforms & Large-scale Problems

- Electromagnetic scattering & shielding effectiveness modeling
- EMI & electrostatic discharge
- Aircraft EMC analysis and design
- System level EMC



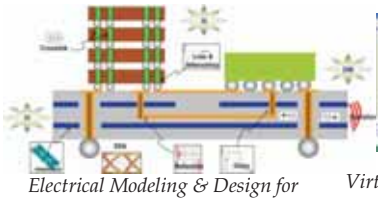
Simulation of automotive EMC



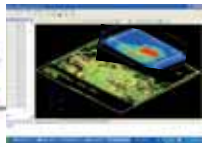
RCS of antenna on Aeroplane

Modeling & Design for PCB, 2D&3D-IC and System Package Integrations

- Electrical modeling of interconnects, packaging & 2D/3D IC
- Signal & power integrity
- PCB and system EMC
- Multi-physical analysis
- 3D IC floor planning and placement



Electrical Modeling & Design for 3D System Integration



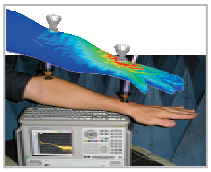
Virtual Lab tool developed for system-level SI/PI/EMC modeling

Bio-Electromagnetic Engineering

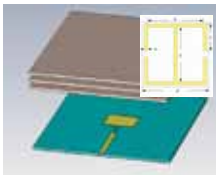
- EM radiation hazards analysis
- SAR (specific absorption rate) study
- Biomedical and microwave imaging

Communication EMC

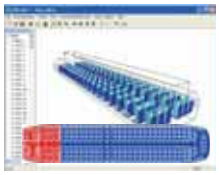
- Channel modeling for wireless body-area network
- Antenna modeling and design
- Radio frequency signal propagation simulation
- Far-field prediction based on near-field measurement



Effect of human body on signal propagation of antenna in wireless body area network (WBAN)



Meta-material antenna for wireless Communication



Modeling of wireless channel inside Aeroplane cabin

Characterization of new material for lightening protection

Contacts:

For Business Enquiries:

Ms Amy Foo
Industry Development Department
Tel: (+65)-64191248 Fax: (65)-64635176
Email: *amyfoo@ihpc.a-star.edu.sg*

For Technical Enquiries:

Dr. LIU En-Xiao
Electronics and Photonics Department
Tel: (+65)-64191524 Fax: (65)-64635176
Email: *liuex@ihpc.a-star.edu.sg*

A*STAR Institute of High Performance Computing,
1 Fusionopolis Way, #16-16 Connexis, Singapore 138632
Webpage: *http://www.ihpc.a-star.edu.sg/ep.php#rf*

NOTES

NOTES

NOTES

NOTES

NOTES

www.semc.cesi.cn

安全与电磁兼容
SAFETY & EMC

CN 11 – 3452/TM ISSN 1005–9776
Tel：010–84029073 Fax：010–64007812 E–mail：anhao@cesi.ac.cn

Reduce EMC Test Complexity

EMCenter RF Measurement System
Freestanding or Rackmount

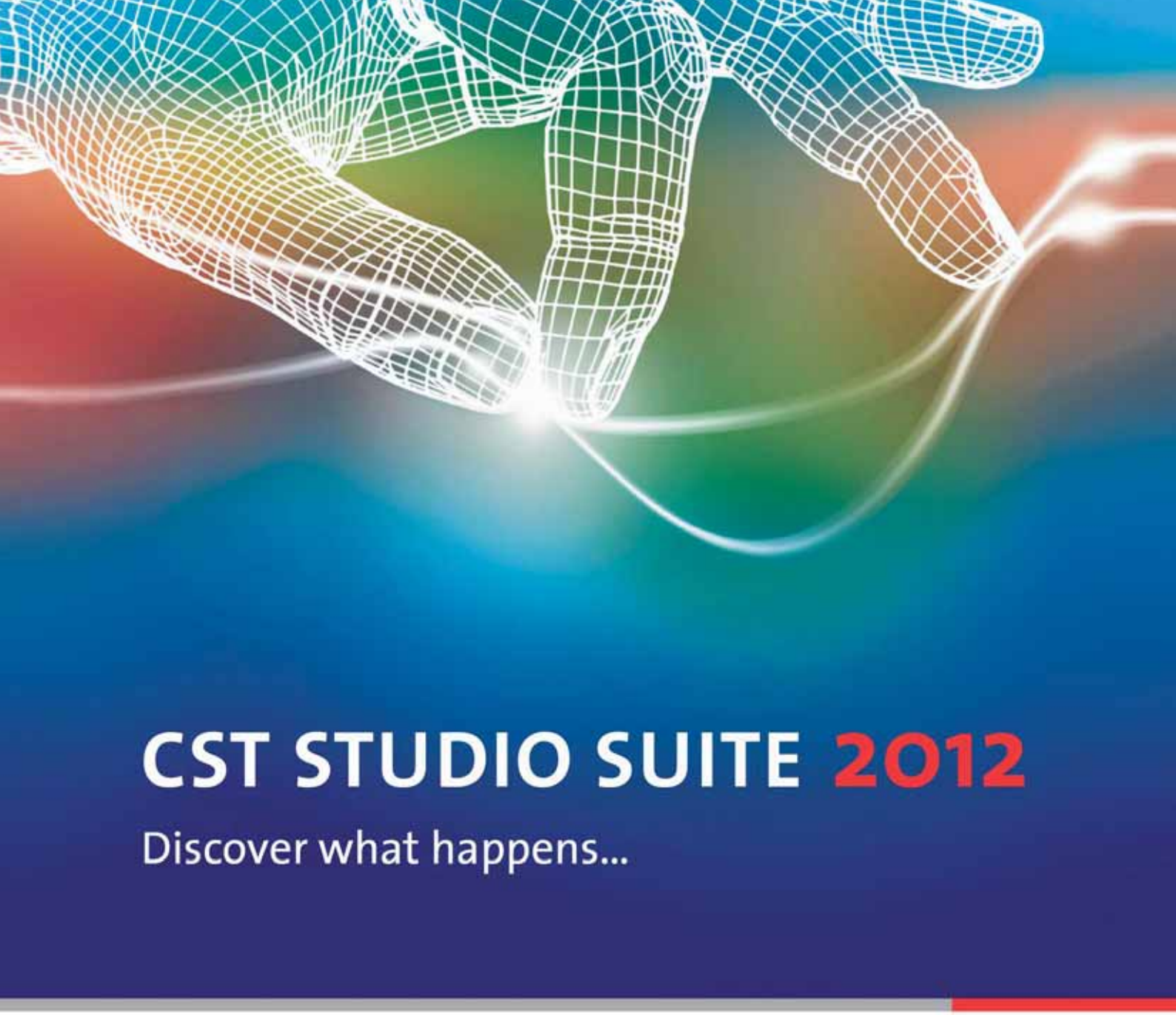
Visit us in Booth 9 & 10
Asia-Pacific EMC Symposium
Singapore, May 21 - 24, 2012

Enabling Your Success™

ETS·LINDGREN™
An **ESCO Technologies** Company

www.ets-lindgren.com

Singapore Office 65-6536-7078 • Singapore@ets-lindgren.com
Offices in the US, Brazil, Finland, UK, Germany, France, India, Japan, Singapore, China, Taiwan



CST STUDIO SUITE 2012

Discover what happens...

Making Sense of the Real World – System Level EM Simulation

Components don't exist in electromagnetic isolation. They influence their neighbors' performance. They are affected by the enclosure or structure around them. They are susceptible to outside influences. With System Assembly and Modeling, CST STUDIO SUITE 2012 helps optimize component as well as system performance.
Get the big picture of what's really going on. Ensure your product and components perform in the toughest of environments.

Choose CST STUDIO SUITE 2012 – complete technology for 3D EM.

CST

CHANGING THE STANDARDS