



## Chapter Chatter

*Todd Robinson, Associate Editor*

### Into the Cold, By Mike Violette

**T**he daffodils bend their faces skyward, but we remember winter...A thick sheet of sleet grips the ground and freezes wipers to windows. The winter has been brutish and, except for an occasional glimpse of Mother Sun, it is Yukon. Even when the snow stops falling there is no relief, the wind bending trees, rattling branches and the slick is thick and the wind can't knock the white stuff from the branches so it swoons mournfully through leaky windows. The dog won't stand outside long; but we all know that she's a city creature with a physique fit for couch, not a snow bank. This time of year harkens back to the last trip we made together to the Northern Territories in western Canada, flying in from DC, chasing the sun in the late afternoon to Seattle, jumping the border just north into Vancouver. There, we met with three local engineers—Tyler, Terry and Bill—who would accompany us north, and crowding our gear and persons into an eight seat puddle jumper out of Vancouver, we set down in a stiff cross wind onto the single runway at Prince George, an outpost town on the Trans-Canada/Yellowhead Highway. "The rental car will be parked at the terminal," the agent on the phone told me a few days before. "The keys are on the visor and the contract on the dash." OK. "Just fill it with gas when you're done and I'll send you a bill." Hmm. OK. We exited the gas-station-sized terminal, tended by a bored gate agent who was reading the local paper for the fourth time that day. In the lot, the cars all had electric plugs lolling out the front of their grills because if you don't plug in the crankcase heaters overnight, no battery and starter combination in the world will turn the frozen sludge smothering the crank. We unplugged the sedan and the reticent V8 turned over and we headed to the only hotel in town. Along the way, one of the veterans directed us to a quick pit stop: the local ABC retailer, where we loaded up on our own individual selections. "The nights are kinda long out here," Terry laughed, "and cold." "Ya, ya. And the men come out of woods in Spring to shower," Bill replied in a mock-Russian accent, and picked up his brown bag from the counter. "Let's go." West Coast Transmission, founded in 1949 by the late Frank McMahon, provided a few billion cubic feet of natural gas *per day* to the United States and the more populated East Coast cities of Canada. The pipeline, called the **big inch**\*, pushed the gaseous gold between remote pumping stations throughout the territory to hungry consumers south of the border. The stations were spaced at intervals of a few hours' drive. Our task was to make some measurements and take a look at a noise problem afflicting one of the stations. \*The "big inch" referred to pipes that were 20 to 48 inches in diameter. In the larger branches, a man could crouch and walk a half a mile inside before he'd have to stretch. Along the big inch were two kinds of pumping

stations featuring old technology and new, the first installed in the late 60s and the others, within the past few years. The first stop was at a large older station with pumps powered by V-12s, not your Jaguar sports-car variety, but freighter-sized boat engines adapted for the job and with cylinders large enough for a fit man. The machine's as big as a house. The newer stations were powered by jet turbines. If memory serves, the boat engines cranked out about 10,000 horsepower and the jet turbines roared 100,000 HP. The pump house with the V-12 had ten motors, all lined up in a row on a concrete deck. The room shook and the behemoths grumbled, thumping chest and rattling pelvis with enough motion to induce vertigo. To reach the spark plugs--two serving each piston--you needed to climb a ladder. Everything here was working fine. We made some measurements and shrugged our shoulders. The next pump station, powered by the turbine, was four hours away. We beat feet back to the hotel as the sun dove into the snowy plain, shot some pool and watched a few hours of national championship curling on the tube in the bar, a fascinating sport and the only one I know of that is played with a broom. The following morning we set out north of Prince George, driving through near-virgin forest and the only car on the road in either direction. Arriving at the earth-bound jet, whose insult was an uber-sonic scream that pierced ear plugs and ear muffs, we set up our antennas and spectrum analyzer and mapped the space, collecting some data and performing quick checks of the control instrumentation: what the heck were we doing here? Outside, we packed up our gear and puzzled, "Where's the problem?" Tyler shouted over the whine of the machine, still cutting through at 80 dB although we were sitting in the car parked outside the building. "No problems here! This is just for reference. But we've got some noise at the *next* pump house. We've got the big V-12s there." He turned the car around in the parking lot and we headed away from the scream. "You'll see. The control feedback loop signals are bouncing all over the place. And we just installed new systems in both places." Back at the first stop everything worked fine. "Remember the lower quad-station?" Bill asked. "The first place...yesterday afternoon?" Yup. "Well, this next station is exactly the same: same layout, same engines, same control, same everything—or it's supposed to be." We drove while Bill and Terry chatted about the curling match. "You owe five loonies, Bill. Saskatoon's number one. Again." I'll pay ya in beer when we get back," Terry laughed. By mid-afternoon we arrived at the third location. Indeed, it was the same building, a large weather-beaten steel-paneled building that thrummed. "Let's go inside." Engine 3 was down and a technician was crouching down inside the crankcase. We looked over and he peered through the cylinder casing. Huge wrenches were laid out on the ground. I kicked

one; it didn't move. Terry waved at the mechanic, who was wrestling with an enormous thrust-rod nut. "Take a look over here," Terry motioned us to the wiring that fired the dual spark plugs that sprouted from the enormous heads. Not much different than a ginormous lawn mower engine. The wiring was tied to the natural gas supply lines that fed injectors on the heads—these babies ate what they were pumping.

All was tied neatly back to an enormous distributor. Gray sensor cables were wrapped on the same array. We asked to see the sensor collection point. The shielded twisted pairs that carried sensor data were pulled neatly into the breakout box, same as the first place. "Look at the shields," Norm said. We all looked down. There was the problem. "Two different guys wired these systems." What did Norm see?

## Boston

A joint EMC and Power Electronics meeting was held on Tuesday, October 19, 2010 at EMC Corp in Hopkinton, MA. Nearly 20 members and guests attended the meeting. The speaker was Oliver Optiz of Wurth Electronics, Midcom Inc, a manufacturer of EMC and inductive components. The subject of the presentation was "Magnetics - Their Application in EMI and Power Electronics". The technical presentation covered new techniques for analyzing and solving radiated and conducted noise problems associated with today's complex board designs, as



*Oliver Optiz of Wurth Electronics with the Boston Chapter in October 2010.*

well as magnetic topics related to switch-mode power supplies. Specific topics covered were magnetic field basics, filtering and signals, insertion loss calculation, and filter topologies. For those who attended the presentation, Wurth Electronics provided a new design guide published by the company entitled, "Trilogy of Magnetics." The book can be reviewed via the following web link: [http://www.web/online.com/web/emc/produkte\\_4/Neue\\_Trilogie.php](http://www.web/online.com/web/emc/produkte_4/Neue_Trilogie.php)

## Chicago

Jerry Meyerhoff, Chapter Secretary, reports that the Chicago IEEE EMCS Chapter's Winter 2010 season started with its famous Oktoberfest event, wholly sponsored by ELITE Electronic Engineering in Downers Grove. Over 100 attendees enjoyed the hearty, traditional OktoberFest food and drink in the huge shielded room. Speaker Dr. William Radasky, IEEE Fellow and founder of Metatech, discussed High Power E-M Threats to the Power Distribution System. Dr. Radasky clearly and simply explained natural threats caused by solar emissions as well as man-made nuclear ionization. His analysis of the impact to the power grid and other electronic systems was compelling; particularly the photos of burned-out high voltage distribution power transformers and even insulators. It was comforting to learn that many of our traditional EMC analysis and mitigation techniques provide a good degree of protection if they are fully exercised.

Our November program was generously hosted at Shure Inc. in Niles, home to Programs Chair Tom Braxton and a new venue for us. Tom also invited the Audio Engineering Society Chicago Section and organized a complimentary pizza dinner sponsored by TEC-Rep.com which contributed to a great turnout of 85 people. Shure engineers Marty Reiling, Scott Brumm,



*Boston Chapter Chair Boris Schusterman (front left) presided at the October meeting.*



*Oliver Optiz of Wurth Electronics during his presentation to the Boston Chapter in October.*





*Chicago's OktoberFest Feast attracted 100 Chapter members to ELITE's shielded room.*



*Chicago Holiday Party event chair, Andrea Spellman (left), and member Louann Devine enjoy a joint turn at bocce bowling.*

Roger Grinnip and Mike Moffit spoke on "Audio in an RF World" sharing their real-world experiences in designing solutions for wireless microphone EMC issues such as the infamous "GSM Buzz". In one case-study the microphone housing structure was resonant at the interfering source frequency; thus illustrating the importance of a systems-level design approach.

Our annual December Holiday party at "Pinstripes" was again organized by

Programs Chair Andrea Spellman of Underwriters Laboratories and attracted over 30 participants. We enjoyed a spread of hearty flat-breads and veggies, Ray Klouda's famous Holiday Word Quiz and the popular bocce competition. Gift cards from a local electronic toy store were awarded to the top scoring bocce teams and the word game winners.

Treasurer Bob Hofmann organized our scholarship voting and happily an-

nounced a milestone, our 10th award winner, Cheng Zhang. He is a very qualified and deserving 4.0 EE Graduate Student at the Illinois Institute of Technology who is active in his IEEE Chapter and has industrial experience in RF design for cellular systems and particle accelerators.

We look forward to a busy 2011 led by our active board members, volunteers and commercial supporters.

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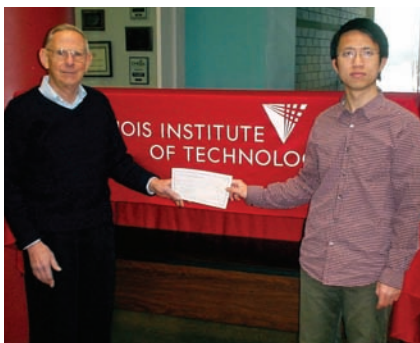
*Chicago's Tom Braxton (left) awards a speaker plaque to Bill Radasky at the OktoberFest.*



*In November, the Chicago Chapter held a joint meeting with AES at Shure Inc. with engineer Marty Reiling as speaker.*



*Chicago Chapter Chair Jack Black (center) checks Vickie Peter's Holiday Word Game entry at the Holiday Party.*



*Chicago Chapter Treasurer Bob Hofmann (left) awards the 10th scholarship to student Cheng Zhang.*

Our monthly programs will include an added special February Engineering Week demonstration at IIT and our 13th annual May MiniSymposium organized again by Frank Krozel of EIA. Please check our website [www.emcchicago.org](http://www.emcchicago.org) for more information.

## Croatia

Antonio Šarolić, Chapter Chair, reports that the IEEE EMC Croatia Chapter started the year 2010 with a new chair. Antonio Šarolić, PhD, Assistant Professor at the University of Split, picked up the chairman's gavel from Chapter founder and previous four-year chair, Ms. Vesna Roje.

Chapter activities in 2010 included a wide spectrum of events: technical, scientific, educational, public and social. Croatia's main yearly event, Symposium on Environmental Electromagnetic Compatibility, was held in September, in conjunction with the 18th International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2010). The conference was held in Split and on the beautiful Adriatic island of Brač. The scientific and technical part of the Environmental EMC Symposium included 14 presented papers from various aspects of EMC, and four tutorials given by renowned experts: Elya Joffe (K.T.M. Project Engineering), Professor Frank Leferink (Thales Nederland), Dr. Sergey V. Tkachenko (Otto-von-Guericke University) and Professor Dragan Poljak (University of Split). The overall number of presented papers at the SoftCOM conference was over 110!

Evenings at the Symposium were spent in a more relaxed atmosphere enjoying the Adriatic in late summer: restaurants and wine tasting in the picturesque small town Bol on the island Brač (once famous



*A focused audience at SoftCOM 2010 was evident by (in front row from left) Antonio Šarolić, Croatia Chapter Chair, Vesna Roje, and Dragan Poljak, all from the University of Split, Croatia. In the audience were Frank Leferink of Thales Nederland, Jacek Skrzypczynski from Wroclaw University of Technology, Elya Joffe of K.T.M. Project Engineering, and Sergey V. Tkachenko from Otto-von-Guericke University.*





*Zvonimir Šipuš (left), Head of the Department of Wireless Communications at the University of Zagreb, Croatia, and Antonio Šarolić, Croatia Chapter chair, from the University of Split, Croatia.*

as a small winemaking and fishermen city, now a tourist destination) and a social event with traditional dancing in the cellars of the emperor Diocletian's palace in Split, Croatia. The Chapter certainly looks forward to the 2011 SoftCOM conference that will also take place in Split and on one of the nearby Adriatic islands.



*Elya Joffe giving a tutorial on "EMC Requirements Elicitation" at the Symposium on Environmental EMC, held in conjunction with SoftCOM 2010.*

Earlier in the year, Chapter members took an active part at the Science Fair, a six-day public educational event, organizing educational presentations in the field of electromagnetics and radio communications. Posters and experiments were presented at the city center, trying to raise interest in engineering among



*Frank Leferink giving a tutorial on "Reverberation Chambers" at the Symposium on Environmental EMC, held in conjunction with SoftCOM 2010.*

the school children and general public. Throughout the year, some promotional activities were undertaken among students, seizing the fact that the Chapter Chair Antonio Šarolić also serves as the Student Branch Counselor of the IEEE SB Split. The benefits of IEEE and EMC Society membership were also promoted





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*A traditional dance at the cellars of the 1700 year old palace of the Roman emperor Diocletian, in Split, Croatia—the social event at SoftCOM 2010*

during the Career Day at the University of Split.

Finally, in the last part of the year 2010, the Chapter welcomed the new feature of Distinguished Lecturer online seminars, which were used as an excellent basis for a pair of technical meetings. Greetings are extended from the Croatia

Chapter to all EMC Society members. They are looking forward to see you at the EMC 2011 symposia!

### France

The Chapter sponsored once again the French, “Colloque International et

Exposition Sur la Compatibilité Électromagnétique” on April 7–9 in Limoges (France). This was the 15th edition of the Symposium and a great success with more than 100 presentations. The chairman of the IEEE France Section, Daniel Pasquet, offered an award for the two best student papers. The winners selected by the Scientific Committee were Fabien Adam and Denis Labrousse.

### Germany

During November 10–11, 2010, the IEEE Germany EMC Chapter hosted the First Annual European Workshop on Intentional Electromagnetic Interference at the University of the Federal Armed Forces Hamburg. Over 40 EMC professionals and scientists gathered at this meeting to listen to and discuss 16 presentations in the fields of IEMI sources, modelling, coupling, and



*Denis Labrousse is pictured receiving a symbolic cheque (which was materialized some time later) from André Berthon, chairman of the French Chapter, and the Chairman of the Symposium, Alain Reineix (from left to right).*



*Fabien Adam is shown receiving a symbolic cheque (which was materialized some time later) from André Berthon, chairman of the French Chapter, and the Chairman of the Symposium, Alain Reineix (from left to right).*



*German EMC Society Chapter members Stefan Dickmann and Markus Clemens listen with great interest to a presentation.*



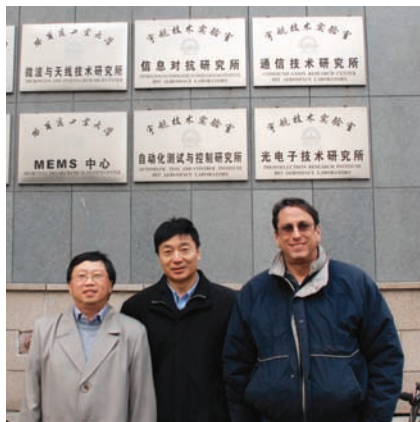
*German EMC Society Chapter members listen while Stefan Pottbast explains the susceptibility of generic IT-networks against IEMI attacks to the attendees of the First European Workshop on Intentional Electromagnetic Interference in Hamburg.*



protection. Coffee breaks and dinner provided many opportunities to further exchange thoughts and opinions within an informal atmosphere. The workshop also was a benefit for the IEEE: Three attendees of the workshop enjoyed this IEEE event so much that, as a result, they signed up to become new IEEE members.

## Harbin (China)

Two well-known IEEE EMC Society members, Professor Qiubo Ye and Mr. Mark Montrose, were invited to visit the IEEE Harbin EMC/MTT/AP joint Chapter from October 25 to November 1, 2010. Harbin is located in the North-eastern part of China. The chairman of the Harbin Chapter is Professor Qun Wu, who is with the department of Electronics and Communications Engineering, Harbin Institute of Technology (HIT). An English introduction about this university can be found in this link (<http://en.hit.edu.cn/about/profile.htm>).



*Professor Ye, Professor Wu and Mr. Montrose (from left) outside a building in HIT National University Science Park which has many research centers, including the Microwave and Antenna Research Center headed by Professor Wu.*



*Mr. Montrose (left) and Professor Wu are shown in front of HIT's main building.*



*Mark Montrose is shown giving a presentation to the Harbin EMC Chapter in HIT.*

Professor Ye was an invited guest professor at HIT.

During the visit, Professor Ye gave several presentations on "Time Domain Be-

haviors of Ultra-Wideband Antennas" and "Numerical Methods for Electromagnetic Scattering by Large Structures." Professor Ye is currently a Project Leader and

 An advertisement for Spira EMI products. It features a collage of technical drawings and photographs of various EMI/Environmental Connector-Seal Gaskets and Honeycomb Fan Filters. The drawings show different shapes and sizes of gaskets and filters, some with circular patterns and others with rectangular frames. The background is a dark, textured surface.
 

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*Professor Ye answers a question from the audience following his presentation.*



*Professor Ye and Mr. Montrose are seen in the HIT Museum of Astronautics and Aerospace in front of an array of rocket models.*

Research Scientist at Communications Research Centre and an Adjunct Professor of Carleton University, both located in Ottawa, the capital city of Canada. He is Chair of the IEEE EMC Society Standards Education and Training Committee (SETCom), Chair for the 2011 IASTED International Conference on Wireless Communications to be held in Vancouver from June 1–3, and General Chair for 2016 IEEE International Symposium on EMC to be held in Ottawa.

Mr. Montrose gave a series of presentations on “PCB EMC Compliance” and a number of EMC problems in the practical application of compliance. Mr. Mark Montrose is principle consultant of Montrose Compliance Services, Inc., a Senior Member of the IEEE and a

current member of the Board of Directors of the IEEE as Division VI Director. He is also a long-term past Board member of the IEEE EMC Society plus champion and first president of the IEEE Product Safety Engineering Society. He has presented numerous papers based on sophisticated research related to printed circuit boards in the field of EMC at international EMC symposiums and colloquiums worldwide. Their presentations attracted sizable audiences including students and teachers in microwave and EMC and other research fields. After each of their presentations, there was a period of time for questions and answers. The presenters always answered questions in detail and made sure the answers were

satisfactory. The audiences highly valued the opportunities to interact with these two world class experts. Both Professor Ye and Mr. Montrose were invited to tour the Microwave and Antenna Research Center headed by Professor Qun Wu in HIT and had nice discussions with Professor Wu’s graduate students on research topics of interest. Professor Ye and Mr. Montrose, accompanied by Professor Wu, visited the HIT Museum of Astronautics and Aerospace which was recently established.

During their stay in Harbin, they had opportunities to tour the city and its attractions and were also treated to different Chinese cuisines. Mark said that every meal was thoroughly enjoyable. Mr. Montrose also had a good time traveling around Harbin. Accompanied by some students of Professor Wu, he travelled to Songhua River, Center Avenue, Sophia Church, Dragon Tower and other attractions in Harbin. Even though the weather was extremely cold, he enjoyed the beautiful scenery and took many pictures. Market places provided delicacies such as hot chestnuts (sold in Center Avenue) and Russian chocolate.

## **Oregon and SW Washington**

Alee Langford, Chapter Vice-Chair, reports that the Oregon and SW Washington Chapter concluded the year with their annual Christmas social at Who Song and Larry’s on the Columbia River. As the parade of Christmas ships sailed along, the attendees enjoyed Mexican food and laughter that was brought upon by all the wonderful white elephant gifts. The Chapter would like to thank all attendees, and members of the Chapter, for making 2010 such a great year.



*Dave Britton (left) and Mark Briggs at the Oregon/SW Washington Chapter’s Winter Social.*





*Ken and CeCe Westby enjoying themselves at the traditional Oregon/SW Washington Winter Social.*



*Sidney Chan of the Oregon/SW Washington Chapter was 'banking' on getting a great gift from the white elephant gift exchange.*

As we welcome the New Year, plans are underway to confirm speakers for the monthly meetings. The first Chapter meeting will be February 16 with Bob Stern of Agilent. The topic is "Quality considerations in selecting a calibration supplier." The following month, we are pleased to announce that Bob Scully of NASA will be presenting on "EMI in Space." Meeting details and additional information can be found by visiting the Chapter website at <http://ewh.ieee.org/r6/oregon/emc/>

### **River Rock Valley (Illinois)**

Jamal Shafii, Chapter Chair, reports that they held two EMC meetings in 2010, in March and October.

Zhong Chen of ETS-Lindgren was the speaker for March EMC meeting. The meeting was held at the Technology Center of Rock Valley College in Rockford.

About 30 people attended the meeting. Zhong traveled from Austin, Texas for his presentation. He has chaired and spoken at the antennas and field probes workshops at the IEEE-EMC symposiums for the past several years.

Mr. Chen discussed two topics of importance for EMC testing: antennas and fields probes.

In addition to radiated emissions and immunity testing, EMC antennas are also used for site qualification testing and other applications such as exciting a reverberation chamber. Most EMC antennas are linearly polarized, such as log periodic, biconical antennas, and dipoles.

In most EMC applications, gain is interchangeable with directivity. Furthermore, gain also includes the mismatch factor between the antenna and its feed. VSWR, reflection coefficient, and return loss all describe the same physical phenomenon. Antenna factor (AF) is a function of antenna directivity, gain, VSWR and frequency. For a log periodic dipole antenna, the phase center of a log antenna moves from the back of the antenna boom to the front as frequencies go up. Thus, the measurement distance from the antenna to the device under test is unclear. It is often chosen at a fixed position as an approximation.

Unbalanced antennas have different responses depending upon which side is up when vertically polarized. This causes large measurement uncertainties. Baluns provide low impedance to differential current and high impedance to common mode current. For Biconical antennas, due to high VSWR at < 50 MHz, balun performance is important.

The speaker also discussed the calibration of different antennas, use of antennas for emission and immunity testing and site validation testing.

Field probes are broadband devices similar to RF power sensors. Isotropic probes consist of three orthogonal axes. Probes are designed to interact minimally with the environment.

The main components are: 1) Antenna elements which are resistively loaded, electrically short, and non-resonant, 2) Diode detector, and 3) C filtering where frequency information is lost.

For immunity measurements, we need to correctly size amplifiers for output power based on transmit antenna and test environment to confirm the spectral purity of the output signal. One needs to take modulation in mind as well and use



*Zhong Chen of ETS-Lindgren presented at the March meeting of the River Rock Valley Chapter.*

the correct probe orientation in respect to the antenna to avoid resonance.

Many factors affect probe calibration and applications including signal purities, fixtures, isotropicity, linearity, and test setups. Care must be taken during each step.

Many thanks go to the EMC Society for covering speaker expenses through the Angel Program!

The speaker for the October EMC Chapter meeting was Professor Veysel Demir from the Department of Electrical Engineering in Northern Illinois University in Dekalb. The title of his presentation was, "Simulation of Electromagnetic Fields: The Finite Difference Time Domain (FDTD) Method and its Applications." The meeting was held in Rock Valley College in Rockford, Illinois. There were about 35 attendees.

Dr. Demir first discussed the basic formulation of FDTD from Maxwell's Equations. He then talked about modeling passive and active lumped elements in FDTD, near field to far field transformation, absorbing boundary condition



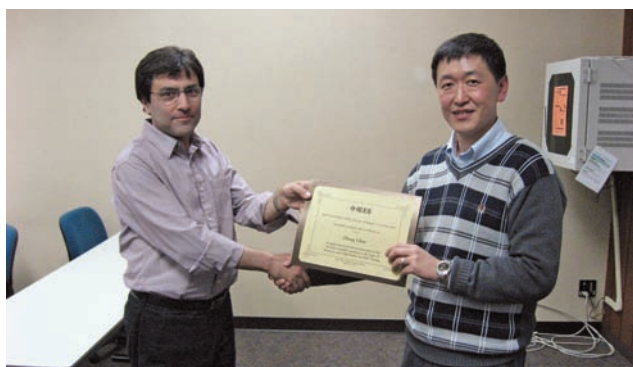
*The October speaker, Veysel Demir (right), received a certificate of appreciation from Larry Wachowiak, Vice President of the IEEE River Rock Valley Section.*



*Pictured are attendees during the Q&A session at the March River Rock Valley Chapter meeting.*



*Attendees at the River Rock Valley Chapter meeting lingered following the presentation and asked many questions of the speaker.*



*Speaker Zhong Chen (right) receives a certificate of appreciation from River Rock Valley Chapter Chair, Jamal Shafii.*



*The October meeting of the River Rock Valley Chapter attracted many members and guests.*



*It was a full house at the October meeting of the River Rock Valley EMC Chapter.*



*The River Rock Valley EMC Chapter October speaker, Veysel Demir.*

and scattering problems using FDTD. He illustrated some FDTD simulations such as scattering from dielectric spheres.

He then overviewed some ongoing applications of FDTD such as Earth/Ionosphere models in geophysics, wireless personal communications devices, phantom head validation, microwave detection of early stage breast cancer, and focusing plasmonic lens.

The full presentations can be found on our Section web site <http://www.ieee.org/rrvs>

### **Santa Clara Valley**

On December 14, 2010, the Santa Clara Valley (SCV) EMC Chapter held a joint meeting with the SCV Product Safety and Engineering Society Chapter. Professor Ji Chen, ECE Dept., University of Houston, gave a presentation entitled, "EMC/EMI Issues in Biomedical Research."

The interactions between electromagnetic signals and biomedical systems lead to safety considerations for medical devices and patients. In his talk,

Professor Chen presented some recent investigations on the EMC/EMI issues related to these scenarios. In particular, he discussed 1) safety evaluation for pregnant woman under walk-through metal detector, 2) thermal and temperature evaluation of pregnant woman models under MRI RF coil, 3) effects of implantable devices within human subject models under MRI coils, and 4) the interactions between vehicular mounted antenna and bystanders with implantable medical devices.





*Dr. Ji Chen of the University of Houston spoke to the Santa Clara Valley Chapter in December.*

Dr. Ji Chen received the Bachelor's degree from Huazhong University of Science and Technology, Wuhan, Hubei, China, the Master's degree from McMaster University, Hamilton, ON, Canada, in 1994, and the Ph.D. degree from the University of Illinois at Urbana-Champaign in 1998, all in electrical engineering. He is currently an Associate Professor with the Department of Electrical and Computer Engineering, University of Houston, Houston, Texas. Prior to joining the University of Houston, from 1998 to 2001, he was a Staff Engineer with Motorola Personal Communication Research Laboratories, Chicago, Illinois. Dr. Chen has received the outstanding teaching award and the outstanding junior faculty research award from the College of Engineering at the University of Houston. He is also the recipient of an ORISE fellowship in 2007. His research group also received the best student paper award at the IEEE EMC Symposium in 2005 and the best paper award from the IEEE APEMC conference in 2008.

On January 11, Dr. William A. Radasky, President and Managing Engineer of Metatech Corporation, IEEE Fel-



*Dr. William Radasky spoke to the Santa Clara Valley Chapter in January.*

low, P.E., spoke to the Santa Clara Valley Chapter regarding, "HEMP, IEMI and Severe Geomagnetic Storm Effects on Critical Infrastructures." Over the past 10 years there has been a growing awareness that the threat of high-altitude electromagnetic pulse (HEMP) from a nuclear detonation could be devastating to the commercial infrastructures of the United States, with special concern directed to the U.S. power grid. Interestingly, it has also been established that a severe geomagnetic storm from a solar event could also create significant damage to our power grid that could also take many years to repair. Finally, a new threat of intentional electromagnetic interference (IEMI) produced by electromagnetic weapons by criminals and terrorists raises a third specific electromagnetic threat.

Dr. Radasky's presentation briefly reviewed each of these threats and described their potential impact on the U.S. power grid. In addition, past work by the U.S. Congressional EMP Commission, the National Academy of Sciences and the International Electrotechnical Commission (IEC) was touched on. The talk closed with a brief summary of current actions being taken by the FERC, NERC and the U.S. Congress.

Dr. Radasky received his Ph.D. in Electrical Engineering from the University of California at Santa Barbara in 1981. He has worked on high power electromagnetics applications for more than 42 years. In 1984, he founded Metatech Corporation in California, which performs work for customers in government and industry. He has published over 400 reports, papers and articles dealing with electromagnetic environments, effects and protection during his career. He is Chairman of IEC SC 77C and IEEE EMC Society TC-5.

Dr. Radasky is very active in the field of EM standardization, and he received the Lord Kelvin Award from the IEC in 2004 for outstanding contributions to international standardization.

## Singapore

Richard Gao Xianke, Chair of IEEE EMC Singapore Chapter, reports that Dr. Dominique Lesselier from CNRS France, delivered two technical talks to the Chapter entitled, "On Low-Frequency Electromagnetic Scattering by Simple Bodies in Conductive Medium, and Extensions to Subsurface Probing" and "MUSIC-Type



*Professor Zhibang Chen, David from Dalbousie University Halifax, Canada, delivered a technical talk at the Institute of High Performance Computing of A\*STAR, Singapore, on 30 November 2010.*



*Participants listened attentively at Professor Madhavan Swaminathan's seminar on 15 December 2010.*

Imaging From Asymptotic Formulations Within the Full Maxwell System and Additional Examples." The presentations were made at the National University of Singapore, on 28 October and 01 November 2010, respectively. A total of 24 attendees (seven were IEEE members), participated the seminars.

Dr. Luk Arnaut from Imperial College, United Kingdom, delivered a series of four technical talks, "Electromagnetic Materials Modeling and Measurement," "Numerical and Stochastic Techniques for Modeling of Wave Propagation, Scattering and Radiation," and "Topics in Wireless Communication, Localization and Ranging." The talks were given at the Temasek Laboratories, NUS, and "Dynamic Random Fields & EM Reverberation Chamber with Applications to EMC Problems" at DSO, Science Park, respectively, during 22-24 November 2010. There were 71 participants for the four seminars (33 were IEEE members).

On 28 November 2010, the Singapore Chapter held a social event, "Chapter

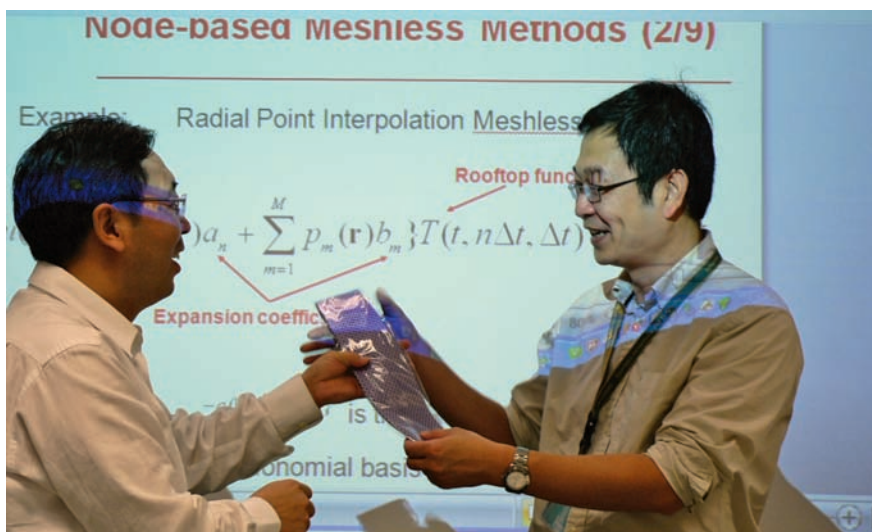




*Singapore Chapter committee members (from left to right), Dr. Junhong Deng, Dr. Richard Gao Xianke, Dr. Eng-Kee Chua, Dr. Chao-Fu Wang, and Mr. Keng Kok Khoo, gathered at Universal Studios.*



*Chapter members with their families participated the "Chapter's Family Day" at Universal Studios Singapore, Sentosa, on 28 November 2010.*



*Professor Zhizhang Chen, David (right) appreciated a speaker gift of a tie with IEEE and EMC logos presented by Professor Er-Ping Li from IHPC A\*STAR on behalf of the Singapore EMC Chapter.*

Family Day," for all Chapter members. The purpose was to provide a networking platform for all members thus enhance the relationship among members and to encourage members to spend their precious time with their families as an appreciation to the family's support. Further, the social event was held to celebrate the award of "Best Chapter for 2010" from the IEEE EMC Society. Thirteen Chapter members with 37 family guests joined the special social event which was held at Universal Studio Singapore, Sentosa. The thrilling, dazzling and fantastic attractions impressed all members, especially the kids, with an immersive entertainment experience.

On 29–30 November 2010, Professor Zhizhang Chen, David from Dalhousie University, Canada, delivered two technical talks entitled, "Method of Moments and Node-Based Meshless Method" and "Moving from Grid-based to Node-based Meshless Numerical Methods," respectively, with a total of 44 attendees, of which 19 were IEEE members.

On 6 December 2010, Professor Andreas Cangellaris from the University of Illinois at Urbana, USA, delivered an excellent talk entitled, "Electromagnetic Macromodeling – An Important Field Rich in Opportunities and Potential," at the Institute of High Performance Computing (IHPC) of A\*STAR, Singapore. There were a total of 27 attendees (10 were IEEE members).

On 7 December 2010, Professor Qi-Jun Zhang from Carleton University, Canada, delivered a technical seminar, "Advances in Modeling and Optimization Techniques for High-Frequency Electronic Design," at Nanyang Technological University (NTU), Singapore. A total of 15 attendees (eight were IEEE members) participated the seminar.

On 10 December 2010, Professor Jun Fan from the Missouri University of Science and Technology, USA, delivered a technical talk entitled, "Source Reconstruction for IC Radiated Emissions from Measurements," at IHPC. There were a total of 12 attendees of which eight were IEEE members.

On 15 December 2010, Professor Swaminathan Madhavan from the Georgia Institute of Technology, USA, delivered a technical talk at IHPC as well, entitled "Multi-Physics and Multi-Scale Modeling of Structures for 3D Microsystems." A total of 13 people attended the presentation, six of which were IEEE members.



On 17 December 2010, Professor H. Nakano from Hosei University, Japan, gave a technical talk entitled, “Extremely Low-profile Spiral Antenna with PEC and EBG Reflectors,” at NTU. There were a total of 24 attendees of which 15 were IEEE members. In conclusion, for the year of 2010, the Singapore Chapter organized a total of 37 distinguished lectures/technical seminars/workshops and three social events for Chapter members.

## **United Kingdom and Republic of Ireland**

Paul Duxbury, Chairman, reports that during the EMCUK conference and exhibition on 12–13 October 2010, the Chapter once again ran a series of practical and computer based demonstration

sessions akin to those at the International IEEE EMC Symposium. Well positioned in the exhibition hall, these informal table-top demonstrations showed a range of EMC concepts and principles, phenomena, effects, measurement methods, modeling approaches and simulation methods. As with previous years, there was a wide range of demonstrations including:

“The Principles of Operation and EMC Considerations for Railway Track Circuits” from Stuart Charles of E-Mead Consulting in which, with the aid of a model of a Depot Track Circuit, he showed the general methodology behind the EMC assessments that are undertaken to ensure that RSFs (Right Side Failures) and WSFs (Wrong Side Failures) are designed out of the system.

Alistair Duffy from De Montfort University, and a member of the IEEE EMC Society Board of Directors, gave a demonstration looking at IEEE STD 1597.1 on “Validation of Computational Electromagnetics Computer Modeling and Simulation” and how the Feature Selective Validation (FSV) method helps in quantifying comparative data to be used for validation.

Roy Ediss gave a few demonstrations over the two days including showing how analog and digital circuits behave in the presence of indirect electrostatic air discharge, and also showing how the near-field shielding ability of different materials varies depending on the properties of the material.

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