

# **Chapter Chatter**

## Dennis Lewis, Associate Editor

www.ith a new year, I reflect back on all of the great EMC Society events and activities of 2017 including our annual symposium in Washington, D.C. I'm amazed at the dedication of our volunteers. It takes a lot of time and effort to organize events. Our activities foster learning, knowledge sharing, networking with colleagues and build and strengthen friendships.

Welcome to our new EMC Society Distinguished Lecturers (DLs): Zhong Chen, Dr. Richard Xian-Ke Gao and Dr. Ihsan Erdin. And a

Benelux

The IEEE EMC Benelux Chapter was honored to have welcomed the IEEE EMC Society Distinguished Lecturer Kate Remley on the subject "An Introduction to Free Field Measurements of Wireless Devices in Reverberation Chambers." This lecture provided a general overview of what types of wireless tests can be done in reverberation chambers. About 30 attendees joined the event that took place on 18 October 2017 in the Hogeschool van Amsterdam, the Netherlands. Kate is an IEEE Fellow since 2012 and is leading the Metrology for Wireless Systems Project at NIST in Boulder, Colorado, USA. Her lecture was followed by the President of the IEEE Micro-

big thanks to the outgoing DLs Dr. Kate Remley, Dr. Farhad Rachidi and Dr. Chunfei Ye. The DL program is vital, creating a pool of speakers who cover a large variety of EMC related topics at our national and regional chapter meetings. You can read more about them and the DL program on page 78 of this issue.

I hope you will take advantage of the opportunities in 2018 to get involved and participate in our chapter events. Happy New Year!

wave Theory and Techniques Society (MTT-S), Dylan Williams, who shared a lecture with us on "VNA Uncertainties." Dylan also works for NIST in Boulder. Further discussions on their lectures and the beauty of Colorado were shared around a local beer and dinner following the meeting. Kate and Dylan: Thank you for visiting the Benelux EMC Chapter!

## ation Chambers



Kate Remley, IEEE EMC Society Distinguished Lecturer, gave a presentation to the Benelux EMC Chapter.



There were several attendees for the Benelux EMC Chapter meeting held at the Hogeschool van Amsterdam in October.



Dylan Williams, President of the IEEE Microwave Theory and Techniques Society, also gave a presentation to the Benelux EMC Chapter.



The Benelux EMC Chapter officers hosted a nice dinner in Amsterdam for the speakers following the Chapter meeting.



Germany EMC Chapter Chair Christian Schuster (left) welcomes Dr. Kate Remley to the Hamburg University of Technology.



The IEEE CLAS TECH event in Los Angeles featured some big name speakers on hot topics, including Professor Gabriel Rebeiz of the University of California at San Diego who presented "Low Cost Phased-Arrays for Ku- and Ka-Band SATCOM and 5G."

## Germany

The IEEE EMC Society Distinguished Lecturer talks at the Technical University of Munich (TUM) and Hamburg University of Technology (TUHH) are always popular. On October 13, (in Munich) and October 17, (in Hamburg) Dr. Kate A. Remley (NIST, Metrology for Wireless Systems Group) gave a lecture about "Precise Measurements for Millimeter-wave 5G Wireless Technologies." Both events were organized within the IEEE Distinguished Lecturer (DL) program and hosted by the German EMC Chapter. More than 30 guests from industry and academia participated in each of the talks and learned about the technical challenges that arise with millimeterwave frequencies and wide modulation bandwidths. Dr. Remley discussed calibration and measurement techniques that allow correction of millimeter-wave modulated-signal measurements. She also showed that traditional assumptions at

microwave frequencies might not be adequate at millimeter-wave frequencies. During her DL travel Dr. Remley was accompanied by Dylan Williams (NIST, IEEE MTT-S President). A dinner in Hamburg provided further opportunities for local IEEE members (from TUHH A. Jacob, H.-D. Brüns, and C. Schuster) to discuss technical questions related to wireless systems.

## **Los Angeles**

The Los Angeles EMC Chapter participated in a full-day annual event organized by the IEEE Coastal Los Angeles Section (CLAS). The event, titled CLAS TECH, featured speakers from the EMC, Antennas and Propagation, and Microwave Theory and Techniques Chapters who addressed Antenna and Microwave technology. A tabletop exhibition complemented the two-track technical program of five sessions each. Over 200

people attended this year's CLAS TECH event held at the Proud Bird in Los Angeles on Friday, October 20. Our EMC speaker was Zhong Chen of ETS-Lindgren who presented "Time Domain Measurements for Test Site Validation above 1 GHz: Implications of Site VSWR Measurement Uncertainties on Radiated Emissions Measurements". Zhong also provided a demo of the time domain measurement technique in the exhibit area so attendees could see in real time the efficiency and time saving results of time domain measurements for EMC test site validation. An extensive lunch served in the exhibit area provided good food and good networking opportunities for engineers and exhibitors. Hats off to the CLAS TECH steering committee, especially General Chair Charlie Jackson, Technical Program Chair Brian Williams, and Exhibition Chair Bryan Takamiya whose tremendous efforts resulted in a very successful event.



CLAS TECH is a full-day event so lunch was eagerly anticipated after two excellent morning sessions. The two-track program featured speakers on antenna and microwave technology. Lunch was held in the exhibit area.



Speaker Zhong Chen (left) of ETS-Lindgren represented the EMC Society in the afternoon CLAS TECH sessions. Dan Slater stopped by to see Zhong's time domain measurement demo following his presentation on this topic.



CLAS TECH was held at the Proud Bird. The Proud Bird opened in 1967 as a salute to achievements in aviation, offering a front-row view of planes approaching LAX for landing. The site features many historic planes, which Los Angeles EMC Chapter Chair Ray Adams (left) of Boeing toured with speaker Zhong Chen following the event.



Elya Joffe, past Distinguished Lecturer of the IEEE EMC Society, presented at the  $\cap$ EC 2017 conference in Niš, Serbia on August 30-September 1.

## **Montenegro**

∩EC participants and IEEE EMC Society members attending ∩EC 2017 used this opportunity to build on existing projects and partnerships, and to start new ones. In this way ∩EC achieved its goal, and benefitted not only the universities and institutions, but the scientific society as well. This conference might not be among the greatest and most famous, but it is still growing every second year, and conference papers and scientific contributions progress in their quality. You may also enjoy social events during this conference, warm and sunny September weather in Niš, wonderful foods and national dances. We are grateful to the participants and guests for their contributions and efforts to attend this year. The ∩EC Organizing Committee invites you also to join us for the next **\Omega EC** Conference in 2019! Updated information may be found on the conference web site: http://pes.elfak.rs.

#### Nanjing

The Joint Nanjing Chapter cosponsored technically the 2017 Asia-Pacific Electro-



The poster sessions at the  $\cap$ EC 2017 conference provided a great opportunity to interact personally with the authors.



Attendees of the  $\cap EC$  2017 conference toured one of the oldest hydropower plants in Serbia.



Participants of the ∩EC 2017 conference are shown in front of the Faculty of Electronic Engineering of Niš.





The 2017 Asia-Pacific Electromagnetic Week (APEMW2017) opening ceremony was well attended on October 19 in Xi'an, China.

A panorama view of the APEMW2017 Opening Ceremony.

magnetic Week (APEMW2017). The conference was held successfully on October 19 in Xi'an, China. APEMW2017 was comprised of the 2017 Conference on Electromagnetic Compatibility (AP-EMC'2017), 2017 National Conference on Antennas (NCANT2017) and 2017 Asia-Pacific Conference on Antennas and Propagation (APCAP2017). It was technically co-sponsored by IEEE AP-S, Chinese Institute of Electronics (CIE) and IEEE AP-MTT-EMC Joint Nanjing Chapter.

APEMW2017 had its grand opening ceremony hosted by APEMW2017 General Co-Chair Professor Wei Hong from Southeast University. APEMW2017 General Co-Chair, Member of Chinese Academy of Engineering, Professor Baoyan Duan from Xidian University, President Elect of AP-S, Professor Weng Cho Chew from Purdue University, and others addressed the audience during the opening ceremony. Then, General Chair of AP-EMC'2017. Professor Erping Li from Zhejiang University, General Chair of APCAP2017 Professor Zhining Chen from National University of Singapore, and General Chair of NCANT2017 Professor Shuxi Gong from Xidian University delivered welcome speeches. Furthermore, IEEE Fellow Professor James L. Drewniak from the Missouri University of Science and Technology and the General Designer of the first Chinese Mars exploration, Dr. Rongqiao Zhang, made their brilliant keynote presentations at the opening ceremony.

In this great event, 129 oral sessions and eight poster sessions were arranged; there were more than 1,200 presentations delivered including 13 special sessions and 136 invited talks, covering relevant topics such as antennas, propagation as well as electromagnetic compatibility, and their latest applications. APEMW2017 was a grand gathering that has gained great attention and support from academia and industry.

The 2017 Conference on Electromagnetic Compatibility (AP-EMC'2017) was organized as a special track of 2017 Asia-Pacific Electromagnetic Week. The conference is an international forum for the exchange of information on the progress and recent advancements in the research and development of electromagnetic compatibility. More than 100 papers were submitted to AP-EMC'2017 and 81 papers were accepted for presentation at the conference. Also, three plenary speeches and 25 invited talks were scheduled to describe the latest technological developments in the Electromagnetic Compatibility area during the conference. The Best Student Paper Contest Session was organized to encourage "new blood" to show innovation which was also one of the underlying tenets of the conference. A total of 21 papers were submitted to the AP-EMC'2017 Best Student Paper Contest; eight papers were shortlisted for the final competition. Finally, four papers won the Best Student Paper Award.

## Pittsburgh

The joint Pittsburgh EMC Society Chapter and Power & Energy/Industry Applications Chapters organized a meeting on Thursday, September 7, 2017 at the Westinghouse Headquarters, Cranberry, Pennsylvania. Michael Oliver, IEEE EMC Chapter Chair and David Vaglia, Power & Energy/Industry



Student authors gathered for a photo celebrating the Best Student Paper Award Winners.



Pittsburgh EMC Chapter Chair Mike Oliver (left) of MAJR Products presented a certificate of appreciation to speaker Steve Ferguson of Washington Labs.



The audience is shown at the Joint Pittsburgh EMC Society Chapter and Power & Energy/Industry Applications Chapter meeting on Thursday, September 7, 2017.

Applications Past Chapter Chair, hosted the meeting with 19 persons in attendance. The meeting started with a social/dinner prior to a technical presentation. We had the privilege of having Steve Ferguson as our technical speaker; Steve is an Executive V.P. at Washington Laboratories, Ltd (WLL) and has been working in the compliance test arena for over 35 years at test laboratories and manufacturing companies designing products, developing procedures and performing tests and advising developers on routes and techniques for attaining product compliance. He presents various courses on EMI/EMC compliance including EMC for Nuclear Power Facilities, Architectural Shielding and a hands-on course MIL-STD-461 testing at the WLL facility in Maryland and on-site for multiple government and industrial clients. His work also includes EMC and Safety evaluations for commercial, military and medical devices and training of hundreds of personnel on test and evaluation techniques. He is a member of the TR-102323 Working Group, supporting preparation of Revision 4 and was the Vice-chair for

EMCS+SIPI 2017 – the IEEE EMC Society Symposium for 2017 in Washington DC.

Prior to the technical presentation, Dave Vaglia discussed facility safety, fire exits, and future IEEE meetings. Then, Mike Oliver introduced Steve Ferguson. Steve presented "Reverse Engineering - EMC Equipment Qualification Pitfalls." He explained that reverse engineering is used throughout the electronics industry as a means to maintain form, fit and function compatibility for updated equipment with many applications. Understanding the EMC design presents a complex problem as part of the reverse engineering process - how did the original design attain compatibility? Design documentation may provide EMC control components but seldom defines structural details contributing to control, so the reverse engineering lacks adequate information. This presentation explored the EMC design process and the major effects of seemingly benign attributes from component selection, circuit board and wiring layout and EMC control attained by design and incidental (parasitic) elements. The presentation goal was to provide a basic introduction on Electromagnetic Compatibility design techniques that need consideration as an integral part of reverse engineering.

## Seattle

The Seattle EMC Chapter, together with the joint Seattle AP/MTT/ED Chapter and joint Seattle VTS/ComSoc Chapter, hosted a oneday seminar on Friday, October 6, 2017. The event was the Seattle Section's celebration of "IEEE Day" which celebrates the first time in history when engineers worldwide and IEEE members gathered to share their technical ideas in 1884. IEEE Day is officially October 3. The seminar program titled, "Smart Antennas for IoT and 5G: Recent Advances for Commercial and Aerospace Applications", was held at the Museum of Flight in Seattle. Over 70 IEEE members and guests attended the program, including IEEE Seattle Section Chair Alon Newton of Microsoft and IEEE Seattle EMC Chapter



The dinner buffet at the Pittsburgh Joint Chapter meeting held at Westinghouse Headquarters in Cranberry, Pennsylvania.



IEEE Seattle Section Chair, Alon Newton (left) and Membership Chair Joe Decuir welcomed attendees to the "Smart Antennas" seminar on October 6, 2017. The event was the Section's celebration of "IEEE Day."



The call for papers for the 2018 IEEE Symposium on EMC+SIPI in Long Beach and In Compliance magazine were available for Seattle Section members to pick up at the seminar.



Over 70 people attended the full-day seminar "Smart Antennas for IoT and 5G: Recent Advances for Commercial and Aerospace Applications" held at the Museum of Flight in Seattle.



Tabletop exhibitor Gabe Alcala (left) of Advanced Test Equipment Rentals visited with Ian King (center) of AT&T and Paul Kolesnikoff (newly retired from Ball Aerospace) during the lunch break at the Seattle seminar.



Tabletop exhibitor Robert Tozier of CKC Labs could not resist the yummy desserts provided during the "Smart Antennas" seminar in Seattle.



Keynote Speaker Professor Constantine Balanis (far right) of Arizona State University (ASU) was happy to sign his books brought by some of the attendees to the Seattle seminar.



Speakers at the Seattle seminar included (seated from left) Pieter Abrie from Ampsa, Constantine Balanis of ASU, Anil Kumar of Boeing, and Jari Vikstedt of ETS-Lindgren. In the back row is Seattle EMC Chapter Chair Dennis Lewis (left) of Boeing and Alon Newton of Microsoft.



Max Smoot (center) of Kymeta was the lucky raffle prizewinner of the book Advanced Engineering Electromagnetics by Professor Balanis. He is shown with the author (left) and Seattle EMC Chapter Chair Dennis Lewis.



Randy Clark of CKC Labs brought his daughter, Katherine, to the "Smart Antennas" seminar in Seattle; she is interested in engineering and following in her father's footsteps.



Following the seminar, attendees could tour the exhibits at the Museum of Flight in Seattle at no charge. Speaker Jari Vikstedt got into the aviation spirit at the famous "Red Barn" exhibition.



A dinner was held for the speakers and Seattle EMC Chapter and Section officers who supported the "Smart Antennas" seminar. Constantine Balanis enjoyed visiting with Dennis Whetten (right) of Boeing whose father was a Ph.D. student of Professor Balanis.



Tom Sertic (left) of CPI and Leo Smale of Lionheart Northwest enjoyed dinner at the Crab Pot restaurant on the Seattle waterfront following the seminar. Leo is the secretary/treasurer of the Seattle EMC Chapter.

the demand for<br/>increases, the<br/>sidered for mobile platforms such as auto-<br/>mobiles, cellular phones (mobile units), and<br/>laptops. Smart antennas integrate many<br/>technologies, including antennas, digital<br/>signal processing, communications and<br/>networks. The advancement and integra-<br/>tion of the characteristics of each of these<br/>areas is critical to the efficiency and per-<br/>formance of a communication system<br/>channel, as measured by Bit-Error-Rate

Chair, Dennis Lewis of Boeing, who each provided an update on the current and future activities of the Seattle Section and EMC Society, respectively.

The seminar's technical program began with the keynote presentation by Professor Constantine Balanis of Arizona State University. He presented "Smart Antennas: Technology Integrating Antennas, DSP, Communications and Networks." Professor Balanis noted that as the demand for mobile communications increases, the need for improved capacity, greater coverage and higher transmission quality rises. Therefore, a more efficient use of the radio spectrum is required. He showed how smart antenna systems are capable of efficiently utilizing the radio spectrum, and their promise for an effective solution to meet the desired performance demands in network and communication systems. Following lunch, our next speaker was Jari Vikstedt of ETS-Lindgren who presented "Test Challenges of Smart Antenna Systems." Mr. Vikstedt advised how the proliferation of wireless technologies into every corner of our lives, starting with traditional cellular and wireless LAN technologies and leading to the impending evolution of connected cars and the "Internet of Things," all require the use of one common asset - bandwidth. While the traditional approach to added bandwidth is simply to use more RF spectrum, the availability of spectrum, especially at frequencies compatible with most of today's applications, is severely limited. Technologies continue to evolve to make better utilization of the available bandwidth, including MIMO, beam forming, spectrum sharing and reuse, etc. Mr. Vikstedt pointed out that the added complexity of these "smart" antenna systems carries over into the complexity of trying to test radios using these technologies. Smart antenna systems that adapt to their environment are not likely to perform the same way in a traditional laboratory test as they would in the real world. Thus, the laboratory test methodologies must advance to keep up with these innovations to be able to determine the expected over-the-air performance of these devices without requiring an unlimited number of test cases. This presentation provided an overview on the evolving 5G and mmWave technologies and the resulting dramatic changes to the wireless industry that will affect the way all RF and EMC testing of devices is performed.

Given that the seminar was held at the Museum of Flight, it was fitting to have Anil Kumar of Boeing present the topic "The Wireless Aircraft Cabin – 60 GHz." Mr. Kumar's presentation reviewed the recent results on the measurements of 60 GHz RF signals in an aircraft cabin to support broadband wireless applications. The viability of mmWave technology on aircraft with some specific applications were discussed and established. He showed the advantages of adopting a 60 GHz band wireless technology (WiGiG) over the Wi-Fi LANs in the lower frequencies. Mr. Kumar concluded his presentation with a thought provoking discussion on the outstanding technical challenges to support high throughput at low latency.

It was special to have three outstanding speakers on the technical program. Since 1983, speaker Constantine A. Balanis has been with the School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ, where he is Regents' Professor. He received the BSEE degree from Virginia Tech, Blacksburg, VA; the MEE degree from the University of Virginia, Charlottesville, VA; and the Ph.D. degree in Electrical Engineering from Ohio State University, Columbus, OH. Prior to joining ASU, he was with NASA Langley Research Center, in Hampton, VA. His research interests are in computational electromagnetics, flexible antennas and high impedance surfaces, smart antennas, and multipath propagation. A Life Fellow of the IEEE, he has received numerous awards throughout his career. Perhaps he is best known as the author of Antenna Theory: Analysis and Design (Wiley, 2015, 2005, 1997, 1982), Advanced Engineering Electromagnetics (Wiley, 2012, 1989) and Introduction to Smart Antennas (Morgan and Claypool, 2007). In fact, many attendees brought his books to the seminar. Professor Balanis was happy to sign them! He also donated one of his books as a raffle prize at the end of the seminar.

Speaker Jari Vikstedt is the Manager, Wireless Solutions for ETS-Lindgren in Cedar Park, Texas. He has over 20 years of experience with ETS-Lindgren in developing and testing RF test solutions for both EMC and Wireless applications. Mr. Vikstedt and the other engineers at ETS-Lindgren are active technical contributors to the leading wireless industry organizations, including the CTIA, 3GPP, IEEE and the Wi-Fi Alliance®. Recently Mr. Vikstedt has devoted his expertise to the development of CTIA and 3GPP Over-The-Air (OTA) testing solutions as well as developing innovative 5G OTA test solutions. He holds a BSEE degree in RF Engineering from the Turku University of Technology, Finland.

Speaker Anil Kumar is a subject matter expert in RF and signal processing with focus on wireless and satellite communications on Boeing commercial and military platforms. He is the Chief Architect of Networks & Communication Systems with the Cabin & Networks group. He was responsible in obtaining global spectrum licenses to operate wireless systems on board aircraft. As a lead architect on the BCA Flyaway RFID initiative, he has developed a scalable solution to connect aircraft parts to the network. He is currently working on conformal SATCOM antenna systems and mmWave technology applications on BCA platforms. Mr. Kumar is a Boeing Technical Fellow and a member of IEEE Communications Society. He holds a Master's degree from the Indian Institute of Technology, Delhi, in Communications and Radar engineering.

Many thanks to the tabletop exhibitors who participated in this great event, including Advanced Test Equipment Rentals, CST, CKC Laboratories, Element Materials Technology, EMSCAN, ETS-Lindgren, Lionheart Northwest and Pearson Electronics. The IEEE Seattle EMC Chapter appreciates your support!

## **Santa Clara Valley**

The IEEE Santa Clara Valley EMC Chapter hosted its 2017 Mini-Symposium on October 12. The event was held at the Biltmore hotel in Santa Clara, strategically chosen to facilitate people attending given its central location in the heart of the Silicon Valley. The event featured two very distinguished speakers: Dr. Todd Hubing and Dr. Jun Fan.

During the morning session Dr. Hubing, Michelin Endowed Chair in Vehicle Electronic Systems Integration at the University of Clemson, enlightened the audience with a very captivating presentation on common printed circuit board error design that cause products to fail worldwide regulatory EMC requirements. He outlined seven general categories of mistakes and dwelled extensively on practical examples leaving the audience with an increased awareness of the steps necessary to take in order to prevent all these disastrous design oversights.

On the other hand, during the afternoon session, Dr. Fan, Professor of Electrical and Computer Engineering and Director of the EMC Laboratory at the Missouri University of Science and Technology, guided the audience through several interesting topics related to Signal Integrity. He discussed issues for designs targeting 56Gbps and



The IEEE EMC Santa Clara Valley Chapter hosted its 2017 Mini-Symposium on October 12. Chapter officers Giuseppe Selli of Cisco Systems and Caroline Chan of Lockheed Martin welcomed attendees at the registration table.



The Mini-Symposium technical program also included a second distinguished lecturer, Professor Jun Fan of the Missouri University of Science and Technology.



The Mini-Symposium was held at the Biltmore hotel in Santa Clara. Professor Todd Hubing of Clemson University was a distinguished lecturer on the technical program.



Santa Clara Valley EMC Chapter Chair, Giuseppe Selli (left), presented a certificate of appreciation to Gold Sponsor Brendon Berg of The EMC Shop.



Gold Sponsor Tom Eichelberger (right) of AR RF/Microwave also received a certificate of appreciation.



Giuseppe Selli presented Gold Sponsor Dan Turgeon (left) of Trescal with a certificate of appreciation.



Kathy Ellam (left) of Altamont Technical Services was a proud Gold Sponsor of the successful Santa Clara Valley Mini-Symposium.



Giuseppe Selli presented Gold Sponsor Erika Bisgard (left) of Pearson Electronics with a certificate of appreciation.



Santa Clara Valley EMC Chapter Treasurer Caroline Chan promoted attendance at the 2018 Joint IEEE EMC and APEMC Symposium to be held over May 14-17 in Singapore.



Evangelos (Angelo) Tonas, retired TRW, former Santa Clara Valley EMC Chapter Chair, enjoyed attending the Santa Clara Valley Mini-Symposium.



Over 70 people attended the first-class technical program presented at the Santa Clara Valley EMC Chapter's Mini-Symposium on October 12.



Exhibitors provided many interesting products and services for attendees to check out at the Santa Clara Valley Mini-Symposium.



The Santa Clara Valley EMC Chapter recognized Yoshi Fukawa of Tech Dream (Toyo) as a Platinum Sponsor. He enjoyed the great dessert served after lunch!



Lunch was provided in the exhibition area at the Santa Clara Valley Mini-Symposium so attendees could network with the many exhibitors at the event.



Platinum Sponsor Gabe Alcala (left) of Advanced Test Equipment Rentals received a certificate of appreciation from Giuseppe Selli (center) and Caroline Chan.



On October 19, the SE Michigan EMC Chapter meeting was hosted by Robert Bosch Inc. and sponsored by Teledyne LeCroy. Joanna McLellan (left) and Lora Schulwitz attended the meeting.



Attendees at the October SE Michigan Chapter meeting enjoyed a fun evening activity titled "EMC Maker: Antenna Challenge."



A diagram created for the "EMC Maker: Antenna Challenge" organized by the SE Michigan EMC Chapter.



Each antenna team was provided with wire, duct tape, hot glue guns, small tools, aluminum foil and PVC tubing to create a novel antenna.



Kimball Williams (left) thanked Candace and John Suriano for organizing the interactive meeting on October 19, 2017.



John Suriano (far left) was impressed with the antenna team who met the challenge of receiving signals on both 150 MHz and 800 MHz in the horizontal and vertical polarizations.

beyond, such as printed circuit board loss characterization, PAM4 signaling, power supply induced jitter and high memory bandwidth channel analysis. His presentation was at the same time a very good introduction to many in the audience as well as a source of great insight for those who were at a more expert level as the industry gets ready to deal with such high speeds.

During the session breaks, lunch and the evening reception, the attendees were also served food and beverages and given the opportunity to network. They discussed the topics of the sessions and visited the approximately 25 exhibitors of test, simulation and measurement products and services, which were also an integral part of the Mini-Symposium. Several raffles were held with prizes generously provided by some of the exhibitors as well as the Santa Clara EMC Chapter.

## **Southeastern Michigan**

The IEEE EMC Southeastern Michigan Chapter eagerly awaits the annual Rohde and Schwarz Octoberfest event each September! This year on September 28, it was a great event! We watched oscilloscope waterfalls with Alyssa Harder, and heard her tales of fun with old scopes. Her basement is full of old scopes! They have many backward compatible programs on the new scopes; some of the crowd was very thankful, especially as they told stories of old systems labeled, 'Do not upgrade!' cluttering labs!

Bill Wangard held down the EMI receiver/ spectrum analyzer, corner. He explained the benefits of pre-selection, time domain scan, and real-time spectrum analysis. The main benefit of the time domain scan is speed, and this was demonstrated. The lesser known benefit is the ability to capture intermittent signals - greatly increasing the confidence in properly characterizing the spectrum. He demonstrated the value of pre-selection showing spurious signals appearing in the spectrum when pre-selection was off. Bill explained that the traditional spectrum analyzer user interface requires the user to compute the necessary number of points as well as the sweep time depending on the standard. EMC receivers allow for the direct input of dwell time and abstract the number of points calculation reducing the opportunity for error.

Scott Niemic held up the last corner, explaining how a two port sixteen thousand dollar network analyzer can fulfill Ford test requirements. Scott's corner



More than 100 attendees from 19 universities participated in the Summer Program held at Yuan Ze University, Taoyuan City, from August 21 to 25, 2017.



The Turkey Joint AP/MTT/EMC/ED Chapter has continued activities with a Distinguished Lecturer Short Course by Dr. Sudhakar Rao, followed by an active role in the Fourth International EMC Turkiye Conference (24 September 2017).



An opening speech for the 2017 EM Education Initiative Summer Program was delivered by Rong-Zong Liu, the Chairman of the Board of the Chinese Microwave Association. The Taipei EMC Chapter organized the event.

attracted the most attention. Stories were swapped about the old days when network analyzers were used to categorize the components and discover their impedance versus frequency characteristics. It was a fun night, the brats and pretzels were amazing! Thanks Rohde and Schwarz!

On October 19, our EMC Chapter meeting was hosted by Robert Bosch Inc. and sponsored by Teledyne LeCroy for a fun evening on "EMC Maker: Antenna Challenge." Candace and John Suriano lead the group of 48 members and guests and divided everyone into five teams. They provided each team with wire, duct tape, hot glue guns, small tools, aluminum foil (and pie plates), PVC tubing, etc. and challenged each team to build a single antenna that would receive signals on both 150 MHz and 800 MHz in horizontal and vertical polarizations. Some planning, some thought, lots of hand waving and discussions eventually resulted in some plans, sketches and finally building (not necessarily in that order). At the conclusion of the construction phase, each team and its antenna was conveyed to the Bosch EMC Laboratory where it was tested to determine how well each antenna realization performed.

## Taipei

The 2017 EM Education Initiative: Summer Program was successfully held at Yuan Ze University, Taoyuan City, from August 21 to 25. This program was organized and sponsored by the IEEE EMC Taipei Chapter, Chinese Microwave Association, Taiwan Electromagnetic Industry-Academia Consortium, and the Department of Communications Engineering of Yuan Ze University. In this five-day program, ten introductory courses to the EM-wave profession were provided for more than one hundred graduate students from 19 universities in Taiwan. These courses teach the students the history of electromagnetics, the fundamental concepts of EM-wave engineering, the trend of the EM-wave technology, and the new and attractive EM-wave applications. At the end of the program, most participants felt very satisfied with what they had learned in these courses.

## Turkey

The Turkey joint AP/MTT/EMC/ED Chapter has continued activities with a Distinguished Lecturer (DL) Short Course by Dr. Sudhakar Rao on 24 September 2017, followed by an active role in the Fourth International EMC Conference (24 September 2017). The Chapter has also organized three seminars in this period:

#### 20 October 2017

Speaker: Dr. Alper Sinan Akyürek, ASELSAN Topic: "Optimal Control in the Smart City"



Members of the Turkey Joint AP/MTT/EMC/ED Chapter supported the EMC Turkiye conference by staffing an EMC Society table. The EMC Magazine was on display to promote membership in the EMC Society.



The Turkey Joint AP/MTT/EMC/ED Chapter organized a social activity (a movie screening) that attracted nearly 100 students!



On October 20, 2017, Dr. Alper Sinan Akyürek with ASELSAN presented "Optimal Control in the Smart City" for the Turkey joint AP/MTT/EMC/ ED Chapter.



Assistant Professor Emine Ülkü Sarıta with Bilkent University, presented "Magnetic Particle Imaging: Applications and Magnetic Field Safety Limits" for the Turkey Joint Chapter on October 27, 2017.

#### 27 October 2017

Speaker: Asst. Prof. Emine Ülkü Sarıta, Bilkent University

Topic: "Magnetic Particle Imaging: Applications and Magnetic Field Safety Limits"

#### 03 November 2017

Speaker: Prof. Ouz Gülseren, Bilkent University Topic: "My Journey in the Flatland"

A social activity (a movie screening) has also

been organized, attracting nearly 100 students! A very tight schedule, including seminars, short courses, DL talks, and social activities, is expected in the upcoming months (see http://aeme.ieee.metu.edu.tr/activities). **EMC** 

# The Kids are Alright: University of Maryland's Hyperloop Team

Washington DC/Northern Virginia Joint Chapter Meeting By Mike Violette

The University of Maryland's UMDLOOP team presented their successes and goals at the November 3, 2017 gathering of the IEEE EMC Society's Washington DC/Northern Virginia Chapter held at Washington Laboratories Environmental Test Laboratory. The A. James Clark School of Engineering is, for the third year, facilitating the development of a concept vehicle for the SpaceX Hyperloop transportation mode.



The UMDLoop team explains their vision and team efforts at the November 3, 2017 meeting of the Washington DC/Northern Virginia EMC Chapter.

The Hyperloop, a vision of SpaceX's Elon Musk, is to be a totally new mode of transportation, something between a train and a rocket. The principal notion is to create a vacuum inside a tube that will extend between stations, shoot a specially-designed passenger vehicle through the tube to achieve extremely high speeds. The objective is to develop velocities approaching those of an airplane. Hence, the electronics guy on the team is actually in charge of avionics.



UMDLoop team leaders Kyle Kaplan, Neel Patel, Sashank Sadula, and Shelly Szanto (foreground from left) provided a vertical dive into the challenges of designing and assembling the chassis, propulsion, braking and controls for their entry to SpaceX's competition.