



AUTOMATIC RF TECHNIQUES GROUP NEWSLETTER

Important deadlines:

Sep. 15, 2018: IMS/ARFTG workshop proposals for Spring 2019

Oct. 1, 2018: ARFTG student fellowship applications

Oct. 26, 2018: 92nd conference (Jan 2019) paper submission and student sponsorship applications

Feb. 15, 2019: 93rd conference (Spring 2019) paper submission deadline

SUMMER 2018

NUMBER 59

91st ARFTG Microwave Measurement Conference: Wideband Modulated Test Signals for Network Analysis of Wireless Infrastructure Building Blocks

OVERVIEW



The Loews Hotel, Philadelphia was the site for the 91st ARFTG Microwave Measurement Conference.

The 91st ARFTG Conference took place at the Loews Hotel, Philadelphia, PA, on June 15, 2018 with 142 attendees. The conference formed part of Microwave Week 2018, which also included the International Microwave Symposium (IMS), the Radio Frequency Integrated Circuits (RFIC) Symposium, and many workshops, short courses, and other meetings.

In addition to its conference, ARFTG also sponsored two joint ARFTG/IMS workshops, two joint IMS/ARFTG technical sessions, and meetings of the NVNA and On-

Wafer Users' Forums. All these activities ran from Sunday, June 10th through Friday, June 15th.



*Attendees are greeted at the ARFTG registration desk.
(Photo by LylePhotos, Atlanta)*

CONFERENCE TECHNICAL SESSIONS

The 91st ARFTG conference began with a welcome from Dominique Schreurs, ARFTG President and Conference Chair, and Technical Program Chair, Andrej Rumiantsev. The conference theme was "Wideband Modulated Test Signals for Network Analysis of Wireless Infrastructure Building Blocks," and featured four technical sessions and an interactive forum. The main technical sessions consisted of 15 papers given as oral presentations and addressed a variety of topics, such as characterization challenges of modulated signals, large-signal measurement, calibration and measurements for 5G, and mm-wave measurement challenges. The interactive forum featured a total of 16 papers presented as posters during the breaks from the oral sessions.



*Attendees listen to the keynote talk.
(Photo by LylePhotos, Atlanta)*

The best oral presentation, as selected by the attendees, was "Electro-optic near field imaging of high-power RF/microwave transistors in plastic packages," by J. Urbonas¹, F. Vanaverbeke², K. Kim², and P.H. Aaen¹ (¹University of Surry, ²NXP Semiconductors). The best interactive forum presentation was voted to be "Active antenna array characterization for massive MIMO 5G scenarios," by M. Jordao, D. Belo, and N. Borges Carvalho (Instituto de Telecomunicacoes).

ARFTG is pleased to thank the sponsors of the 91st Microwave Measurement Conference:

Gold sponsor: Qorvo

Silver sponsors: Anritsu Company, Copper Mountain Technologies, Keysight Technologies, and Maury Microwave.

For future sponsorship opportunities, please contact the Sponsorship Chair, Joe Gering (sponsorship@arftg.org).



*Interactive forum papers, co-located with the exhibition, encourage ample discussions between presenters and attendees.
(Photo by LylePhotos, Atlanta)*

CONFERENCE EXHIBITS

ARFTG has a strong tradition of holding an exhibition jointly with the conference. A total of 16 companies chose to exhibit their latest equipment and capabilities at the 2018 Spring ARFTG conference. These companies were AMCAD Engineering, Anritsu Company, Copper Mountain Technologies, Flann Microwave, FormFactor, Junkosha Inc., Keysight Technologies, LadyBug Technologies, Maury Microwave, Microsanj, MPI Corporation, OML, Inc., Rohde & Schwarz, Spinner

GmbH, Tektronix, and Virginia Diodes, Inc. Keysight Technologies was voted as best exhibitor by the attendees. To exhibit at future conferences, please contact the Exhibits Chair, Joel Dunsmore (exhibits@arftg.org).



The Exhibits Chair introduces the exhibitors at the start of the morning break. (Photo by LylePhotos, Atlanta)

ARFTG BUSINESS MEETING

The 2018 ARFTG Business Meeting was held on June 15, 2018. A report was given by the ARFTG Treasurer, Ron Ginley. Also, notice was given to the membership of proposed changes to the ARFTG by-laws to be reviewed and voted on at the Jan. 2019 meeting.



Extended breaks allowed for ample interaction between attendees and exhibitors. (Photo by LylePhotos, Atlanta)

AWARDS LUNCHEON

ARFTG President, Dominique Schreurs, presided over the Awards Luncheon. This began with handing out Certificates of Appreciation to the 91st conference organizers: Conference Chair Dominique Schreurs and Technical Program Chairs Andrej Rumiantsev. This was followed by handing out awards related to the 90th (Fall 2017) ARFTG conference, held in Boulder, CO. The best oral paper presentation award was given to "Establishing traceability for on-wafer S-parameter measurements of membrane technology devices up to 110 GHz" by U. Arz¹, S. Zinal¹, T. Probst¹, G. Hechtfisher², F.-J. Schmuckle³, and W. Heinrich³ (¹Physikalisch Technische Bundesanstalt, ²Rohde & Schwarz, ³Ferdinand Braun Institut). The best interactive forum paper award went to "Quantifying variance components for repeated scattering parameter measurements" by A. Koepke and J. Jargon (NIST). The Best Exhibitor was awarded to Anritsu.

ARFTG also recognizes long-standing ARFTG members with ARFTG Life Member status. For more information, please visit the Membership tab at www.arftg.org.

USERS' FORUMS

A meeting of the NVNA Users' Forum was held on June 14th and about 44 people attended. The meeting was organized by J. Apolinar Reynoso-Hernández and hosted by Patrick Roblin and Karun Rawat. Research updates on "Estimation of load-pull reflection coefficients for modulated signals," by Dhecha Nopchinda (Chalmers Univ. of Technology) and "Advances PA characterization using NVNA," by Alberto Maria Angelotti and Gian Piero Ghibino (Univ. of Bologna) were given. There were also open discussions on the use of NVNA in device modeling and verification and on SCPI commands for NVNA.

On June 14th as well, there was a meeting of the On-Wafer Users' Forum and approximately 20 people attended. The meeting was moderated by Andrej Rumiantsev and Marco Spirito. The meeting started with Andrej Rumiantsev leading a discussion on the principles and the problems in on-wafer characterization. This was followed with research updates by Uwe Arz (PTB) on PlanarCal, an EU funded project focusing on issues in on-wafer calibration and by Ryo Sakamaki (AIST) on best practices in automatic probe landing detection and probe planarization. The meeting wrapped up with a general discussion on future topics.

On July 5th, a meeting of the NVNA Users' Forum was held in Europe during the 2018 IEEE International Workshop on Integrated Nonlinear Microwave and Millimeter-wave Circuits (INMMiC) and about 30 people attended. The meeting was organized by Tibault Reveyrand and featured research updates by T. Gasselting (AMCAD) on "A robust and reliable behavioral model of high power GaN HEMTs for RF Doherty amplifier application" and T. Reveyrand (XLIM) on an "Unknown thru calibration algorithm".

For more information on the users' forums, feel free to contact the organizers or visit Forums at www.arftg.org.

JOINT ARFTG/IMS WORKSHOPS AND TECHNICAL SESSIONS

Two joint ARFTG/IMS workshops were held during Microwave Week. On Sunday, June 10th, 67 people attended WSJ: Millimeter-Wave Systems; Manufacturing, Packaging and Built-in Self Test organized by Didier Belot, (CEA-LETI Grenoble), Mona Hella (Rensselaer Polytechnic Institute), and Pierre Busson (ST Microelectronics). On Monday, June 11th, 42 people attended WMJ: Advanced Applications of Nonlinear Vector Network Measurements for Broadband RF Power Amplifiers Design and Linearization organized by Karun Rawat (Indian Institute of Technology) and Patrick Roblin (The Ohio State University). Additionally, there were two joint ARFTG/IMS technical sessions on Thursday, June

14th: TH1D Advanced High Frequency Large Signal Measurement Techniques and TH2D Innovative mm-Wave Calibration and Measurement Techniques.



ARFTG President, Dominique Schreurs, presents the 90th Conf. Best Paper Award. (Photo by LylePhotos, Atlanta)

FUTURE EVENTS

Jan 2019 ARFTG Symposium

This year's Fall/Winter ARFTG Symposium will be co-located with Radio Wireless Week 2019 (radiowirelessweek.org) and will consist of the 92nd Microwave Measurement Conference, a short course, a workshop, and the NVNA & On-Wafer Users' Forums. These events will be held at the Rosen Plaza Hotel in Orlando, FL on Jan. 20-23, 2019. Detailed information is available at www.arftg.org.



The Rosen Plaza Hotel, Orlando is the site of the 92nd (Jan 2019) ARFTG Symposium.

Microwave Measurement Conference

The theme for the 92nd ARFTG Microwave Measurement Conference is "Next Generation Microwave and Millimeter-Wave Measurement Techniques and Systems". **The deadline for submitting paper summaries (with supporting data and figures) is October 26, 2016.** The paper submission link and instructions are at www.arftg.org/index.php/upcoming-conference/author-instructions. As on previous occasions, the conference will offer ample opportunity for participants to interact with leading professionals in the microwave field. For information on the conference, contact the Conference Co-Chairs, Joe Gering (Joe.Gering@qorvo.com) and Jon Martens (Jon.Martens@anritsu.com) or the Technical Program Co-Chairs, Patrick Roblin (roblin.1@osu.edu)

and Andrej Rumiantsev (Andrej.Rumiantsev@mpi-corporation.com).

Short courses and Workshops

This year, we will have the 1½ day, ARFTG/NIST microwave measurements short course organized by Jim Booth (james.booth@nist.gov). Also, there will be a ½ day workshop on high frequency and high bandwidth measurements for 5G and related applications organized by Jon Martens (Jon.Martens@anritsu.com), Marco Spirito (M.Spirito@tudelft.nl), and Patrick Roblin (roblin.1@osu.edu).

Jan 2019 ARFTG Symposium – tentative schedule

Sunday, Jan. 20 8:00 am – 5:00 pm	NIST/ARFTG Short Course
Monday, Jan. 21 8:00 am – 12:00 pm	NIST/ARFTG Short Course
Monday, Jan. 21 8:00 am – 12:00 pm	NVNA & On-Wafer Users' Forums
Monday, Jan. 21 1:00 pm – 5:00 pm	92 nd Microwave Measurement Conference
Monday, Jan. 21 6:00 pm – 7:00 pm	RWW/ARFTG Reception (in Exhibition Hall)
Tuesday, Jan 22 8:00 am - 5:00 pm	92 nd Microwave Measurement Conference
Tuesday, Jan 22 12:00 pm - 1:30 pm	Awards Luncheon
Wednesday, Jan. 23 8:00 am - 12:00 pm	Workshop

Spring 2019 ARFTG activities

The 93rd ARFTG Microwave Measurement Conference will be held on June 7, 2019 in Boston, Massachusetts, as part of Microwave Week 2019, in conjunction with IMS (ims-ieee.org) and RFIC. The conference theme is "Measurement Challenges for the Upcoming RF and mm-Wave Communications and Sensing Systems." **The deadline for submitting paper summaries (with supporting data and figures) is February 15, 2019.**

For conference information, visit www.arftg.org or contact the Conference Co-Chairs, Mohamed Sayed (mmsayed@sbcglobal.net) and Dave Blackham (dave_blackham@keysight.com) or the Technical Program Chair, Marco Spirito (M.Spirito@tudelft.nl). As part of the 93rd ARFTG conference activities, there will be joint IMS/ARFTG technical sessions, meetings of the NVNA and On-Wafer Users' Forums, and ARFTG/IMS co-sponsored workshops. **For those interested in organizing a workshop, the proposal deadline is September 15, 2018.** For more information, contact Patrick Roblin at roblin.1@osu.edu.

Users' Forums

NVNA Users' Forums occur at all ARFTG conferences and at INMMiC. Please send your ideas for the meeting at the winter ARFTG in Orlando or any future meetings to the forum organizers: J. Apolar Reynoso-Hernández (apolinar@cicese.mx), Patrick Roblin (roblin.1@osu.edu), Karun Rawat (Karun.rawat.in@ieee.org), Jean-Pierre Teyssier (jean-pierre.teyssier@keysight.com), Tibault Reveyard (reveyard@gmail.com), and Dominique Schreurs (dominique.schreurs@kuleuven.be). Dominique Schreurs and Patrick Roblin are organizing the Jan. 2019 meeting in Orlando, and Karun Rawat will be organizing the Spring 2019 meeting in Boston.

On-Wafer Users' Forums also occur at all ARFTG conferences. Please send your ideas for the meeting at the winter ARFTG in Orlando or any future meetings to the forum organizers: Andrej Rumiantsev (Andrej.Rumiantsev@mpi-corporation.com) and Marco Spirito (M.Spirito@tudelft.nl).

More information on the latest activities and schedules of both forums can be found at the ARFTG web site, www.arftg.org under the Forums tab. The program should be available on-line about two weeks prior to the meetings.

ARFTG STUDENT PROGRAMS

ARFTG typically awards one or more *ARFTG Roger Pollard Memorial Student Fellowships in Microwave Measurement* to recognize and provide financial assistance to graduate students who show promise and interest in pursuing research related to microwave measurement techniques. The next application deadline is October 1, 2018. The application instructions and criteria for an award are published at www.arftg.org, or you may contact the Education Chair, Jim Booth (james.booth@nist.gov).

ARFTG Student Sponsorships help M.S. and Ph.D. students defray the expense of attending the fall/winter conference. Students are required to present a paper and provide volunteer service at the conference. The application deadline is October 26, 2018. For more information, visit the ARFTG website (www.arftg.org) or contact the Sponsorship Chair, Joe Gering (sponsorship@arftg.org).

ADDENDUM

If you have not done so, be sure to click the opt-in link in the GDPR email from ARFTG, which was sent prior to May 25, 2018. This allows us to include you on our emails.

Every effort has been made to publish correct information in this newsletter. Significant errors should be reported to the ARFTG Secretary, Joe Gering (joe.gering@qorvo.com), so that corrections can be reported in the next issue.