



# AUTOMATIC RF TECHNIQUES GROUP

## NEWSLETTER

SUMMER 2015

NUMBER 53

### Important deadlines:

Sept. 8, 2015: ARFTG/IMS workshop proposals for spring 2016

Oct. 1, 2015: ARFTG student fellowship applications

Sept. 14, 2015: 86<sup>th</sup> conference paper submission and Ph.D. student sponsorship applications (Fall 2015)

Feb. 8, 2016: 87<sup>th</sup> conference paper submission deadline (Spring 2016)

## 85<sup>th</sup> ARFTG Microwave Measurement Conference: “Measurements and Techniques for 5G Applications”

### OVERVIEW



*The Hyatt Regency Hotel, Phoenix, AZ, site of the 85<sup>th</sup> ARFTG Microwave Measurement Conference.*

The 85<sup>th</sup> ARFTG Conference took place at the Hyatt Regency Hotel, Phoenix, AZ, on May 22<sup>nd</sup>, 2015. The number of attendees was 170. The conference formed part of Microwave Week 2015, 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 a meeting of the NVNA Users' Forum and Special Interest Group (SIG) on “Standards for Nonlinear Measurements,” next to two joint ARFTG/IMS Workshops. ARFTG was also represented by a booth at the IMS exhibition. All these activities ran from Monday, May 18<sup>th</sup> through Friday, May 22<sup>nd</sup>.



*ARFTG booth at the IMS exhibition.*

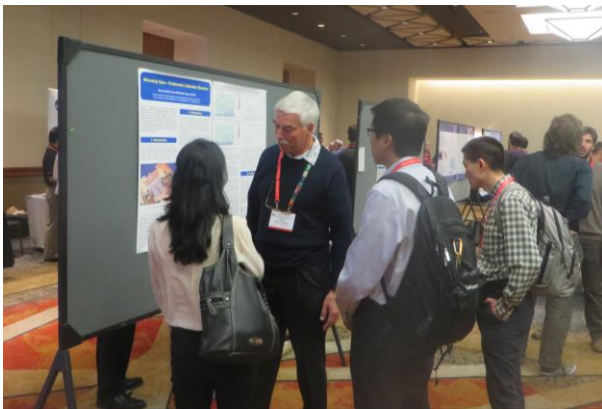
### CONFERENCE TECHNICAL SESSIONS

The 85<sup>th</sup> ARFTG conference began with a welcome from Mohamed Sayed, ARFTG President, Conference Chair, Dave Blackham, and Technical Program Chair, Nick Ridler. The conference theme was “Measurement and Techniques for 5G Applications,” and featured four technical sessions and an interactive forum. The main technical sessions consisted of papers given as oral presentations and addressed a variety of topics, such as linear and nonlinear calibration and verification topics, and 5G related metrology. The technical sessions were all recorded (with author permission) and talks will be available for later viewing at [www.arftg.org](http://www.arftg.org). The interactive forum featured a total of 16 papers presented as posters during the breaks from the oral sessions.



*Attendees listened to a variety of measurement talks.*

The best oral presentation, as selected by the attendees, was "Rectangular-Waveguide Impedance," by D. Williams *et al.* (NIST and PTB). The best interactive forum presentation was voted to be "Physical Models for 2.4 mm and 3.5 mm Coaxial VNA Calibration Kits Developed within the NIST Microwave Uncertainty Framework," by J. Jargon *et al.* (NIST and KRISS).



*Interactive forum papers, collocated with the exhibition, encourage ample discussions midst presenters and attendees.*

ARFTG is pleased to thank the sponsors of the 85<sup>th</sup> Microwave Measurement Conference:

- Gold sponsors: Anritsu and Qorvo
- Silver sponsors: Copper Mountain Technologies, Keysight Technologies, and Maury Microwave

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

## CONFERENCE EXHIBITS

ARFTG has a strong tradition of holding an exhibition jointly with the conference. A total of 18 companies chose to exhibit their latest equipment at the 2015 Spring ARFTG conference.



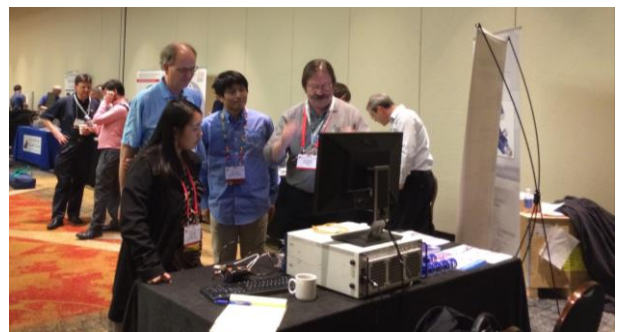
*The Exhibits Chair introduces the exhibitors at the start of the morning break.*

These companies were:

- Anritsu
- Cascade Microtech
- Copper Mountain Technologies
- Flann Microwave Ltd
- Focus Microwaves
- Junkosha Inc.
- Keysight Technologies
- Maury Microwave
- MaXentric Technologies
- MPI Corporation
- National Instruments
- OML, Inc.
- Rohde & Schwarz
- Southwest Microwave
- Spinner GmbH
- TeraProbes Inc.
- T-Plus Co. Ltd.
- Virginia Diodes Inc.

Maury Microwave was voted as best exhibitor by the attendees.

To exhibit at future conferences, please contact the Exhibits Chair, Joe Gering (exhibits@arftg.org).



*Extended breaks allowed for ample interaction between attendees and exhibitors.*

## AWARDS LUNCHEON

ARFTG President, Mohamed Sayed, presided over the Awards Luncheon. This began with handing out Certificates of Appreciation to the 85<sup>th</sup> conference organizers: Conference Chair Dave Blackham and Technical Program Chair Nick Ridler. Next, ARFTG Roger Pollard Memorial Student Fellowships in Microwave Measurement were awarded to María F. Córdoba-Erazo, University of South Florida (advisor: Thomas Weller) and to Cosan Caglayan, The Ohio State University (advisor: Kubilay Sertel). This was followed by handing out awards related to the 84<sup>th</sup> Fall ARFTG conference, held in Boulder, CO. The best oral paper presentation award was given to “Novel Flexible Dielectric Waveguide for Millimeter and Submillimeter Frequencies - Design and Characterization” by U. Nickel and J. Zovo (Spinner GmbH, Germany). The best interactive forum paper award went to “A Near-Field Scanning Microwave Microscope for Measurement of the Permittivity and Loss of High-loss Materials,” by A.P. Gregory, *et al.* (NPL & Imperial College, UK). The Best Exhibitor was awarded to Spinner GmbH.



*ARFTG President, Mohamed Sayed, presides over the 85<sup>th</sup> ARFTG Awards Luncheon.*

## NVNA USERS' FORUM

A meeting of the NVNA Users' Forum was held on May 21<sup>st</sup> and about 45 persons attended. The meeting, moderated by Jean-Pierre Teyssier and Dominique Schreurs, kicked off with a research update by PhD student Pawel Barmuta (KU Leuven-Warsaw University of Technology). The Forum then transitioned into a SIG meeting, chaired by Nick Ridler. Two initiatives were discussed. The first topic led by Kate Remley was on “Uncertainty for EVM measurement,” whereas the second topic by Dylan Williams addressed “Large-Signal-Network-Analysis Nomenclature”. Be welcome to contact any of the organisers for more information, or look at: [http://www.arftg.org/about\\_nvna.html](http://www.arftg.org/about_nvna.html),



*NVNA users' forum attendees listening to a research update.*

## JOINT ARFTG/IMS WORKSHOPS

Two joint ARFTG/IMS workshops were held on May 18<sup>th</sup>. About 50 persons attended the full day workshop “Direct Extraction of FET Circuit Models from Microwave and Baseband Large-Signal Measurements for Model-Based Microwave Power Amplifier Design,” organized by Patrick Roblin and David Root. The second half-day workshop on “Measurement-based Modeling in SI Applications,” organized by Mike Resso and Heidi Barnes, was attended by about 30 attendees.

## FUTURE EVENTS

### NVNA Users' Forum

NVNA Users' Forum occurs at all ARFTG conferences. Please send your ideas for the meeting at Fall ARFTG to Apolinar Reynoso Hernandez and Patrick Roblin ([apolinar@cicese.mx](mailto:apolinar@cicese.mx); [roblin@ece.osu.edu](mailto:roblin@ece.osu.edu)).

In addition, an annual meeting is also held in Europe. In 2015, the meeting is on Oct. 1<sup>st</sup> at INMMiC in Taormina, Italy (<http://www.inmmic.org>). Please send your suggestions to Dominique Schreurs ([dominique.schreurs@ieee.org](mailto:dominique.schreurs@ieee.org)) or Patrick Roblin ([roblin@ece.osu.edu](mailto:roblin@ece.osu.edu)).

More information on the latest activities and schedules can be found at [http://www.arftg.org/about\\_nvna.html](http://www.arftg.org/about_nvna.html). The program should be available on-line about two weeks prior to the meeting.

### Fall 2015 ARFTG Symposium

This year's Fall ARFTG Symposium will consist of the 86<sup>th</sup> Microwave Measurement Conference, a short course, a workshop, and the NVNA Users' Forum. All of these events will be held at the Georgia Tech Hotel and Conference Center on Dec. 1<sup>st</sup>-4<sup>th</sup>, 2015. Detailed information and registration is available at: [www.arftg.org/conferences/86th\\_conference.html](http://www.arftg.org/conferences/86th_conference.html).



ARFTG Ph.D. Student Sponsorships help students defray the expense of attending. The application deadline is September 14<sup>th</sup>, 2015. For more information, visit the ARFTG website or contact the Sponsorship Chair, Joe Gering (sponsorship@arftg.org).

### **Short course and workshops**

A 1.5 day short course will be conducted covering practical and advanced microwave measurement techniques and practices. For more information, contact Patrick Roblin (roblin@ece.osu.edu).

A workshop will be held Wednesday afternoon on the conference theme of bioengineering and biomedicine (organized by Jim Booth, NIST). Instead of a Friday afternoon workshop, there will be tours of the Institute for Electronics and Nanotechnology National Nanotechnology Infrastructure Network and the Parker H. Petit Institute for Bioengineering and Bioscience.

### **Microwave Measurement Conference**

The theme for the 86<sup>th</sup> ARFTG Microwave Measurement Conference is “Microwave Measurements with Applications to Bioengineering and Biomedicine”.

The deadline for submitting summaries (with supporting data and figures) is September 14<sup>th</sup>, 2015. The paper submission link and instructions are at [www.arftg.org/conferences/86th\\_conference.html](http://www.arftg.org/conferences/86th_conference.html).

As on previous occasions, the conference will offer ample opportunity for participants to interact with leading professionals in the microwave field. For more information, contact the Conference Chair, Mohamed Sayed (mmsayed@ieee.org) or the Technical Program Chair, Joe Gering (joe.gering@qorvo.com).

#### *Fall 2015 ARFTG Symposium – tentative schedule*

Tuesday, Dec. 1 <sup>st</sup> 8:00 am – 5:00 pm	NIST/ARFTG Short Course
Wednesday, Dec. 2 <sup>nd</sup> 8:00 am – 12:00 pm	NIST/ARFTG Short Course
Wednesday, Dec. 2 <sup>nd</sup> 1:20 pm – 5:00 pm	Workshop
Wednesday, Dec. 2 <sup>nd</sup> 5:00 pm – 7:00 pm	NVNA Users’ Forum
Thursday, Dec. 3 <sup>rd</sup> 8:00 am - 5:00 pm	86 <sup>th</sup> Microwave Measurement Conference
Thursday, Dec. 3 <sup>rd</sup> 7:00 pm – 10:00 pm	Reception and Awards Banquet
Friday, Dec. 4 <sup>th</sup> 8:00 am – 12:00 pm	86 <sup>th</sup> Microwave Measurement Conference
Friday, Dec. 4 <sup>th</sup> 1:20 pm – 5:00 pm	Georgia Tech Lab Tours



*Georgia Tech Hotel and Conference Center is the site of the 86<sup>th</sup> Fall ARFTG Symposium.*

### **Spring 2016 ARFTG activities**

The 87<sup>th</sup> ARFTG Microwave Measurement Conference will be held on May 27<sup>th</sup>, 2015 in San Francisco, CA, as part of Microwave Week 2016, in conjunction with IMS ([www.ims2016.org](http://www.ims2016.org)) and the RFIC symposium. The conference theme is “Measurements for Emerging Communications Technologies”. **The deadline for submission of paper abstracts (with supporting data and figures) is February 8<sup>th</sup>, 2016.**

For up-to-date information, visit [www.arftg.org](http://www.arftg.org) or contact the Conference Chair, John Wood (john.wood@ieee.org) or the Technical Program Co-Chairs, Dominique Schreurs and Gayle Collins (dominique.schreurs@ieee.org; gayle\_collins@ieee.org). As part of the 87<sup>th</sup> ARFTG conference activities, it is also planned to have joint IMS/ARFTG technical sessions, to hold a meeting of the NVNA Users’ Forum, and to co-sponsor appropriate workshops that will be taking place during Microwave Week 2016. For those interested in organizing a workshop, note that the proposal deadline is Sept. 8<sup>th</sup>, 2015 (contact Patrick Roblin for more information at roblin@ece.osu.edu).

### **STUDENT FELLOWSHIP**

The next application deadline for the ARFTG Microwave Measurement Student Fellowship is October 1, 2015. The purpose is to recognize and provide financial assistance to graduate students who show promise and interest in pursuing research related to microwave measurement techniques. For more information, contact the fellowship coordinator, Patrick Roblin (roblin@ece.osu.edu) or visit [www.arftg.org](http://www.arftg.org).

### **ADDENDUM**

Every effort has been made to publish correct information in this newsletter. Significant errors should be reported to the ARFTG Executive Committee Secretary, D. Schreurs (dominique.schreurs@ieee.org), so that corrections can be reported in the next issue.