



AUTOMATIC RF TECHNIQUES GROUP

NEWSLETTER

SUMMER 2014

NUMBER 51

Important deadlines:

Sept. 9, 2014: IMS/ARFTG workshop proposals for spring 2015

Oct. 1, 2014: ARFTG Student fellowship applications

Oct. 3, 2014: 84th conference summaries (and Ph.D. student sponsorship applications)

Jan. 23, 2015: 85th conference summaries (Spring 2015)

83rd ARFTG Microwave Measurement Conference: “Microwave Measurements for Emerging Technologies”

OVERVIEW



The Marriott Waterside Hotel, Tampa, FL, site of the 83rd ARFTG Microwave Measurement Conference.

ARFTG			WAMICON 1			WAMICON 2		
Time	Activity	Room	Time	Activity	Room	Time	Activity	Room
07:00	Breakfast	Room 2000	07:00	Breakfast	Room 2000	07:00	Breakfast	Room 2000
08:00	Registration & Check-in	Room 2000	08:00	Registration & Check-in	Room 2000	08:00	Registration & Check-in	Room 2000
09:00	Keynote Presentation	Room 2000	09:00	Keynote Presentation	Room 2000	09:00	Keynote Presentation	Room 2000
10:00	Workshop: Non-linear Microwave Measurements	Room 2000	10:00	Workshop: Non-linear Microwave Measurements	Room 2000	10:00	Workshop: Non-linear Microwave Measurements	Room 2000
11:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	11:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	11:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
12:00	Lunch	Room 2000	12:00	Lunch	Room 2000	12:00	Lunch	Room 2000
13:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	13:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	13:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
14:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	14:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	14:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
15:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	15:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	15:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
16:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	16:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	16:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
17:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	17:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	17:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
18:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	18:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	18:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
19:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	19:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	19:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000
20:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	20:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000	20:00	Workshop: Microwave Measurements for Emerging Technologies	Room 2000

83rd ARFTG conference was held jointly with WAMICON.

In addition to its conference, ARFTG also sponsored a meeting of the NVNA Users’ Forum and two joint ARFTG/IMS Workshops. Also, a new Special Interest Group (SIG) on “Standards for Nonlinear Measurements” was initiated. All these activities ran from Monday, June 2nd through Friday, June 6th.

The 83rd ARFTG Conference took place at the Marriott Waterside Hotel, Tampa, FL, on June 6th, 2014. For the first time, the conference was co-located with the IEEE Wireless and Microwave Technology Conference (WAMICON), and the combined number of attendees was 210. The two conferences formed part of Microwave Week 2014, which also included the International Microwave Symposium (IMS), the Radio Frequency Integrated Circuits (RFIC) symposium, and many workshops, tutorials and other meetings.



Interactive discussions start during ARFTG breakfast.

CONFERENCE TECHNICAL SESSIONS

The 83rd ARFTG conference began with a welcome from Mohamed Sayed, ARFTG President and Conference Chair, and Jon Martens, Technical Program Chair. The overall conference theme was “Microwave Measurements for Emerging Technologies,” 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 topics, nonlinear and mixed-signal measurements, and measurements in complex and challenging environments. Lively discussions followed many of the presentations. The technical sessions were all recorded (with author permission) and talks will be available for later viewing at www.arftg.org. The interactive forum featured a total of 18 papers presented as posters during the breaks from the technical sessions. The best oral presentation, as selected by the conference attendees, was “Enhanced Vector Calibration of Load-pull Measurement Systems” by A. Aldoumani, *et al.* (Cardiff University and Mesuro, UK). The best interactive forum presentation was voted to be “Further Investigations into Connection Repeatability of Waveguide Devices at Frequencies from 750 GHz to 1.1 THz,” by N. Ridler, *et al.* (NPL and University of Leeds, UK).



Attendees listened to talks on a variety of microwave and (sub)mmwave measurement topics.

ARFTG is pleased to thank the sponsors of the 83rd Microwave Measurement Conference:

- Platinum sponsor: Mini-Circuits
- Gold sponsors: Anritsu, Maury Microwave, and RFMD
- Silver sponsors: Agilent Technologies, Harris, National Instruments, and Focus Microwaves/ElectroRent
- Bronze sponsor: Cree

- Publications: Microwave Journal, High Frequency Electronics, IEEE Microwave Magazine, and Scitech Publishing

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

CONFERENCE EXHIBITS

A total of 18 companies chose to exhibit their latest equipment at this conference. These companies were:

- Agilent Technologies
- Anritsu Company
- Cascade Microtech
- Copper Mountain Technologies
- EM Software & Systems
- Flann Microwave
- Focus Microwaves
- Gowanda
- Lady Bug Technologies
- Maury Microwave
- Mesuro
- Mini-Circuits
- MPI Corporation
- OML
- Rohde & Schwarz
- Res-net Microwave
- T-plus
- Virginia Diodes



Interactive forum papers are collocated with the exhibition to encourage technical interactions between presenters, exhibitors, and attendees.

Anritsu was voted as best exhibitor by the attendees.

To exhibit at future conferences, please contact the ARFTG Exhibits Chair, Rusty Myers. (exhibits@arftg.org).

AWARDS LUNCHEON

ARFTG President, Mohamed Sayed, presided over the awards luncheon. This began with handing out the ARFTG Life Member Certificate to Larry Dunleavy, followed by presenting Certificates of Appreciation to the 83rd conference organizers: Conference Chair Mohamed Sayed and Technical Program Chair Jon Martens. Finally, awards related to the previous (82nd) conference, held in Columbus, Ohio, were handed out. The award for best oral paper presentation was given to "Investigating Connection Repeatability of Waveguide Devices at Frequencies from 750 GHz to 1.1 THz" by Ronald Clarke and Nick Ridler (NPL, UK). The award for best interactive forum presentation went to "Concurrent Dual-band Transmitter Behavioral Modeling with Physically Motivated 2-D Rational Functions" by N. Naraharisetti, *et al.* (The Ohio State University). The best exhibitor award was presented to Maury Microwave.

NVNA USERS' FORUM



The NVNA users' forum was held in Tampa, FL, on June 5th.

A meeting of the NVNA Users' Forum was held on April 2nd, 2014, in collocation with INMMiC 2014 in Leuven, Belgium. The forum was moderated by Jean-Pierre Teyssier and Dominique Schreurs, and was attended by over 30 people. As part of the agenda, the proposal for a Special Interest Group (SIG) on nonlinear microwave measurements was discussed. The first meeting of this SIG was subsequently held on June 5th, 2014, in Tampa, FL, in collocation with 83rd ARFTG. The meeting was chaired by Mike Janezic and Nick Ridler, and over 40 people attended. The SIG meeting was preceded by the NVNA Users' Forum, moderated by Joe Gering and Dominique Schreurs, and attended by over 50 people. The meeting kicked off with two research updates by Ph.D. students, from KU Leuven and Cardiff University, which initiated constructive feedback and interactions with the audience. This was

followed by a research update from Agilent Technologies.

More information can be found at http://www.arftg.org/about_nvna.html.

JOINT ARFTG/IMS WORKSHOPS

Two joint ARFTG/IMS workshops were held on Monday, June 2nd. About 75 persons attended "Efficient RF Design Using Practical Behavioral Models - Bridging the Gap Between Measurements and Simulations," organized by Marc Vanden Bossche, National Instruments, and Nuno Carvalho, Instituto de Telecomunicacoes. The second workshop on "Challenges and Advances in Wafer-Level Calibration and Characterization of Millimeter and Sub-Millimeter Wave Devices and Systems," organized by Marco Spirito, Delft University of Technology, and Andrej Rumiantsev, Brandenburg University of Technology, was attended by about 35 attendees.

FUTURE EVENTS

NVNA Users' Forum

NVNA Users' Forum occurs at every ARFTG conference. Please send your suggestions for the upcoming meeting planned in conjunction with Fall ARFTG 2014 to Patrick Roblin (roblin@ece.osu.edu) and Apolinar Reynoso Hernandez (apolinar@cicese.mx). The program should be available on-line about two weeks prior to the meeting.

In addition to the meetings at ARFTG conferences, the NVNA Users' Forum is also held in Europe in conjunction with other conferences. In 2015, a meeting is scheduled at INMMiC 2015 in October in Italy.

More information on the latest activities and schedules can be found at http://www.arftg.org/about_nvna.html.

Fall 2014 ARFTG Symposium

This year's Fall ARFTG Symposium will consist of the 84th Microwave Measurement Conference, a short course, two workshops, and the NVNA Users' Forum. All of these events will be held at the St. Julien Hotel, Boulder, CO, on December 2nd-5th, 2014. Detailed information and registration is available at:

www.arftg.org/conferences/84th_conference.html.

ARFTG Ph.D. Student Sponsorships help students defray the expense of attending. The application deadline is October 3rd, 2014. 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).

Two workshops will also be held. The first is on Wednesday afternoon and is entitled “New Techniques and New Applications for Microwave Materials Measurement” (organized by Mike Janezic and Mitch Wallis, NIST). The second workshop takes place Friday afternoon, and it entitled “High Efficiency Microwave Power Amplifiers: Design and Characterization” (organized by Zoya Popovic, University of Colorado, and Patrick Roblin, The Ohio State University). More details can be found at the conference web page.

Microwave Measurement Conference

The theme for the 84th ARFTG Microwave Measurement Conference is “The New Frontiers for Microwave Measurements”. The deadline for submitting summaries (with supporting data and figures) for consideration by the Technical Program Committee is October 3rd, 2014. The paper submission link and instructions will be at www.arftg.org/conferences/84th_conference.html. As on previous occasions, the conference will offer ample opportunity for participants to interact with leading professionals in related RF and microwave fields. For more information, contact the Conference Chair, Ron Ginley (ron.ginley@nist.gov) or the Technical Program Chair, Mitch Wallis (thomas.wallis@nist.org).

Fall 2014 ARFTG Symposium – tentative schedule

Tuesday, Dec. 2 nd 8:00 am – 5:00 pm	NIST/ARFTG Short Course
Wednesday, Dec. 3 rd 8:00 am – 12:00 pm	NIST/ARFTG Short Course
Wednesday, Dec. 3 rd 1:20 pm – 5:00 pm	Workshop I
Wednesday, Dec. 3 rd 5:00 pm – 7:00 pm	NVNA Users’ Forum + SIG Nonlinear Measurements
Thursday, Dec. 4 th 8:00 am - 5:00 pm	84 th Microwave Measurement Conference
Thursday, Dec. 4 th Time TBD	Students’ Session
Thursday, Dec. 4 th 7:00 pm – 10:00 pm	Reception and Awards Banquet
Friday, Dec. 5 th 8:00 am – 12:00 pm	84 th Microwave Measurement Conference
Friday, Dec. 5 th 1:20 pm – 5:00 pm	Workshop II

Spring 2015 ARFTG activities

The 85th ARFTG Microwave Measurement Conference will be held on May 22nd, 2015 in Phoenix, AZ, as part of Microwave Week 2015, in conjunction with IMS (www.ims2015.org) and the RFIC symposium. **The deadline for submission of summaries (with supporting data and figures) is January 23rd, 2015.**

For up-to-date information, visit www.arftg.org or contact the Conference Chair, Dave Blackham (dave_blackham@agilent.com) or the Technical Program Chair, Nick Ridler (nick.ridler@npl.co.uk). It is also planned to hold a meeting of the NVNA Users’ Forum and the SIG on Nonlinear Measurements, as part of the 85th ARFTG conference activities, and to co-sponsor appropriate workshops that will be taking place during Microwave Week 2015. For those interesting in organizing a workshop, note that the proposal deadline is Sept. 9th, 2014 (contact Patrick Roblin for more information at roblin@ece.osu.edu).



The ARFTG Executive Committee meets to prepare the next ARFTG conferences.

STUDENT FELLOWSHIP

The next application deadline for the ARFTG Microwave Measurement Student Fellowship is October 1, 2014. 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, visit www.arftg.org or contact the fellowship coordinator, Patrick Roblin (roblin@ece.osu.edu).

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.