



# 86<sup>th</sup> ARFTG Microwave Measurement Symposium

## *Microwave Measurements with Applications to Bioengineering and Biomedicine*

Atlanta, Georgia  
December 1 – 4, 2015

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## 86<sup>th</sup> Conference Technical Agenda (Sampling of Papers)

- **Microwaves in Biomedical Science — A Path Forward (INVITED)**, W. D. Hunt, Georgia Institute of Technology
- **Sensor-on-CMOS Dielectric Characterization Using Temperature Modulation**, J. Chien, University of California, Berkeley
- **Broadband Single-Cell Detection with a Coplanar Series Gap**, X. Ma, Lehigh University
- **Optimized Matching of an Implantable Medical Device Antenna in Different Tissue Medium Using Load Pull Measurements**, P. Li, St. Jude Medical
- **Microwave Characterization of Ink-Jet Printed CPW on PET Substrates**, A. Sahu, University of Toledo
- **Measurement Methods for the Permittivity of Thin Sheet Dielectric Materials**, J. Kim, Korea Research Institute of Standards and Science
- **Frequency-scalable nonlinear behavioral transistor model from single frequency X-parameter measurements based on time-reversal transformation properties (INVITED)**, D. E. Root, Keysight Technologies
- **Automatic Feed-Forward Cancellation of Modulated Harmonic**, H. Yu, The Ohio State University
- **Enhanced PHD Model Extraction by Improving Harmonic Response Superposition During Extraction**, D. T. Besspalko, Emerging Radio Systems Group
- **Towards Faster, Swept, Time-Coherent Transient Network Analyzer Measurements**, J. Martens, Anritsu
- **Hurdles to On-Wafer Harmonic Measurements**, K. J. Muhonen, Qorvo
- **A compact measurement set-up for envelope-tracking RF PAs with calibrated sensing of baseband V/I at the supply terminal.**, G. Gibiino, KU Leuven
- **Continuing Challenge of Improving Measurement Accuracy in Terahertz Vector Network Analyzers - The Taming of "Terahertz Vector Network Analyzers" (INVITED)**, M. Horibe, National Institute of Advanced Industrial Science and Technology (AIST) - National Metrology Institute of Japan (NMIJ)
- **Performance assessment of VNA calibration schemes for millimeter-wave and submillimeter-wave frequencies, using the 33 GHz – 50 GHz band**, K. Drazil, Czech Metrology Institute
- **An IQ-Steering Technique for Amplitude and Phase Control of mm-Wave Signals**, M. Spirito, Delft University of Technology
- **The Impact of Knowing the Impedance of the Lines Used in the TRL Calibration on the Load-Pull Characterization of Power Transistors**, M. A. Pulido-Gaytan, CICESE
- **Improved SOLT/RSOL Planar Calibration via EM Modelling and Reduced Spread Resistive Layers**, M. Spirito, Delft University of Technology
- **Calibration/Verification Standards for Measurement of Extremely High Impedances**, M. Haase, Czech Technical University in Prague
- **Evaluation and Modeling of Measurement Resolution of A Vector Network Analyzer for Extreme Impedance Measurements**, F. Mubarak, Van Swinden Laboratorium

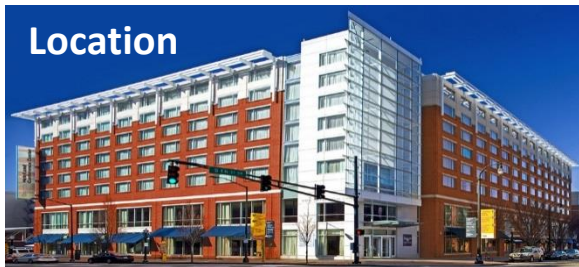
See [www.arftg.org](http://www.arftg.org) for a complete listing of presentations.



## ARFTG Microwave Measurement Conference

ARFTG will hold its 86<sup>th</sup> Microwave Measurement Symposium at the Georgia Tech Hotel and Conference Center in Atlanta, GA. Join us as we explore **Microwave Measurements with Applications to Bioengineering and Biomedicine** and numerous other RF, microwave, millimeter-wave, and Terahertz topics. The Symposium includes the 86<sup>th</sup> Microwave Measurement Conference, a trade show exhibition, a short course, a workshop on Microwave Microfluidics, an NVNA users' forum, and tours of two Georgia Tech Laboratories.

**Register Early! (Rates increase Nov. 15<sup>th</sup>.)**



The **Georgia Tech Hotel and Conference Center** is on the Georgia Tech campus in downtown Atlanta and has convenient access to the university and the city. Nearby attractions include everything from the Atlanta Botanical Garden to the World of Coca-Cola. Atlanta is also the home of the Jimmy Carter Presidential Library and Museum, the Georgia Aquarium, and the Atlanta Zoo.

A special rate of \$164.00 + taxes per night has been arranged at the GTHCC.

Reserve your hotel room at the GTHCC by Nov. 9<sup>th</sup> to receive the conference rate. Call the GTHCC at +1-800-706-2899 and mention ARFTG or go to [www.arftg.org](http://www.arftg.org) for a link to the hotel's reservation system.



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## ARFTG/NIST Microwave Measurement Short Course

Join us in a practical microwave measurement tutorial for wireless communications, intended for engineers, graduate students, experienced technicians, or technical managers.

Day 1 will start in the morning session with (1) oscilloscope measurements, (2) network analyzer measurements, (3) power measurements, and (4) measurement uncertainty theory and will continue in the afternoon session with (5) connectorized, (6) verification, and (7) on-wafer S-parameter measurements at millimeter frequencies and (8) noise measurements.

Day 2 (morning only) will focus on (9) large-signal RF measurements with NVNAs, present (10 & 11) practical examples of CW & pulsed-RF measurement applications, and conclude with (12) spectrum & vector signal analysis.

Measurement uncertainty and the process of measurement verification will be covered in two dedicated lectures. Space is limited; please register early.

Scheduled Instructors: Andy Brush – Tegam, Ken Wong – Keysight Technologies, Paul Hale – NIST, Ali Boudiaf – Infineon Technologies, Jon Martens – Anritsu, Andrej Rumiantsev – MPI Corporation, J. Apolinar Reynoso-Hernández – CICESE, Ron Ginley – NIST, Dominique Schreurs – K. U. Leuven University, Jean Pierre Teyssier – XLIM & Keysight Technologies, Patrick Roblin – The Ohio State University, and Marcus da Silva – Tektronix.



## Microwave Microfluidics Workshop

The interaction of electromagnetic fields with biological systems at microwave frequencies has been studied for more than a century. In general, such interactions can be quite complex, as the inhomogeneous nature of biological systems can make quantitative interpretations of microwave measurements challenging. The emergence of microfluidic approaches over the past decade has provided an excellent opportunity to employ accurate chip-scale measurements and calibrations to very small volumes of fluid samples that can be precisely located within planar microwave structures. This workshop explores recent developments at the intersection of microfluidics and microwave measurements, where the higher level of control of fluidic systems enables accurate manipulation and microwave measurements of fluid samples, such as single cells, cell suspensions, and biomolecules. Such measurements are demonstrating how microwave measurements can provide biologically relevant information, and hold the promise of rapid, sensitive, multiplexed, high-throughput electronic measurements of biological systems in the near future.



## Schedule of Events

ARFTG/NIST Microwave Measurement Short Course	Tues, Dec 1, 8:00 am – 5:00 pm
	Wed, Dec 2, 8:00 am – 12:00 noon
Microwave Microfluidics Workshop	Wed, Dec 2, 1:20 pm – 5:00 pm
IEEE Standards Meeting (P287)	Wed, Dec 2, 9:00 am – 11:00 am
NVNA Users' Forum	Wed, Dec 2, 5:00 pm – 7:00 pm
ARFTG Microwave Measurement Conference and Trade Show Exhibition	Thurs, Dec 3, 8:00 am – 5:00 pm
	Fri, Dec 4, 8:00 am – 12:00 noon
Reception, Awards Banquet, & Entertainment	Thurs, Dec 3, 5:30 pm – 10:00 pm
Georgia Tech Laboratory Tours	Fri, Dec 4, 1:20 pm – 5:00 pm
See <a href="http://www.arftg.org">www.arftg.org</a> for details as changes may happen.	



## Registration

Please see [www.arftg.org](http://www.arftg.org) for **Online Registration** (under the Upcoming Conferences menu) and Student/Retiree/Life Member rates.

Registration:	Before Nov. 15	After Nov. 15
Symposium Package	\$595	\$715
Includes conference, awards banquet, workshops and NVNA Users Forum		
Complete Package	\$880	\$1,055
Symposium package plus short course (all events)		
Short Course only	\$475	\$570
Workshop only	\$200	\$240
Conference only	\$500	\$600
NVNA Users Forum only	Free	Free
Guest Meal (per meal)	\$30	\$30
Guest Awards Banquet	\$65	\$65