

45th Annual Meeting and Symposium of the  
Antenna Measurement Techniques Association



**PRELIMINARY PROGRAM**

Hosted by

Co-Hosted by



# Welcome

I'm excited to welcome you to the 45th Annual Symposium of the Antenna Measurement Techniques Association. Our host committee has worked hard to create an exceptional event. We continue the tradition of featuring a strong technical program and exhibition, as well as an exciting social program.

The technical program kicks off with AMTA Boot Camp, a 1-day course on antenna and related measurement fundamentals taught by a group of seven industry and academic professionals. The technical sessions will be launched by keynote speaker, Dr. Nima Mahanfar, Senior Manager of Antenna Development for Amazon's Project Kuiper. IEEE Invited Speaker, Dr. Stefano Maci of the University of Siena, Italy, will discuss the new paradigm of smart radio environment (SRE) from the perspective of metasurface-based intelligent surfaces (IS). Our EurAAP Invited Speaker, Dr. Manuel Sierra Castañer of the University of Madrid, Spain, will review today's challenges in antenna measurements and summarize some of the most important advances in mobile communications for automotive, space, and defense applications. Dr. Bing Brunton, Professor and H. Stewart Parker Faculty Fellow at the University of Washington, Department of Biology, presents our Thursday Lunch and Learn. This presentation focuses on the transformative potential of data processing, including big data, machine learning, and compressed sensing. In between sessions, make sure you spend time in the Exhibits Hall meeting colleagues from over 30 industry companies. We close our week with an exclusive technical tour of The Boeing Company's iconic 737 Production Facility, birthplace of the world's most popular airliner.

We have a full social calendar for you! Enjoy cocktails and mingle with friends and colleagues at the Welcome Reception. Relax and take in the views during our Monday Night Outing, a private yacht lake cruise. Companion tours offer the chance to visit Seattle's Pike Place Market, the Chihuly Glass Museum, Snoqualmie Falls, local wineries, and Bellevue – "Seattle's Eastside" – for a garden tour and shopping.

Our venue is the Hyatt Regency Lake Washington. City attractions like the Space Needle and Museum of Pop Culture, plus abundant outdoor recreation afforded by Mount Rainier and the waters of the Puget Sound, are around every corner. You'll find a variety of restaurants within walking distance, including local favorite, Ivar's Seafood Bar.

On behalf of the AMTA 2023 Host Committee and co-hosts, The Boeing Company and ETS-Lindgren, we look forward to seeing you in the beautiful Pacific Northwest in October.

Dennis Lewis,  
The Boeing Company



## Who is Exhibiting?

The following companies will be exhibiting this year:

412 TW Benefield Anechoic Facility	Next Phase Measurements
7G aa Co. Ltd	Northrop Grumman Corp.
Advanced Test Equipment Corporation	NSI-MI Technologies
Anritsu	Ophir RF Inc.
AP Americas	PPG Aerospace Cuming Microwave
Century Metal Spinning Co.	QuadSAT
Chamber Services Inc.	Quantic PMI
Delta Sigma Company	Raymond EMC Enclosures LTD
ETS-Lindgren Inc.	Resonant Sciences
ETG Fire	Rohde & Schwarz USA, Inc.
The Hiller Companies	Six Arms
IEEE Antennas and Propagation Society	Sprinkler Innovations
Impulse Technologies	STAR Dynamics Corporation
In Compliance	TDK RF Solutions
Junkosha Inc.	Testforce
Keysight	Virginia Diodes
MVG	

## Future Symposia

- 2024** October 27 - November 1, Cincinnati, OH  
Hosted by Resonant Sciences
- 2025** November 2 - 7, Tucson, AZ  
Hosted by Raytheon Missiles & Defense
- 2026** November 1 - 6, Austin, TX  
Hosted by ETS-Lindgren

## Symposium Benefits

- High-quality technical papers are presented on a continuous basis over four days – no parallel sessions
- Known leading companies related to antenna measurements products and services will present and exhibit
- Practical full-day Boot Camp on antenna measurement fundamentals
- Exclusive technical tour of Boeing's 737 production factory
- Exhibits showcasing the latest innovations in antenna, RCS, and 5G OTA/MIMO measurements
- Networking, social events, and daytime companion tours

## AMTA 2023 Board of Directors

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**President:** Lars Foged

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**Secretary:** Jeff Fordham

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**Meeting Coordinator:** Michelle Lepage

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### AMTA 2023 Host Committee

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**Student Day Coordinator:** Lydell Frasch, The Boeing  
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**Social Events Coordinator:** Emily Lewis

**Graphic Designer:** Pam McClung

**Audio/Visual Coordinator:** Jeff Guerrieri, National  
Voluntary Laboratory Accreditation Program

**Conference Management:** John Vanella, Conference  
Direct

**Technical Tour Coordinator:** Andrew Shyne,  
The Boeing Company

**Mobile Apps Coordinator:** Kim Hassett, Next Phase  
Measurements (NPM)

## 2023 Technical Program Committee

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Francesco D'Agostino, University of Salerno

Justin Dobbins, Raytheon Technologies

Brian Fischer, Resonant Sciences

Lydell Frasch, The Boeing Company (Retired)

Francesco Saccardi, Microwave Vision Group

Manuel Sierra-Castañer, Universidad Politécnica de Madrid

Paul Vizcaino, Reliance Test and Technology (RT&T) - Atlantic  
Test Range (ATR)

Amedeo Capozzoli, University of Naples Federico II

Zhong Chen, ETS-Lindgren

John Locke, Molex Connected Mobile Solutions

Marion Baggett, NSI-MI Technologies

Randy Jost, Ball Aerospace (Retired)

Kubilay Sertel, The Ohio State University

Joshua Gordon, National Institute of Standards and Technology

Jonathan Frasch, The Boeing Company

Nate Roman, The Boeing Company

Domenic Belgiovane, Microwave Vision Group

Claudio Curcio, University of Naples Federico II

Satoru Kurokawa, National Institute of Advanced Industrial  
Science and Technology (AIST)

Adam Mehrabani, SAIC

Stuart Gregson, Next Phase Measurements (NPM)

Jorge Salazar-Cerreño, Oklahoma University

Marc Dirix, Antenna Systems Solutions

José Oliverio Álvarez, Aramco Americas

Amanuel Haile, The Boeing Company

## Student Papers and Travel Scholarship Award Committee

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**Chair: Peter Collins, Resonant Science**

Lydell Frasch, The Boeing Company (retired)

Brian Fischer, Resonant Sciences

Amanuel Haile, The Boeing Company

Alexander Knisely, Air Force Life Cycle Management Center

Fernando Las-Heras, Oviedo University

Teh-Hong Lee, The Ohio State University

Massimiliano Simeoni, European Space Agency

Edward Urbanik, Applied Research Associates

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**Chief Financial Advisor:** David Pinnell, STAR Dynamics

**Historian:** Jeff Guerrieri, National Voluntary Laboratory  
Accreditation Program



# About the Hotel - Venue for AMTA 2023

## The Hyatt Regency Lake Washington At Seattle's Southport

1053 Lake Washington Boulevard North  
Renton, WA, 98056 Phone: +1 (425) 203-1234

[lakewashington.regency.hyatt.com](https://www.hyatt.com/en-US/group-booking/SEARL/G-AM23)

Rooms are available at the AMTA group rate of \$199 USD plus tax for single or double occupancy, available on a first come, first serve basis for reservations made by September 1, 2023. The AMTA group rate includes complimentary high-speed internet access in the guest room. Click here to reserve your room <https://www.hyatt.com/en-US/group-booking/SEARL/G-AM23>

4 Located on the shores of Lake Washington, the Hyatt Regency Lake Washington at Seattle's Southport, a recent AAA Four Diamond and Best of Housekeeping award winner, perfectly combines the natural beauty of the Pacific Northwest with modern amenities. Enjoy close proximity access to Sea-Tac International Airport, downtown Seattle and Bellevue, Mount Rainier National Park, Gene Coulon Memorial Beach Park, and other scenic destinations. Explore the beauty of the Pacific Northwest, then return to your comfortable room in Renton. Hotel guests can enjoy walking the trails along the lake or venture over to The Landing – a family-friendly pedestrian village lined with unique and lively storefronts, over 25 restaurants and lounges, 14 screen cinema, day spas, and boutique shopping. The hotel also boasts a lakeside restaurant with beautiful views, an indoor pool, spa, and a large fitness facility. Many of the 347 spacious guestrooms and suites feature unparalleled views of Lake Washington for the optimal relaxing environment.

In addition, the Boeing Renton facility is adjacent to the Hyatt Regency Lake Washington at Seattle's Southport. Guests can view the recently manufactured Boeing 737 planes as they are prepped for painting from many of the hotel's public spaces

and guest rooms. Boeing's 737 factory at the Renton, WA, site leads the industry as the most efficient airplane factory in the world. More than 14,500 commercial airplanes (707, 727, 737, and 757) or about 30 percent of the worldwide fleet flying today were built in Renton. The P-8, a Navy submarine hunter and maritime patrol aircraft, and a military derivative of the 737-800, is also built at the Renton facility.



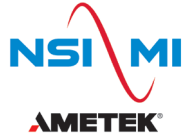
# Social Calendar

## Sunday, October 8

### Welcome Reception

6 - 7:30 p.m.

Sponsored by AMETEK  
NSI-MI Technologies



Enjoy drinks and appetizers with friends and colleagues at the Hyatt Lake Washington, while enjoying a scenic sunset view of the lake. This event is complimentary to all registered symposium participants and their guests.

## Monday, October 9

### Monday Night Outing

5:30 - 9:30 p.m.

Sponsored by Microwave Vision Group (MVG) and Next Phase Measurements (NPM)



Ahoy mates! Join us for a three-hour cruise including a champagne toast upon boarding the Waterways Olympic Star luxury yacht. Enjoy a delicious gourmet dinner buffet and spectacular views along Lake Union and Lake Washington. Nautical attire encouraged. Cocktails may be purchased at the no-host bar. Boarding starts at 5:30 p.m. from the dock at the Hyatt Regency Lake Washington. Sailing starts at 6 p.m. SHARP! Return to the Hyatt Regency Lake Washington dock between 9 and 9:30 pm. Cost: \$100.

## Tuesday, October 10

### Student Day

11 a.m. - 7 p.m.



Dinner Sponsored by STAR Dynamics  
Team Prize Sponsored by Resonant Sciences

Student Day will provide an opportunity for local university students to get a taste of antenna engineering and related disciplines by interacting with practicing engineers in a variety of venues. As in previous years, students will be able to tour vendor exhibits, sit in on papers, and enjoy a complimentary meal while listening to a presentation targeting issues relevant to those soon entering the engineering profession. In addition, AMTA will host a hands-on Student Day Design Contest. This will give students an opportunity to show off their engineering skills to recruiters (students should bring their resumes!) and have fun at the same time. Details are forthcoming, so keep checking the AMTA 2023 website for the latest updates. Cost: Complimentary to all student attendees.

## Wednesday, October 11

**Banquet Reception 6:30 - 7:30 p.m.**

**Banquet Dinner and Awards**

**7:30 - 9:30 p.m.**

Banquet wine sponsored by the Microwave Vision Group (MVG)



The AMTA 2023 Awards Banquet Reception will take place in the Lake Washington Ballroom pre-function space and the Awards Banquet will be held in the Lake Washington Ballroom. The banquet dinner is included with full registrations and additional tickets may be purchased at a cost of \$95 per ticket. During the registration process, you will be asked to select your choice of entrée. Enjoy dinner with wine, plus you may come away with a great bingo prize!

## Thursday, October 12

### Women in Engineering Reception

6 - 8 p.m.

Sponsored by ETS-Lindgren  
and The Boeing Company



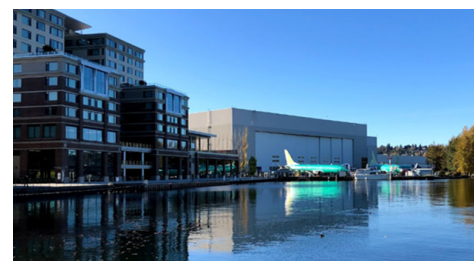
NEW for AMTA 2023! This event welcomes all AMTA symposium registrants and the local IEEE community to promote collaboration, with a spotlight on the work of female RF/Microwave engineers, researchers, and other contributors to our profession. Everyone is welcome - men and women - to attend and enjoy inspiring discussions and networking opportunities! Appetizers and drinks are included in the \$18 ticket price.

## Friday, October 13

### Technical Tour – Boeing 737 Production Facility Renton 9 a.m. - 1 p.m.

Welcome to Boeing's iconic 737 Production factory located in Renton, Washington, adjacent to the Hyatt Lake Washington Hotel. This sprawling facility has been at the forefront of commercial aviation for decades, serving as the birthplace of the world's most popular airliner, the Boeing 737. With its state-of-the-art manufacturing processes and dedicated workforce, the Renton factory remains a symbol of innovation, precision engineering, and the ongoing legacy of Boeing's commitment to excellence in the aerospace industry. Attendance is limited to symposium registrants and will be confirmed on a first-come, first-served basis. Cost: \$65

NOTE: All attendees will be required to provide an approved form of identification on-site in order to enter the Boeing facility. Foreign Nationals will need to submit additional information not later than three weeks in advance of the tour date. Further details to follow.





# Companion Tours\*

## Pike Place and Chihuly Glass Museum

**Monday, October 9**

**9 a.m. - 3:30 p.m.**

Established in 1907, Pike Place Market is home to over 150 craftspeople, 70 farmers, 60 public entertainers, many unique shops, and is the #1 most visited location in Seattle. Ride the elevated Monorail, built for the 1962 World's Fair, to the "Center of the (Seattle) Center" where we'll have lunch as a group. Next, visit the Chihuly Glass Museum and Garden located at the base of the iconic Space Needle. Learn about world-renowned glass artist Dale Chihuly. Wander the garden with its unique plant collection designed to complement Chihuly's work. Meet in the Hyatt lobby at 8:45 a.m.

Lunch is on your own. Cost: \$85



## Snoqualmie Falls and Wine Tasting

**Tuesday, October 10**

**9:15 a.m. - 3 p.m.**

Travel in style...settle into our chauffeured limousine and travel to Snoqualmie Falls, one of Washington's most popular scenic attractions. You may recognize it as the setting for "Twin Peaks," the TV series and a cult classic movie. At the falls, we'll walk through the historic Salish Lodge and overlook the famous 270 foot waterfall. We'll have lunch on our drive to Woodinville's wine country. Enjoy wine tasting at DeLille Cellars. On the way back to the hotel, we'll stop at the magnificent Chateau Ste. Michelle grounds to take photos and visit the gift shop. Meet in the Hyatt lobby at 9 a.m. Lunch is included. Cost: \$90



## Bellevue Botanical Garden and The Shops at The Bravern

**Wednesday, October 11**

**9:30 a.m. - 2:30 p.m.**

In 1981, Cal & Harriet Shorts left their "arboretum" land to the City of Bellevue, providing it remain a public park. In 2022, the 53-acre garden celebrated its 30th anniversary. Travel by chauffeured limousine and enjoy a private docent-led walking tour. Garden features include the Lost Trail, Urban Meadow, and the contemplative Tao Garden. Next, shop - or window-shop! - and soak in the ambience at The Shops at The Bravern. Its prestigious collection includes Gucci, Louis Vuitton, and Prada. We'll enjoy lunch as a group at one of the many restaurants. Meet in the Hyatt lobby at 9:15 a.m. Lunch is on your own. Cost: \$60.



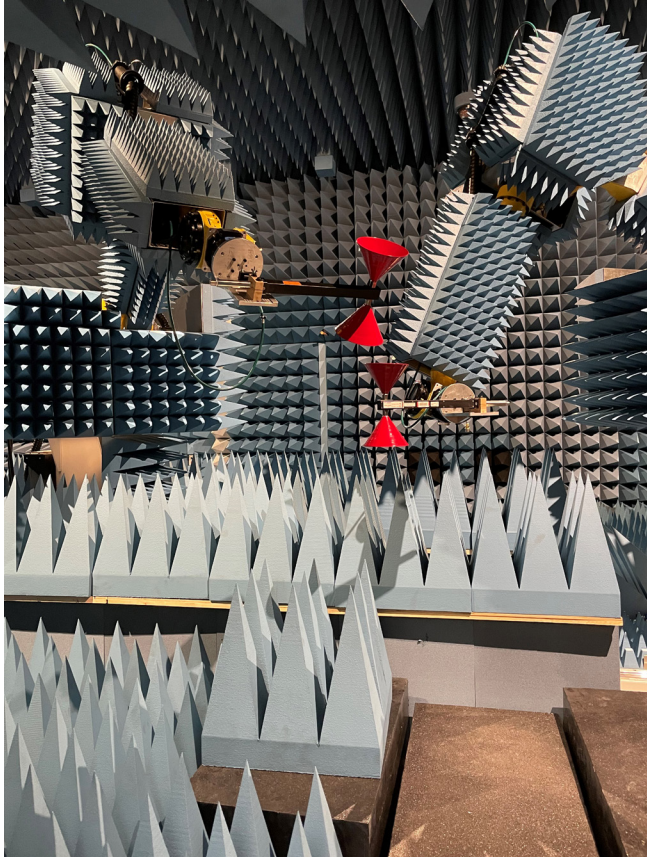
\* Attendance is limited at all Companion Tours; tours will be filled on a first come, first served basis. Comfortable walking shoes are recommended for all tours. Please bring money for lunch on Monday and Wednesday tours and for gratuities (all tours).

## Sunday, October 8

7:15 - 8 a.m. Registration

8 a.m. - 5:15 p.m. Technical Program

The AMTA Boot Camp is a 1-day course on antenna and related measurement fundamentals. Live hands-on demonstrations complement the material presented. The Boot Camp is ideal for those new to the antenna and related measurements community and for those who would appreciate an update or “refresher” course on these topics. Instructors are specialists from industry and academia who were selected based not only on their expertise, but for their ability to communicate effectively. Topics address antenna, radar cross section, material, RF, and EMC/EMI measurements. The Boot Camp program concludes with a discussion on new innovations and trends in antenna measurements. View the AMTA 2023 website to see the full list of instructors as well as their respective topics and biographies. Breakfast, lunch, and coffee breaks are provided for all registered attendees.



## Dr. Nima Mahanfar

Amazon Project Kuiper

## Monday, October 9

8:15 - 8:55 a.m.

Nima Mahanfar, Ph.D. has been leading satellite phased array antenna and customer terminal development for Amazon since 2018, when he joined as a founding team member of Project Kuiper. He has 20+ years of experience leading research and development in RF and antennas at SpaceX, Microsoft, and Nokia. At SpaceX, he was a founding member of the Starlink program, where he built and led the Phased Array Team and developed several generations of phased arrays for satellite payloads. At Microsoft, as Director of Antennas and RF Engineering, he built and led a center of excellence for antenna and RF development for consumer electronics, such as Xbox and HoloLens products, shipping tens of millions of products for consumer use. Previously, he held engineering and leadership roles in consumer electronics at Nokia and Sierra Wireless.

He received his Ph.D. in electrical engineering from Université de Limoges (France) in 2005. He has authored and co-authored over 70 conference papers, journal articles, and patents in the field of antennas for satellites and wireless communication applications.

Project Kuiper is Amazon's initiative to increase global broadband access through a constellation of satellites in low Earth orbit (LEO). Its mission is to deliver fast, affordable broadband to unserved and underserved communities around the world. Some of the challenges include building large, wideband spaceborne phased arrays for the satellite payload, as well as low-cost phased arrays for customer terminals that can be manufactured at scale.

# IEEE AP-S Invited Speaker

# EurAAP Invited Speaker



**Stefano  
Maci**

University of  
Siena, Italy



**Manuel Sierra  
Castañer**

University of Madrid,  
Spain

**Tuesday, October 10**

**8 - 8:30 a.m.**

8 Stefano Maci (F04) received the Laurea Degree cum Laude at University of Florence in '87 and from '97 is a Professor at the University of Siena. In 2004-2007 he was WP leader of the Antenna Center of Excellence (ACE, FP6-EU) and in 2007-2010 he was International Coordinator of a 24-institution consortium of a Marie Curie Action (FP6). In 2004, he was the founder of the European School of Antennas (ESoA), a post graduate school that presently comprises 34 courses on Antennas, Propagation, Electromagnetic Theory, and Computational Electromagnetics with 150 teachers coming from 15 countries.

Professor Maci has been Director of the Ph.D. program in Information Engineering and Mathematics of University of Siena and was a member of the first National Italian Committee for Qualification to Professor. He was the recipient of the EurAAP Award in 2014, of the IEEE Schelkunoff Transaction Prize in 2016, of the Chen-To Tai Distinguished Educator Award in 2016, and of the URSI Dellinger Gold Medal in 2020. He was the Chair of EuCAP 2023 and currently is President of the IEEE Antennas and Propagation Society (AP-S).

The research interests of Prof Maci include high-frequency and beam representation methods, computational electromagnetics, large phased arrays, planar antennas, reflector antennas and feeds, metamaterials and metasurfaces. His research activity is documented in over 200 papers published in international and IEEE journals, 10 book chapters, and some 450 papers in proceedings of international conferences. The papers he coauthored have been cited more than 10,000 times (h index 50, source: Google Scholar).

**Wednesday, October 11**

**8 - 8:30 a.m.**

Manuel Sierra Castañer was born in 1970 in Zaragoza (Spain). He obtained the degrees of Telecommunication Engineering in 1994 and the Ph.D. in 2000, both from the Technical University of Madrid (UPM) in Spain, where he is Full Professor since 2017. During the summers of 2012 and 2013, he was a visiting Professor at Tokyo Tech. He is a Senior Member of the IEEE and Fellow of the AMTA. Since January 2016, he has been a member of the EurAAP (European Association on Antennas and Propagation) Board of Directors, serving as the EurAAP Vice Chair from 2019 to 2021. He was the General Chair of EuCAP 2022 in Madrid. Currently, he is the Dean of the Telecommunications School of Universidad Politécnica de Madrid and has been appointed as the EurAAP ambassador for 2023 to 2024.



# Lunch & Learn Keynote Speaker



**Bing Wen  
Brunton**

**Thursday, October 12**

**Noon - 1:30 p.m.**

## Data-Driven Analytic Methods for Sparse, Dynamic Models of Multimodal Brain and Behavior Data

**Abstract:** Discoveries in modern biology are increasingly driven by quantitative understanding of data, and my work lies at the emerging, fertile intersection of computation and biology. I lead an interdisciplinary research group developing data analytic methods that are applied to, and are inspired by, neuroscience and behavior. I am particularly interested in exploring natural behaviors in diverse animals, including humans. In this talk, I will highlight several projects where we seek understanding of and inspiration from living systems, which provide proof by existence that sparse sensing, processing, and computation can achieve remarkably agile and rapid control in complex, nonlinear, and uncertainty environments.



Bing Wen Brunton joined the faculty at University of Washington (UW) in 2014 to build an interdisciplinary research program at the intersection of biology, neuroengineering, and data science. She is currently a Professor and H. Stewart Parker Faculty Fellow at the Department of Biology, with affiliations at the eScience Institute for Data Science, the Paul G. Allen School of Computer Science & Engineering, and the Department of Applied Mathematics. She studied at Caltech (2006, B.S. in Biology, focus on biophysics) and then Princeton (2012, Ph.D. in Neuroscience, focus on computational and systems neuroscience). Her postdoctoral work (2012--2014, University of Washington) expanded her expertise in applied mathematics, dynamical systems, and neuroengineering.

Her lab now develops data-driven analytic methods that are applied to, and are inspired by, neuroscience. The Brunton Lab is particularly interested in uncovering spatiotemporal patterns in high-dimensional, time-series data, especially exploring the neural basis of naturalistic movements in diverse animals. She has demonstrated a strong record of working collaboratively as a part of interdisciplinary teams, as well as mentoring early career researchers interested in advancing both methods development and neuroscience questions. Her work has been recognized with awards and honors, including the Alfred P. Sloan Foundation Fellowship in Neuroscience (2016), a UW Innovation Award (2017), a Young Investigator Program Award from the Air Force Office of Scientific Research (2018), and as a Weill Neurohub Investigator (2020) and a Moore Distinguished Scholar for visiting faculty at Caltech (2021).

Read more about our inspiring AMTA 2023 Lunch & Learn Keynote Speaker [here](#) and the Brunton Lab at University of Washington, Seattle [here](#).

**Introduction by Zhong Chen, AMTA 2023 Host Committee:**  
*Antenna engineers face the dual challenge of dealing with either excessive or insufficient data. In situations with excessive data, it becomes necessary to reduce the data dimension to uncover the underlying physical meaning. Conversely, limitations such as time constraints or limited data collection may hinder engineers from obtaining sufficient data, e.g., necessitating sub-Nyquist rate sampling. As an example, compressed sensing may serve as a valuable tool for such scenarios. Our Lunch & Learn Keynote presentation focuses on the transformative potential of data processing, utilizing modern data analytical tools in the context of biology applications. Having personally watched several of Bing's enlightening talks on YouTube, such as the one at [www.youtube.com/watch?v=N\\_nd4HN3NVc](https://www.youtube.com/watch?v=N_nd4HN3NVc), I found a great deal of inspiration for my own research work.*

# Preliminary Technical Program

This program is preliminary and is subject to change. Updated listings can be found at [2023.amta.org](http://2023.amta.org).

## Monday, October 9

- 8 - 9 a.m.** Meeting Opening/Keynote Address
- 8 - 8:10 a.m.** Welcome and Introduction of Keynote  
Speaker: Lars Foged (AMTA President)
- 8:15 - 8:55 a.m.** Keynote Speaker: Nima Mahanfar,  
Amazon Kuiper
- 8:55 - 9 a.m.** Opening Remarks and Technical Session  
Overview: Cosme Culotta-López (Technical  
Coordinator)

### Session 1

#### 9 - 10 a.m. Space Applications

- 9 - 9:20 a.m.** 0746\_1123\_000135  
**Comparative Analysis of GNSS Measurements Produced by  
Real and Emulated Satellites via 3D Wave Field Synthesis in  
an OTA Testbed**  
Renato Zea Vintimilla<sup>1</sup>, Mario Lorenz<sup>2</sup>, Nitin Muchhal<sup>1</sup>, Markus  
Landmann<sup>2</sup>, Giovanni del Galdo<sup>1</sup>, <sup>1</sup>Technische Universität  
Ilmenau, <sup>2</sup>Fraunhofer Institute for Integrated Circuits IIS

- 9:20 - 9:40 a.m.** 0746\_1123\_000039  
**BIOMASS Calibration Transponder Antenna Measurements  
in ESA-ESTEC HERTZ Facility**  
Ines Barbary<sup>1</sup>, Luis Rolo<sup>1</sup>, Eric Van Der Houwen<sup>1</sup>, Mauro  
Bandinelli<sup>2</sup>, Davide Bianchi<sup>2</sup>, Dean Rowsell<sup>3</sup>, Mike Royle<sup>3</sup>,  
<sup>1</sup>European Space Agency, ESTEC, <sup>2</sup>IDS Ingegneria Dei Sistemi,  
<sup>3</sup>C-Core

- 9:40 - 10 a.m.** 0746\_1123\_000042  
**Using the Three-Antenna Gain Method to Improve  
Measurement Accuracy for VHF Satellite and Space  
Applications**  
Bennett Gibson-Dunne<sup>1</sup>, Greg Brzezina<sup>2</sup>, Ken Oueng<sup>2</sup>, Adrian  
Momciu<sup>2</sup>, <sup>1</sup>University of Waterloo, <sup>2</sup>Canadian Space Agency at  
the David Florida Lab

#### 10 - 10:30 a.m. MORNING BREAK

### Session 2

#### 10:30 a.m. - 12:10 p.m. Recent European Activities

- 10:30 - 10:50 a.m.** 0746\_1123\_000071  
**Updated Status on the Activities of the EurAAP Working  
Group on Antenna Measurements**

Lucia Scialacqua<sup>1</sup>, Tian Loh<sup>2</sup>, Javier Fernández Álvarez<sup>3</sup>, Michael  
Mattes<sup>3</sup>, Lars Foged<sup>1</sup>, Manuel Sierra-Castañer<sup>4</sup>, <sup>1</sup>Microwave  
Vision Italy, <sup>2</sup>National Physical Laboratory, <sup>3</sup>DTU, <sup>4</sup>Universidad  
Politécnica de Madrid

- 11:10 - 11:30 a.m.** 0746\_1123\_000087  
**Recent Activities of a European Union Joint Research Project  
on Metrology for Emerging Wireless Standards**  
Tian Hong Loh<sup>1</sup>, Wei Fan<sup>2</sup>, Djamel Allal<sup>3</sup>, Akram Alomainy<sup>4</sup>,  
Frédéric Pythoud<sup>5</sup>, Emrah Tas<sup>5</sup>, <sup>1</sup>National Physical Laboratory,  
<sup>2</sup>Aalborg University, <sup>3</sup>Laboratoire National de Métrologie et  
D'Essais, <sup>4</sup>Queen Mary University of London, <sup>5</sup>The Federal  
Institute of Metrology METAS

- 11:30 - 11:50 a.m.** 0746\_1123\_000090  
**Simulation Based Uncertainty Analysis for Radiation Pattern  
Measurements Using an Active Radar Module**  
Anna Granich<sup>1</sup>, Murat Sözer<sup>1</sup>, Dirk Heberling<sup>1,2</sup>, <sup>1</sup>Institute of High  
Frequency Technology, RWTH Aachen University, <sup>2</sup>Fraunhofer  
Institute for High Frequency Physics and Radar Techniques FHR

- 11:50 a.m. - 12:10 p.m.** 0746\_1123\_000091  
**Bistatic Measurements of Binary Reconfigurable Intelligent  
Surfaces in a CATR**  
Florian Reher, Henrik Jansen, Dirk Heberling, Institute of High  
Frequency Technology, RWTH Aachen University

#### 12:10 - 1:30 p.m. EXHIBITOR SPONSORED LUNCH

### Session 3

#### 1:30 - 3:10 p.m. Antennas and Measurements for 5G and Future Communication Systems

- 1:30 - 1:50 p.m.** 0746\_1123\_000028  
**Enhanced Simulation-Augmented OTA Technique Applied to  
Absorbed Power Density Evaluation**  
Benoit Derat<sup>1</sup>, Thorsten Liebig<sup>2</sup>, David Schaefer<sup>2</sup>, Winfried  
Simon<sup>2</sup>, <sup>1</sup>Rohde and Schwarz GmbH & Co. KG, <sup>2</sup>IMST GmbH

- 1:50 - 2:10 p.m.** 0746\_1123\_000065  
**Observing a mm-Wave Metamaterial Lens from the  
Perspectives of Near-to-Far Field and CATR**  
Sungtek Kahng<sup>1</sup>, Yejune Seo<sup>1</sup>, Jaewon Koh<sup>1</sup>, Woogon Kim<sup>1</sup>,  
Dongjin Lim<sup>2</sup>, Jongpil Kim<sup>2</sup>, <sup>1</sup>Incheon National University, <sup>2</sup>C&G  
Microwave Co. Ltd.

- 2:10 - 2:30 p.m.** 0746\_1123\_000119  
**Performance Evaluation of RU and RIS Based on OTA  
Mode Near Field and Bistatic Measurement Systems**  
Chang-Lun Liao<sup>1,2</sup>, You-Hua Lin<sup>2,3</sup>, Ike Lin<sup>3</sup>, Chang-Fa Yang<sup>2</sup>,



# Preliminary Technical Program

<sup>1</sup>Telecommunication Laboratories Chunghwa Telecom Co., Ltd., <sup>2</sup>National Taiwan University of Science and Technology, <sup>3</sup>WaveFidelity Inc.

**2:30 - 2:50 p.m.** 0746\_1123\_000125

## **Enhancing On-Chip Antenna Calibration: A Hybrid Multi-Axis Scanner Enabling Near-Field and Far-Field Measurements for Over-the-Air Calibration**

Edgar Oblitas<sup>1</sup>, Jorge Salazar-Cerreno<sup>1</sup>, Andy Bonthron<sup>2</sup>, Edmond Megerdichian<sup>2</sup>, Ivan Rodionov<sup>2</sup>, Maha Achour<sup>2</sup>, <sup>1</sup>Advanced Radar Research Center (ARRC), The University of Oklahoma, <sup>2</sup>Metawave Corporation

**2:50 - 3:10 p.m.** 0746\_1123\_000023

## **Predication of Planar Near-Field Measurements Based on Full-Wave Three-Dimensional CEM Measurement Simulation**

Rostyslav Dubrovka<sup>1</sup>, Robert Jones<sup>1</sup>, Clive Parini<sup>1</sup>, Stuart Gregson<sup>2</sup>, <sup>1</sup>Queen Mary University of London, <sup>2</sup>Next Phase Measurements

**3:10 - 3:30 p.m.** **AFTERNOON BREAK**

## **Session 4**

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**3:30 - 5:30 p.m.** Standards and Characterization

**3:30 - 3:50 p.m.** 0746\_1123\_000024

## **The Demystification and Measurement of Receiving Efficiency**

Ryan Cutshall, Justin Dobbins, Raytheon Technologies

**3:50 - 4:10 p.m.** 0746\_1123\_000076

## **Revision Progress: IEEE Std 1720 Recommended Practice for Near-Field Antenna Measurements**

Lars Jacob Foged<sup>1</sup>, Justin Dobbins<sup>2</sup>, Vince Rodriguez<sup>3</sup>, Jeff Fordham<sup>3</sup>, Vikass Monebhurrn<sup>4</sup>, <sup>1</sup>MVG, <sup>2</sup>Raytheon Technologies, <sup>3</sup>AMETEK / NSI-MI Technologies, <sup>4</sup>CentraleSupélec

**4:10 - 4:30 p.m.** 0746\_1123\_000136

## **Progress on the Development of IEEE Std 1128 - Recommended Practice on Absorber Evaluation**

Zhong Chen<sup>1</sup>, Lars Foged<sup>2</sup>, Vince Rodriguez<sup>3</sup>, <sup>1</sup>ETS-Lindgren, Inc., <sup>2</sup>MVG, <sup>3</sup>AMETEK / NSI-MI Technologies

**4:30 - 4:50 p.m.** 0746\_1123\_000078

## **Antenna Gain Calibration with Improved Accuracy Modeling of Pyramidal Standard Gain Horns, Part 2**

Domenic Belgiovane<sup>1</sup>, Andrea Giacomini<sup>2</sup>, Edwin Barry<sup>3</sup>, Justin Dobbins<sup>1</sup>, Lars Foged<sup>2</sup>, Francesco Saccardi<sup>2</sup>, <sup>1</sup>Raytheon Technologies, <sup>2</sup>Microwave Vision Italy, <sup>3</sup>AMETEK / NSI-MI Technologies

**4:50 - 5:10 p.m.** 0746\_1123\_000113

## **A 5G NR FR1 UWB Vivaldi Antenna as Benchmark for the Development of Standard IEEE P2816** Vikass Monebhurrn, CentraleSupélec

**5:10 - 5:30 p.m.** 0746\_1123\_000054

## **Modified Thru-Reflect-Match Polarimetric Calibration Technique for Focused Beam Systems**

Jeffrey Massman<sup>1</sup>, Michael Havrilla<sup>2</sup>, <sup>1</sup>Air Force Research Laboratory (AFRL), <sup>2</sup>Air Force Institute of Technology

## **Tuesday, October 10**

**8 - 8:25 a.m.** Invited IEEE AP-S Speaker: Prof. Stefano Maci

**8:25 - 8:30 a.m.** Daily Announcements and Technical Session Overview by Technical Coordinator

**11 a.m. - 7 p.m.** Student Day

## **Session 5**

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**8:30 - 9:30 a.m.** Imaging, Algorithms, and Processing Techniques

**8:30 - 8:50 a.m.** 0746\_1123\_000022

## **Novel Application of Compressed Sensing in Cylindrical Mode Filtering for Far-Field Antenna Measurements**

Zhong Chen<sup>1</sup>, Stuart Gregson<sup>2</sup>, Yibo Wang<sup>1</sup>, <sup>1</sup>ETS-Lindgren, Inc., <sup>2</sup>Next Phase Measurements

**8:50 - 9:10 a.m.** 0746\_1123\_000034

## **A Novel Data Processing Technique for Calibrating Low Frequency Antennas with Long Ring Down Time in An Extrapolation Range**

Yibo Wang<sup>1</sup>, Zhong Chen<sup>1</sup>, Dennis Lewis<sup>2</sup>, Wayne Cooper<sup>2</sup>, <sup>1</sup>ETS-Lindgren, Inc., <sup>2</sup>The Boeing Company

**9:10 - 9:30 a.m.** 0746\_1123\_000036

## **Machine Learning Based Fourier Phase Retrieval for Planar Near-Field Antenna Measurements**

Marc Dirix<sup>1</sup>, Stuart Gregson<sup>2,3</sup>, <sup>1</sup>Antenna Systems Solutions, <sup>2</sup>Next Phase Measurements, <sup>3</sup>Queen Mary University of London

**9:30 - 10 a.m.** **MORNING BREAK**

# Preliminary Technical Program

## Session 6

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**10 a.m. - 12:10 p.m. Antenna Measurements I**

**10 - 10:20 a.m.** 0746\_1123\_000005

**Long-Distance Antenna Gain Measurements Employing RF-Over-Fiber VNA in Ka-Band**

Björn Möhring, Dragan Subasic, Airbus Defence and Space GmbH

**10:20 - 10:50 a.m.** 0746\_1123\_000010

**A New Closed Form Field Asymptotic Expansion Applied to Far-field Evaluation of Antenna Arrays at Short Range Lengths**

Benoit Derat, Rohde and Schwarz GmbH & Co. KG

**10:50 - 11:10 a.m.** 0746\_1123\_000019

**Electric-Field Pattern Measurements of Acoustically Driven Piezoelectric Field Emitters**

Srinivas Prasad Mysore Nagaraja, Brook Feyissa, Tristan Wilson, Jack Bush, Darmindra Arumugam, Jet Propulsion Laboratory

**11:10 - 11:30 a.m.** 0746\_1123\_000053

**Constrained FoV Radiated Power as a Figure of Merit of Phased Arrays**

Alejandro Antón Ruiz<sup>1</sup>, Samar Hosseinzadegan<sup>2</sup>, John Kvarnstrand<sup>2</sup>, Klas Arvidsson<sup>2</sup>, Andrés Alayón Glazunov<sup>3</sup>, <sup>1</sup>University of Twente, <sup>2</sup>Bluetest AB, <sup>3</sup>University of Linköping

**11:30 - 11:50 a.m.** 0746\_1123\_000060

**Proficiency Test for Verification of Measurement Identity of Antenna Calibration Between Korea Accreditation Agencies**

Jeongan Lee, Youngho Kim, Sol Choi, Jonghyuk Lim, Jongkuy Park, Radio Research Agency

**11:50 a.m. - 12:10 p.m.** 0746\_1123\_000083

**Evaluation of the Far-Field Pattern Radiated by a Long AUT in Presence of an Infinite Perfectly Conducting Ground Plane from Spherical Spiral Near-Field Measurements**

Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero, Massimo Migliozzi, University of Salerno

**12:10 - 1:30 p.m. BUSINESS LUNCH**

## Session 7

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**1:30 - 3:30 p.m. Near-Field Measurements I**

**1:30 - 1:50 p.m.** 0746\_1123\_000009

**Design and Performance Comparison of 3D Metal Printed Near Field Probe for K-Ka Band**

Ila Agnihotri, Kymeta Corporation

**1:50 - 2:10 p.m.** 0746\_1123\_000014

**Antenna Coupling Evaluation Based on Accurate Measured Source Models and Simulations**

Lucia Scialacqua<sup>1</sup>, C. J. Reddy<sup>2</sup>, Lars Foged<sup>1</sup>, <sup>1</sup>Microwave Vision Italy, <sup>2</sup>Altair Engineering, Inc

**2:10 - 2:30 p.m.** 0746\_1123\_000017

**Planar Wide Mesh Scanning using Linear Multi-Probe Systems**

Fernando Rodriguez Varela<sup>1</sup>, Manuel Sierra-Castañer<sup>2</sup>, Francesco Saccardi<sup>3</sup>, Lucia Scialacqua<sup>3</sup>, Kim Hassett<sup>4</sup>, Lars Foged<sup>3</sup>, <sup>1</sup>Universidad Rey Juan Carlos de Madrid, <sup>2</sup>Universidad Politécnica de Madrid, <sup>3</sup>Microwave Vision Italy, <sup>4</sup>Orbit Advanced Technologies, Inc. (MVG)

**2:30 - 2:50 p.m.** 0746\_1123\_000029

**A Simple Non-Linear Planar Near-Field Antenna Measurement System**

Jason Jerauld, Tarron Teeslink, Felix Yuen, Nathan Landy, Tom Driscoll, Echodyne Corporation

**2:50 - 3:10 p.m.** 0746\_1123\_000123

**On the Use of Probe Signal Derivatives in Spherical Near-Field Antenna Measurements**

Olav Breinbjerg<sup>1</sup>, Kyriakos Kaslis<sup>2</sup>, <sup>1</sup>EIMaReCo, <sup>2</sup>Technical University of Denmark

**3:10 - 3:30 p.m.** 0746\_1123\_000045

**Impact of Missing Absorber on Near Field Measured Antenna Patterns**

Yanyan Zhang, Rodney Vaughan, Simon Fraser University

**3:30 - 4 p.m. AFTERNOON BREAK**

## Session 8

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**4 - 5:30 p.m. Poster Session I**

0746\_1123\_000032 **Phase Measurement for 5G NR Modulated-Signal Using Rapid Spherical Near-Field System with Probe-Receiver Combined Array**

Jong-Hyuk Lim<sup>1,2</sup>, Jungkuy Park<sup>1</sup>, Dong-Woo Kim<sup>2</sup>, Soon-Soo Oh<sup>2</sup>, <sup>1</sup>Radio Research Agency, <sup>2</sup>Chosun University

0746\_1123\_000035 **Compressive Sensing Applied to Planar Near-Field Based Array Antenna Diagnostics for Production Testing**

Clive Parini<sup>1</sup>, Stuart Gregson<sup>2</sup>, <sup>1</sup>Queen Mary University of London, <sup>2</sup>Next Phase Measurements

0746\_1123\_000048 **Range-Doppler Imaging Method Based on FFT-MUSIC for FMCW Radar**

Sangdong Kim<sup>1</sup>, Bong-seok Kim<sup>1</sup>, Jonghun Lee<sup>1</sup>, Tarun



# Preliminary Technical Program

Chawla<sup>2</sup>, Greg Skidmore<sup>2</sup>, Ram Narayanan<sup>3</sup>, <sup>1</sup>DGIST, <sup>2</sup>remcom, <sup>3</sup>Pennsylvania State University

0746\_1123\_000049 **Total Radiated Power Measurements in a Hybrid Anechoic-Reverberation Chamber**

Pavlo Krasov<sup>1</sup>, Oleg Lupikov<sup>1</sup>, Rob Maaskant<sup>1</sup>, Jonas Friden<sup>2</sup>, Marianna Ivashina<sup>1</sup>, <sup>1</sup>Chalmers University of Technology, <sup>2</sup>Ericsson

0746\_1123\_000057 **Measurements on Extended Long Objects for Radar Field Probes**

Pax Wei, Boeing

0746\_1123\_000058 **Near Field Measurement and Analysis in Frequency Ranges of 20 GHz to 90 GHz**

Jungkuy Park, Sol Choi, Korea Radio Research Agency

0746\_1123\_000059 **Uncertainty Evaluation of Millimeterwave(20GHz) Antenna Measurement System**

Sol Choi, Jeong-An Lee, Jong-hyuk Lim, Jung-kyu Park, Korea Radio Research Agency

0746\_1123\_000068 **Designing 3D-Printed Patch Antennas with Varying Infill Densities**

Bibek Kattel, Winn Hutchcraft, Richard Gordon, University of Mississippi

0746\_1123\_000070 **An Investigation on SLA-Printed Waveguide Components at 10 GHz - 15 GHz**

Snorre Skeidsvoll, Cosme Culotta-Lopez, QuadSAT ApS

0746\_1123\_000072 **Compact Antenna Test Range using Offset Gregorian Antenna for Over 100 GHz Antennas and Metamaterial Reflector**

Michitaka Ameya, Yuto Kato, AIST

0746\_1123\_000073 **New Designs for a Feed Fence to Reduce the Direct Coupling to the Quiet Zone on Compact Ranges**

Mark Ingerson, Vince Rodriguez, Daniel Janse van Rensburg, Anil Tellakula, NSI-MI Technologies

0746\_1123\_000074 **Diverse Utilization of an Anechoic Chamber for Automated Electronic Warfare (EW) Testing in Support of Explosive Ordnance Disposal (EOD)**

Joseph Friedel, David Oyediran, Thomas Higdon, NSWC-IH

0746\_1123\_000080 **Compact RCS Test Range Feed Carousel and Baffle House Design**

Gil Yemini<sup>1</sup>, Stefano Sensani<sup>1</sup>, Andrea Giacomini<sup>2</sup>, Lars Foged<sup>2</sup>, Marcel Boumans<sup>3</sup>, <sup>1</sup>ORBIT/FR Engineering Ltd. MVG, <sup>2</sup>Microwave Vision Italy, <sup>3</sup>Antenna Measurement Experts GmbH

0746\_1123\_000086 **Testing of a Dielectric-Filled Ridged Waveguide System for Oil/Water Ratio Measurements**

Jose Alvarez, Aramco Americas: Aramco Research Center – Houston

**5:15 - 6:30 p.m. IEEE 149 Near-Field Working Group Meeting**

## Wednesday, October 11

**8 - 8:25 a.m.** Invited EurAAP Speaker, Prof. Manuel Sierra Castañer

**8:25 - 8:30 a.m.** Daily Announcements and Technical Session Overview by Technical Coordinator

### Session 9

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**8:30 - 9:30 a.m. RF Material Design and Characterization**

**8:30 - 8:50 a.m.** 0746\_1123\_000011 **Design and Validation of Material Properties of Additively Manufactured Latticed Material**

Anna Stumme, Alexander Golding, Mark Dorsey, Scott Rudolph, US Naval Research Laboratory

**8:50 - 9:10 a.m.** 0746\_1123\_000044 **An In-Situ Probe for Continuous Dielectric Permittivity Monitoring**

John Schultz, Compass Technology Group

**9:10 - 9:30 a.m.** 0746\_1123\_000134 **New Methods for Extraction of VHF Electrical Properties of Conductive Coatings**

Ren Geryak, John Schultz, Compass Technology Group

**9:30 - 10 a.m. MORNING BREAK**

### Session 10

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**10 a.m. - 12:10 p.m. Antenna Measurements II**

**10 - 10:20 a.m.** 0746\_1123\_000096 **On the Limitations of Off-normal-incident Measurement of Reflectivity Performance of Microwave Absorbers**

Vince Rodriguez<sup>1</sup>, Amin Enayati<sup>2</sup>, <sup>1</sup>NSI-MI Technologies, <sup>2</sup>E&C Anechoic Chambers NV

# Preliminary Technical Program

**10:20 - 10:50 a.m.** 0746\_1123\_000101

## **Estimating Uncertainties of System Level RF Parameters of Transponder Spacecraft Payloads**

Edwin Barry, Pieter Betjes, Patrick Pelland, Daniël Janse van Rensburg, AMETEK / NSI-MI Technologies

**10:50 - 11:10 a.m.** 0746\_1123\_000115

## **Automotive Antenna Test Facility Comparison and Evaluation with a Standard Gain Horn Antenna**

Daniel Aloï<sup>1</sup>, Luis Rivera<sup>2</sup>, Robert Nelson<sup>2</sup>, Ali Attaran<sup>2</sup>, John Locke<sup>2</sup>, <sup>1</sup>Oakland University, <sup>2</sup>Ford Motor Company

**11:10 - 11:30 a.m.** 0746\_1123\_000027

## **NIST's Antenna Gain and Polarization Calibration Service Re-instatement**

Joshua Gordon<sup>1</sup>, Benjamin Moser<sup>2</sup>, <sup>1</sup>National Institute of Standards and Technology (NIST), <sup>2</sup>Colorado School of Mines

**11:30 - 11:50 a.m.** 0746\_1123\_000126

## **Measurement Uncertainties in Outdoor Far-field Antenna Ranges**

14 Edwin Barry, Pieter Betjes, Eric Kim, AMETEK / NSI-MI Technologies

**11:50 a.m. - 12:10 p.m.** 0746\_1123\_000132

## **Characterizing Compact Antenna Test Range Using Advanced Computational Techniques**

Venkata Bhyrava, Murthy Devata, Altair Engineering

**12:10 - 1:30 p.m.** **LUNCH**

**12:10 - 1:30 p.m.** IEEE 1128 Absorber Working Group Meeting

## **Session 11**

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**1:30 - 3:30 p.m.** Near-Field Measurements II

**1:30 - 1:50 p.m.** 0746\_1123\_000069

## **Evaluation of Near-Field to Far-Field Transformation Accuracy Based on Reference Radiation Models**

Arun Bhatt<sup>1</sup>, Afroditi Kyriligkitsi<sup>1</sup>, Thomas Gemmer<sup>1</sup>, Adam Tankielun<sup>1</sup>, Hendrik Bartko<sup>1</sup>, Benoit Derat<sup>1</sup>, Thomas Dallmann<sup>2</sup>, <sup>1</sup>Rohde and Schwarz GmbH & Co. KG, <sup>2</sup>Radio Technologies for Automated and Connected Vehicles Research Group, TU Ilmenau

**1:50 - 2:10 p.m.** 0746\_1123\_000077

## **Accurate Evaluation of Antenna Measurement Range Performance with the SWE Transmission Formula**

Francesco Saccardi, Andrea Giacomini, Lars Foged, Microwave Vision Italy

**2:10 - 2:30 p.m.** 0746\_1123\_000079

## **Design and Validation of Quasi Ideal Ultra-Wideband 3dB/180° Couplers for High Precision Spherical Near-Field Probes**

Andrea Giacomini<sup>1</sup>, Francesco Saccardi<sup>1</sup>, Vincenzo Schirosi<sup>1</sup>, Antoine Raulais<sup>1</sup>, Lars Foged<sup>1</sup>, Jean-Marc Baracco<sup>2</sup>, <sup>1</sup>Microwave Vision Italy, <sup>2</sup>MARDEL SARL

**2:30 - 2:50 p.m.** 0746\_1123\_000084

## **Design of a Multiprobe Planar Near-Field Scanner for Ku-Band**

Juha Ala-Laurinaho<sup>1</sup>, Sabin Karki<sup>1</sup>, Ville Viikari<sup>1</sup>, Ari Alanne<sup>2</sup>, Risto Lehto<sup>2</sup>, Paul Moseley<sup>3</sup>, Massimiliano Simeoni<sup>3</sup>, <sup>1</sup>Aalto University, <sup>2</sup>DA Design Oy, <sup>3</sup>ESA

**2:50 - 3:10 p.m.** 0746\_1123\_000092

## **Phaseless Spherical Near-Field Antenna Measurements of Polyhedral Sampling Structures in a Robot-Based Measurement System**

Adrien Guth<sup>1</sup>, Roland Moch<sup>1</sup>, Dirk Heberling<sup>1,2</sup>, <sup>1</sup>Institute of High Frequency Technology, RWTH Aachen University, <sup>2</sup>Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

**3:10 - 3:30 p.m.** 0746\_1123\_000100

## **An Alternative Formulation for Plane-Polar Data Transformation**

Scott McBride, AMETEK / NSI-MI Technologies

**3:30 - 4 p.m.** **AFTERNOON BREAK**

## **Session 12**

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**4 - 5:30 p.m.** Poster Session II

## **0746\_1123\_000089 On the Uncertainty Evaluation of Absorber Reflectivity Measurements**

Marc Dirix<sup>1,2</sup>, Amin Enayati<sup>3</sup>, <sup>1</sup>Marc Dirix / RF, <sup>2</sup>Antenna Systems Solutions, <sup>3</sup>E&C Anechoic Chambers

## **0746\_1123\_000093 Validation of OTA Measurement Setup at 28GHz Using A Plan Wave Generator**

Shoaib Anwar<sup>1</sup>, Francesco Scattone<sup>2</sup>, Evgueni Kaverine<sup>1</sup>, Andrea Giacomini<sup>2</sup>, Francesco Saccardi<sup>2</sup>, Nicolas Gross<sup>1</sup>, Per Iversen<sup>3</sup>, Lars Foged<sup>2</sup>, <sup>1</sup>MVG Industries, <sup>2</sup>MVG, <sup>3</sup>Orbit Advanced Technologies, Inc. (MVG)

## **0746\_1123\_000097 Experimental Validation of Linear Multiprobe Arrays for Fast and Accurate PNF Antenna Characterizations**

Francesco Saccardi<sup>1</sup>, Andrea Giacomini<sup>1</sup>, Lars Foged<sup>1</sup>, Nicolas Gross<sup>2</sup>, Thierry Blin<sup>2</sup>, Per Iversen<sup>3</sup>, Kim Hassett<sup>3</sup>, Roni Braun<sup>4</sup>, Lior Shmidov<sup>4</sup>, Meng He<sup>5</sup>, Chen Chen<sup>5</sup>, Xavier Bland<sup>5</sup>, <sup>1</sup>Microwave Vision Italy, <sup>2</sup>MVG Industries, <sup>3</sup>Orbit/FR, <sup>4</sup>ORBIT/FR Engineering Ltd. MVG, <sup>5</sup>MVG Hong-Kong



# Preliminary Technical Program

0746\_1123\_000104 **A Simple Algebraic Approach for Finding Minimal but Most Representative Measurement Points of Antenna Patterns**

Robert Geise, HTWK University of Applied Science

0746\_1123\_000106 **Design of a Tunable Frequency-Selective Surface for Microwave Material Measurement Applications**

Christopher Howard<sup>1</sup>, Kenneth Allen<sup>1</sup>, Bill Hunt<sup>2</sup>, <sup>1</sup>Georgia Tech Research Institute, <sup>2</sup>Georgia Institute of Technology

0746\_1123\_000108 **Integration Challenges for Phased Array Calibration and Near-Field Measurements**

Patrick Pelland, Chris Smith, Quang Ton, Eddy Park, Bill Marks, AMETEK /NSI-MI Technologies

0746\_1123\_000109 **Study of the Advanced Computational Tool for Scattering Analysis**

Jaehoon Kim, Altair Engineering Inc.

0746\_1123\_000116 **Miniaturized In-Case Antennas for Wireless Audio Transmitter Application**

Ali Attaran<sup>1</sup>, John Locke<sup>2</sup>, Luis Rivera<sup>1</sup>, Daniel Aloï<sup>2</sup>, <sup>1</sup>Ford Motor Company, <sup>2</sup>Oakland University

0746\_1123\_000117 **Optical Fiber Link Millimeter Wave Antenna Measurement System Using the Intermediate Frequency Substitution Method**

Satoru Kurokawa<sup>1</sup>, Anton Widarta<sup>1</sup>, Michitaka Ameya<sup>1</sup>, Masanobu Hirose<sup>2</sup>, <sup>1</sup>National Institute of Advanced Industrial Science and Technology, <sup>2</sup>7G aa Co., Ltd.

0746\_1123\_000118 **Free-Space Material Measurement for a Small Dielectric Plate at W-Band**

Jin-Seob Kang, Korea Research Institute of Standards and Science (KRISS)

0746\_1123\_000120 **Using Spherical Near-Field Measurements to Perform Pre-Compliance Testing on Automotive Antenna Systems**

John Locke<sup>1</sup>, Daniel Aloï<sup>2</sup>, Ali Attaran<sup>3</sup>, Luis Rivera<sup>3</sup>, <sup>1</sup>Molex Connected Vehicle Solutions, <sup>2</sup>Oakland University, <sup>3</sup>Ford Motor Company

0746\_1123\_000121 **Exploring the Effect of Varying Infill Densities and Patterns on Effective Relative Permittivity in 3D Printed Dielectric Substrates**

Bibek Kattel, Winn Hutchcraft, Richard Gordon, University of Mississippi

0746\_1123\_000082 **An Approach to Compensate 3-D Probe Positioning Errors Affecting the Non-Redundant Cylindrical Near-Field Measurements**

Florindo Bevilacqua, Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero, Massimo Migliozi, University of Salerno

0746\_1123\_000137 **Linearly Polarized Feed Rotational Offset Effect on Circularly Polarized Gain Uncertainty**

Adam Mehrabani<sup>1</sup>, Rob Mercer<sup>2</sup>, Jeff Fordham<sup>2</sup>, <sup>1</sup>SAIC, <sup>2</sup>AMETEK /NSI-MI Technologies

**6:30 - 9:30 p.m. AWARDS BANQUET**

## Thursday, October 12

### Session 13

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**8 - 9:40 a.m. Range Design, Instrumentation, and Characterization**

**8 - 8:20 a.m.** 0746\_1123\_000025

**A Unique Spherical Near-Field Test System for Commercial Aircraft Radar Radome Testing**

Kefeng Liu<sup>1</sup>, Anbang Liu<sup>2</sup>, Dennis Lewis<sup>3</sup>, <sup>1</sup>ETS-Lindgren, Inc., <sup>2</sup>MJK Electronic Engineering, <sup>3</sup>Boeing

**8:20 - 8:40 a.m.** 0746\_1123\_000099

**Accurate Antenna Characterization at UHF/VHF Frequencies with Plane Wave Generator Systems**

Lars Foged<sup>1</sup>, Francesco Saccardi<sup>1</sup>, Vincenzo Schirosi<sup>1</sup>, Andrea Giacomini<sup>1</sup>, Francesco Scattone<sup>1</sup>, Lucia Scialacqua<sup>1</sup>, Arianna Diamanti<sup>1</sup>, Enrico Tartaglino<sup>1</sup>, Nicolas Gross<sup>2</sup>, Shoaib Anwar<sup>2</sup>, Evgueni Kaverine<sup>2</sup>, Per Iversen<sup>3</sup>, Edward Szpindor<sup>3</sup>, <sup>1</sup>MVG Italy, <sup>2</sup>MVG Industries, <sup>3</sup>MVG - Orbit Advanced Technologies Inc.

**8:40 - 9 a.m.** 0746\_1123\_000004

**Recommendations for RF Absorber Treatment of Ranges Having a Movable Gantry or Multiple Probes**

Vince Rodriguez, Mark Ingerson, AMETEK / NSI-MI Technologies

**9 - 9:20 a.m.** 0746\_1123\_000064

**Introducing LORENTZ: A Novel Low-temperature Near-Field Terahertz Chamber for Instrument Characterization**

Paul Moseley<sup>1</sup>, Luis Rolo<sup>1</sup>, Andrey Baryshev<sup>2,3</sup>, Tobias Vos<sup>4</sup>, Alena Belitskaya<sup>3</sup>, Daniele Ronso da Costa Lima<sup>2</sup>, Peter de Maagt<sup>1</sup>, Paul Hartogh<sup>5</sup>, <sup>1</sup>European Space Agency, ESTEC, <sup>2</sup>Kapteyn Astronomical Institute, <sup>3</sup>Dutch Terahertz, <sup>4</sup>SRON, <sup>5</sup>MPS

**9:20 - 9:40 a.m.** 0746\_1123\_000052

**A Squat Cylinder-Dihedral Dual Calibration Device for Compact Ranges at UHF**

Hirsch Chizever<sup>1</sup>, Brett Haisty<sup>1</sup>, Laura Suzuki<sup>2</sup>, <sup>1</sup>Delta Sigma Company, <sup>2</sup>Applied Research Associates

**9:40 - 10 a.m. MORNING BREAK**

# Preliminary Technical Program

## Session 14

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### 10 a.m.- 12 p.m. Antenna Design and Analysis

10 - 10:20 a.m. 0746\_1123\_000013

#### Performance Comparison of Traditionally Manufactured and Additively Manufactured Luneburg Lenses

Anna Stumme, Alexander Golding, Mark Dorsey, US Naval Research Laboratory

10:20 - 10:40 a.m. 0746\_1123\_000105

#### Horn Antenna Manufacturing Using Additive Manufacturing Techniques

Jeffrey Fordham, Jon Swarner, Edwin Barry, NSI-MI Technologies

10:40 - 11 a.m. 0746\_1123\_000114

#### The Electric Multipole Produced by an SAE J2954 Wireless Power Transfer System Employing DD Couplers

James McLean, Robert Sutton, TDK Corp.

16 11 - 11:20 a.m. 0746\_1123\_000127

#### Breaking the Limits: A High Performance Dual-Polarized Ultrawideband Antenna for Radar and Communication Systems

Syed Jehangir, Jorge Cerreno, Advanced Radar Research Center (ARRC), The University of Oklahoma

11:20 - 11:40 a.m. 0746\_1123\_000062

#### Transforming the Near field of a Virtual Antenna to the Far Field of a Non-conventional Phased Array

Altunkan Hizal<sup>1</sup>, Hayrullah Yildiz<sup>2</sup>, <sup>1</sup>Aselsan Inc., <sup>2</sup>Baskent University

11:40 a.m. - 12 p.m. 0746\_1123\_000111

#### U Slot Loaded Wearable Textile Dualband Antenna for Energy Harvesting Application

Varsha Kheradiya, Pandit Deendayal Energy University

12 - 1:30 p.m. **Lunch & Learn with Prof. Bing Brunton**

## Session 15

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### 1:30 - 3:10 p.m. Robotic and UAV Antenna Measurements

1:30 - 1:50 p.m. 0746\_1123\_000046

#### Exploration of UAV-based Testing and Qualification of NGSO Earth Stations

Andrian Buchi, Ondrej Pokorny, Snorre Skeidsvol, Sigurd Petersen, QuadSAT ApS

1:50 - 2:10 p.m. 0746\_1123\_000050

#### Electrical Alignment Technique for Offset-Mounted and Arbitrarily Oriented AUTs in a Robot-Based mm-Wave Antenna Test System

Henrik Jansen<sup>1</sup>, Roland Moch<sup>1</sup>, Dirk Heberling<sup>1,2</sup>, <sup>1</sup>Institute of High Frequency Technology, RWTH Aachen University, <sup>2</sup>Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

2:10 - 2:30 p.m. 0746\_1123\_000129

#### A Self-Contained and Airborne SDR Transceiver System for UAS Based Antenna Pattern Measurement and Phased Array Radar Calibration Validation

Khuda Burdi<sup>1</sup>, Antonio Segales<sup>1</sup>, Caleb Fulton<sup>1</sup>, Daniel Wasielewski<sup>2</sup>, Igor Ivic<sup>2</sup>, Jorge Salazar-Cerreno<sup>1</sup>, Robert Palmer<sup>1</sup>, <sup>1</sup>Advanced Radar Research Center (ARRC), The University of Oklahoma, <sup>2</sup>National Oceanic and Atmospheric Administration (NOAA)

2:30 - 2:50 p.m. 0746\_1123\_000130

#### W-Band Near-Field Measurement Techniques using a Portable Laser Guided Robotic Metrology System

Bryan Schoenholz, James Downey, Seth Waldstein, NASA Glenn Research Center

2:50 - 3:10 p.m. 0746\_1123\_000124

#### Drone Based RF Measurements as a Viable Broadcast and Defense Antenna Pattern Verification Tool

Jason Schreiber, SixArms

3:10 - 3:30 p.m. **AFTERNOON BREAK**

## Session 16

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### 3:30 - 5:20 p.m. RCS Measurements

3:30 - 3:50 p.m. 0746\_1123\_000038

#### Background and Clutter Removal Algorithm for RCS Extraction in Semi-anechoic Chamber

Papa Ousmane Leye, Adamo Banelli, Shaikha Aldhaheri, Chaouki Kasmi, Felix Vega, Islem Yahi, Technology Innovation Institute

3:50 - 4:10 p.m. 0746\_1123\_000056

#### The Small Resonant Sphere for Validating Radar Cross Section Measurement Accuracy

Donald Hilliard, Michael Emire, Long To, Advanced Research and Technology Corporation

**4:10 - 4:30 p.m.** 0746\_1123\_000081

**Compact RCS Test Range Field Probing using a Shorted Antenna as Target**

Gil Yemini<sup>1</sup>, Stefano Sensani<sup>1</sup>, Andrea Giacomini<sup>2</sup>, Lars Foged<sup>2</sup>, Marcel Boumans<sup>3</sup>, <sup>1</sup>ORBIT/FR Engineering Ltd. MVG, <sup>2</sup>Microwave Vision Italy, <sup>3</sup>Antenna Measurement Experts GmbH

**4:30 - 4:50 p.m.** 0746\_1123\_000095

**Compact Bistatic Radar Cross Section Measurement System Using a New Plane-Wave Synthesis**

Masanobu Hirose<sup>1</sup>, Satoru Kurokawa<sup>1,2</sup>, <sup>1</sup>7G aa Co., Ltd., <sup>2</sup>AIST

**4:50 - 5:10 p.m.** 0746\_1123\_000085

**Reproducible Measurements of “Fan Blades in a Pipe” CEM Benchmark**

Jon Kelley, Kurt Norris, Brian Mackie-Mason, Brody Barton, David Chamulak, Scott Schaeffer, Mark Martin, Kendall Crouch, Clifton Courtney, Ali Yilmaz, Lockheed Martin Aeronautics Company

**5:10 - 5:20 p.m.** Closing Remarks and  
2023 Vision for AMTA



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# Registration



Go to **2023.amta.org** to register.

**Early registration ends Friday, September 8**

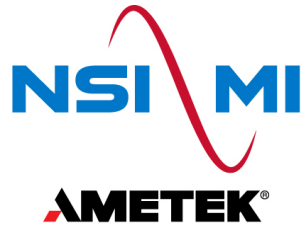
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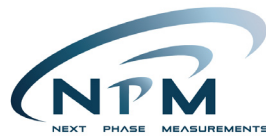
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