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14. ABSTRACT
The 2016 Antenna Applications Symposium was held at Allerton House Conference Center in Monticello, Illinois on September 20-22, 2016. Over the two and a half days of the meeting, in a single-session format, 39 high quality papers were presented. There were two student paper competition finalists, with the winner, selected by Allerton attendees, being Mr. Aman Samaiyar from the University of Colorado Boulder. There were 47 attendees, including 32 from the DoD services and government contractors. Throughout the meeting, time was scheduled for informal exchange of ideas and discussions, which the post-symposium survey indicated were extremely valuable

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antennas, antenna systems, arrays

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Report Title

Final Report: Antenna Applications Symposium

ABSTRACT

The 2016 Antenna Applications Symposium was held at Allerton House Conference Center in Monticello, Illinois on September 20-22, 2016. Over the two and a half days of the meeting, in a single-session format, 39 high quality papers were presented. There were two student paper competition finalists, with the winner, selected by Allerton attendees, being Mr. Aman Samaiyar from the University of Colorado Boulder. There were 47 attendees, including 32 from the DoD services and government contractors. Throughout the meeting, time was scheduled for informal exchange of ideas and discussions, which the post-symposium survey indicated were extremely valuable to all participants. TThe new call for papers for the 2017 Antenna Applications Symposium was sent to the symposium mailing list electronically. This year's abstract submission deadline was May 21, 2017, with full papers due on August 17, 2017. As of the submission of this report, we have nearly 30 accepted papers. We are also planning to host an invited keynote talk on 3D design and fabrication for physically-reconfigurable antenna technology by an AFRL researcher.

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations: 0.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received	Paper
06/28/2015	1 Various authors. Proceedings of the 2013 Antenna Applications Symposium, Antenna Applications Symposium. 17-SEP-13, . : ,
06/28/2015	2 Various authors. Proceedings of the 2014 Antenna Applications Symposium, Antenna Applications Symposium. 23-SEP-14, . : ,
TOTAL:	**2**

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received	Paper
TOTAL:	

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received	Paper
TOTAL:	

Number of Manuscripts:

Books

Received Book

TOTAL:

Received Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Names of Post Doctorates

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Names of Faculty Supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Under Graduate students supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period:	0.00
The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:.....	0.00
The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:.....	0.00
Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):.....	0.00
Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:.....	0.00
The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense	0.00
The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields:	0.00

Names of Personnel receiving masters degrees

NAME

Total Number:

Names of personnel receiving PHDs

NAME

Total Number:

Names of other research staff

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

Support for professional technical meeting in support of the antenna applications community in DoD and other government agencies.

Technology Transfer

2014 ANTENNA APPLICATIONS SYMPOSIUM

Supported by

Antenna Technology Branch
AFRL Sensors Directorate
Wright Patterson AFB, Ohio

US Army Research Office
Army Research Laboratory
Research Triangle Park, North Carolina

Antennas and Propagation Laboratory
University of Massachusetts
Amherst, Massachusetts

Electromagnetics Laboratory
University of Illinois
Urbana-Champaign, Illinois

The Antenna Applications Symposium and its predecessor, the Air Force Antenna Symposium, have for fifty years provided a unique forum for exchange of ideas and information about the practical aspects of antenna design, development, and use in systems. The Antenna Applications Symposium emphasizes antenna design and application to systems. Engineers are encouraged to present practical solutions to problems that are encountered during development and implementation of antennas and antenna systems. Military and commercial applications are included.

Papers typically span the areas of antenna design based on empirical and/or numerical methods, feed networks, system architecture, integration with other systems and subsystems, materials, compatibility with modern platforms and composite materials, and measurements. Topics often span the frequency range from HF to millimeter waves and from single radiators to large, wideband phased arrays. Antenna phenomena learned from numerical simulation, empirical design, manufacturing, system integration and testing are typical topics at the symposium, as are novel and potentially revolutionary technologies.

*See the Advance Program **below** or at http://www.ecs.umass.edu/ece/allerton/*

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Advance Program – Subject to Change
2014 Antenna Applications Symposium

Tuesday, September 23, 2014

8:30 **Keynote: Large Antennas, Small Spaces** Paul Fellows

Antennas and Materials

9:30 **Flexible and Transparent Antenna on Polyamide Substrate for Laptop Computer** C. Lee and C. W. Jung *Seoul National University of Science and Technology*

9:55 **Metaferrite Antennas** S. Weiss *U.S. Army Research Office*

10:20 Break

10:50 **Investigation of Electrical Properties of Clay Soil** A. Horton, C. Fulton, J. Ruyle, and K. Hatami *University of Oklahoma*

11:15 **Metamaterial-Loaded Dipole Antennas** J. Hodge II, T. Anthony, and A. Zaghloul *U.S. Army Research Office*

11:40 **A Wideband Cavity-Backed Spiral Antenna with Ring Absorber and Dyson Balun for Sensing Applications on a UAV Platform** R. Hasse, J. Skala, G. Hopkins, V. Tripp, D. Revier, S. Skiles, and B. Whitfield *Georgia Tech Research Institute*

Student Paper Finalist Presentations

1:35 **Wideband Antennas for Towed Decoy Systems** J. Ha and D. S. Filipovic *Univ. of Colorado*

2:00 **UHF-RFID Tag Antenna: Analysis and Design Using Theory of Characteristic Modes** E. A. Elghannai and R. G. Rojas, *The Ohio State Univ.*

2:25 **Comparison of Sum-Difference Beam Generation of Circular and Spherically-Bound Random Arrays** K. Buchanan and G. H. Huff, *Texas A&M Univ.*

2:50 Break

HF and Direction Finding Antennas

3:20 **Broadband, Horizontally-Polarized, Omni-directional, HF Antenna Operating over Imperfect Ground** J. McLean, R. Fitzgerald, R. Gilley *Antenna Products Corp.* T. Harrington *Federal Communications Commission* R. Sutton *TDK R&D Corp.* H. Foltz *Univ. of Texas-Pan American*

3:45 **Design of Low-Profile HF Antennas for Diverse Vehicular Platforms** M. Ignatenko and D. Filipovic *Univ. of Colorado*

4:10 **Antenna Noise Figure Comparison for Electrically Small HF Antennas** S. Best *MITRE Corp.*

4:35 **The Realities of Direction Finding Antenna Array Design** K. Lysiak *Applied Research Laboratory, The Pennsylvania State Univ.*

Wednesday, September 24, 2014

8:30 **Keynote: Antenna and Electromagnetic Technology** Tony Kim, *U. S. Air Force Research Laboratory*

Multifunctional and Reconfigurable Antennas

9:30 **Design of Combined-Antennas Using Spherical Modes** M. Elmansouri and D. Filipovic *Univ. of Colorado*

9:55 **A Characteristic Mode Perturbation Approach for Reactively Loaded Antennas** M. W. Young and J. Bernhard *Univ. of Illinois at Urbana-Champaign*

10:20 Break

10:50 **Using Equivalence Principle Algorithm to Analyze and Design Reconfigurable Pixelled Antennas** M. Fallahpour and W. Chew *Univ. of Illinois at Urbana-Champaign*

11:15 **Analysis of Circularly Polarized Annular Slot Antennas to Determine Reconfiguration Mechanism** S. Fass, B. Hennessy, L. Szolc, and J. Ruyle *Univ. of Oklahoma*

11:40 **Beamsteering, Direction-of-Arrival, Polarization Reconfiguration and Thermal Encoding Using Networked Multifunctional Antenna Modules** N. Brennan, G. Huff *Texas A&M Univ*. B. Rupp, M. Bevan, S. Long, and W. Dorsey *U.S. Naval Research Laboratory*

Arrays and Array Systems

1:35 **Common Compact True Time Delay on a Photonic Integrated Circuit** T. Holzheimer, *Raytheon*

2:00 **Floquet Mode Analysis of a Dual Polarized Probe Fed Planar Radiating Aperture** M. Buckley, J. Wolf, and L. Paulsen *Rockwell Collins*

2:25 **A Microfabricated 8-40 GHz Dual-Polarized Reflector Feed** K. Vanhille, T. Durham, K. Lambert, and F. Miranda *Nuvotronics*

2:50 **Phase Mode Analysis of a Cylindrical Polarimetric Phased Array Antenna** C. Fulton *Univ. of Oklahoma*

3:15 Break

3:45 **Monte Carlo-Based Active Electronically Scanned Array Performance Prediction** J. West and R. Dana *Rockwell Collins*

4:10 **Low Cost Passive Electronically Steered Dielectric Traveling Wave Array** J. Apostolos, B. McMahon, B. Molen, and W. Mouyos *AMI Research and Development*

4:35 **Evolution of Low-Risk PUMA Array Designs at NRL** R. Kindt, M. Lee, J. Logan U.S. Naval Research Laboratory and M. Vouvakis *Univ. of Massachusetts, Amherst*

Thursday, September 25, 2014

Design and Analysis Techniques

8:30 **Wideband Impedance Matching Techniques** S. Holland *Milwaukie School of Engineering*

8:55 **Comprehensive Analysis of the Infinite Balun** J. McLean, R. Sutton *TDK Corp.* H. Foltz *Univ. of Texas-Pan American*

9:20 **On Engineering Flow in Standing Waves** H. Schantz *Q-Track Corp.*

9:45 **Generalized Modal Expansion and Reduced Modal Representation of Electromagnetic Fields** Q. Dai, W. Chew, and L. Jiang *Univ. of Illinois at Urbana-Champaign*