USNC–URSI National Radio Science Meeting

The National Academies of
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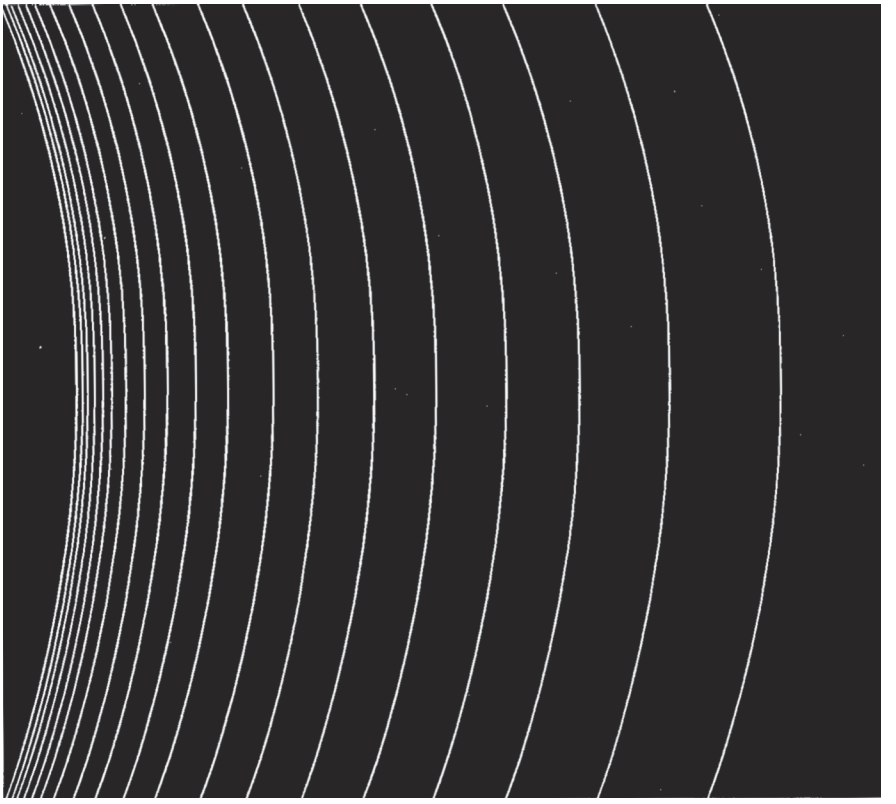

6-9 January 2016

Boulder, Colorado, USA

Sponsored by the US National Committee for the

International Union of Radio Science

and CU Conference Services,

University of Colorado Boulder

www.nrsmboulder.org

2016 USNC-URSI National Radio Science Meeting
Meeting Overview: Technical Program and Commission Business Meetings

Room	105	150	151	155	200	245	265	1B40	1B51	Math 100
Wednesday 6 January 08:20-12:00	B3 - Complex Media, Propagation and Metasufaces	F1 - RF Propagation Utilizing Numerical Weather Prediction I	A1 - Novel Measurements of EM Materials and Systems	B4 - Guided Waves and Waveguiding Structures	B2 - Emerging Applications of Phased Arrays B5 - Reconfigurable Antennas and Circuits	H1 - Physics of Radiation Belts I	J1 - Emerging Instrumentation and Techniques	B1 - Numerical Methods	C1 - Emerging Challenges in Reliability, Distributed Sensing, and Signal Processing	
Lunch										
Wednesday 6 January 13:20-17:00	B8 - Scattering	F2 - RF Propagation Utilizing Numerical Weather Prediction II	CDE1 - Spectrum Issues, Developments, and Solutions	B9 - 3D Printed Antennas	B7 - Printed Antennas and Arrays BD1 - Energy Harvesting Rectennas and Back-Ends	H2 - Physics of Radiation Belts II	J2 - SKA Technical Development	B6 - Finite Arrays and Antenna Measurements B11 - Wearable Antennas and Electronics	B10 - Uncertainty Quantification in CEM and Electronic Design Automation	
17:00		**F Business - 17:00**		**E Business - 17:00**						
18:00			**C Business - 18:00**			**A Business - 18:00**				
Reception	**Reception for all Attendees in Engineering Center Lobby from 18:30 to 21:00**									
Thursday 7 January 08:20-12:00	**Plenary Session (Math 100):** **Ernest K. Smith USNC-URSI Student Paper Competition** ***Meeting Highlight: Electromagnetics in Medicine***									
Lunch	**Lunch Provided for Student Travel Awardees and Student Paper Finalists (Colorado Room in the Center for Community)**									
Thursday 7 January 13:20-17:00	B14 - Antenna Techniques and Measurements	F3 - Methods and Models for Precipitation Sensing	HE1 - Lightning and its Interactions with the Ionosphere	K1 - Medical Imaging and Therapy Systems	B13 - Antennas for Small Satellites	HG1 - Ionospheric Modification and Remote Sensing	J3 - Digital Developments J4 - New Telescopes, Techniques, and Observations I	B12 - Advances in Computational EM and Emerging Applications	C2 - Compressive Sensing	H3 - Waves in Outer Solar System Plasmas H4 - Waves and Instabilities in Laboratory and Space Plasmas
17:00					**G Business - 17:00**			**B Business - 17:00**		
18:00	**D Business - 18:00**			**K Business - 18:00**		**H Business - 18:00**	**J Business - 18:00**			
Friday 8 January 08:20-12:00	GH1 - Meteors, Orbital Debris, and Dusty Plasmas	F4 - Nanosatellites for Remote Sensing		K2 - Implanted Sensors and Propagation Inside the Human Body	B16 - Terahertz Antennas and Applications	HFG1 - GNSS, Radio Beacons and Remote Sensing	J5 - Timing and Transients J6 - New Telescopes, Techniques, and Observations II	B15 - Antenna Design and Measurements	C3 - Advances in Radar Processing, Measurements, and Modeling Techniques F5 - Propagation Modeling and Measurements	
Lunch	**Special Event: Third Hans Liebe Lecture (Math 100)**									
Friday 8 January 13:20-17:00	G1 - Space Plasma Measurement Techniques	F7 - Complex and Random Media				F6 - L-Band Microwave Remote Sensing of Land and Ocean Surfaces	J7 - Atacama Large Millimeter Array - Systems and Science	B17 - Antenna Arrays		

International Union of Radio Science / Union Radio Scientifique Internationale

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Founded in 1919, the International Union of Radio Science (URSI) coordinates studies, research, applications, scientific exchange, and communication in all fields of radio science from telecommunications and radio astronomy to medicine (www.ursi.org).

Both URSI and the U.S. National Committee (USNC) of URSI are organized into ten commissions: :

Electromagnetic Metrology (Commission A)
Fields and Waves (Commission B)
Radiocommunication Systems and Signal Processing (Commission C)
Electronics and Photonics (Commission D)
Electromagnetic Environment and Interference (Commission E)
Wave Propagation and Remote Sensing (Commission F)
Ionospheric Radio and Propagation (Commission G)
Waves in Plasmas (Commission H)
Radio Astronomy (Commission J)
Electromagnetics in Biology and Medicine (Commission K)

About the USNC-URSI

The U.S. National Committee of URSI (USNC-URSI) is appointed by the National Academies of Sciences, Engineering and Medicine, and represents U.S. radio scientists in URSI. It encourages studies in radio science, provides a forum for the dissemination of research findings, and provides an organizational infrastructure for the radio science community in the United States.

The USNC-URSI hosts the National Radio Science Meeting (NRSM) each January in Boulder, Colorado. The IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (RSM), co-sponsored by USNC-URSI and the Antennas and Propagation Society of the Institute of Electrical and Electronics Engineers (IEEE/AP-S), is held each summer. Every five to eight years, a North American Radio Science Meeting (NARSM) is organized, co-sponsored by the U.S. and Canadian National Committees to URSI. The last NARSM was held in Vancouver, British Columbia, Canada on July 19-25, 2015.

The international URSI General Assembly and Scientific Symposium is held every three years in locations around the world. The 31st URSI General Assembly and Scientific Symposium was held in Beijing, China, on August 17-23, 2014. Over 1300 papers were presented by authors from over 50 countries in technical sessions covering the areas of all ten URSI Commissions. The 32nd URSI General Assembly and Scientific Symposium will be held in Montreal, Quebec, Canada, on August 19-26, 2017. The symposium website is www.gass2017.org.

For further information on USNC-URSI please visit www.usnc-ursi.org.

U.S. National Committee Leadership and Commission Chairs (2015-2017)

(In addition to the individuals below, the USNC-URSI includes Members at Large, Society Representatives, and scientists serving in executive roles in international URSI.)

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UNITED STATES NATIONAL COMMITTEE
INTERNATIONAL UNION OF RADIO SCIENCE
TECHNICAL PROGRAM
National Radio Science Meeting
6-9 January 2016
University of Colorado Boulder
Sponsored by USNC–URSI

ROOM AND TIME SCHEDULE FOR SESSIONS

TUESDAY, 5 January 2016

WEDNESDAY, 6 January 2016

THURSDAY, 7 January 2016

FRIDAY, 8 January 2016

SATURDAY, 9 January 2016

National Radio Science Meeting

6-9 January 2016

University of Colorado Boulder

Sponsored by USNC-URSI

TUESDAY EVENING, 5 January 2016

19:00 – 23:00 USNC-URSI Business Meeting, Millennium Hotel

WEDNESDAY MORNING, 6 January 2016

Session A1: Novel Measurements of EM Materials and Systems
Room 151

Co-Chairs: Joshua Gordon, *National Institute of Standards and Technology*;
Jeanne Quimby, *National Institute of Standards and Technology*

08:20 A1-1
DYNAMIC EVALUATION OF SIX-AXIS ROBOTIC SPHERICAL AND EXTRAPOLATION MEASUREMENTS GUIDED BY A LASER TRACKER
Alexandra E. Curtin*, David R. Novotny, Joshua A. Gordon, Ronald Wittmann, Michael Francis, Jeffrey R. Guerrieri
National Institute of Standards and Technology, Boulder, CO

08:40 A1-2
ELECTROMAGNETIC SCATTERING FROM CARBON NANOTUBES IN THE TUMBLEWEED CONFIGURATION
Ahmed M. Hassan*[1], Fernando Vargas-Lara[2], Jack F. Douglas[2], Edward J. Garboczi[3]
[1]*Computer Science Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO*
[2]*Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD*
[3]*Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO*

09:00 A1-3
PORTABLE AND CONFORMAL RF SENSOR FOR HIGH-ACCURACY REAL-TIME IMAGING
Md Asiful Islam*, Asimina Kiourti, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

09:20 A1-4
DETERMINING ACCURATE ESR VALUES OF CERAMIC DECOUPLING CAPACITORS
Sai Ram Anand Vempati*[1], Sunil S. Kollipara[2], Aleksandr Gafarov[2], Melinda J. Piket-May[1], Eric Bogatin[1]
[1]*Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Mentor Graphics Corporation, Longmont, CO*

09:40 A1-5
ANALYSIS OF SIMULATION TO MEASUREMENT CORRELATION FOR PCB INTERCONNECTS IN HFSS
Pranav Balachander*, Melinda J. Piket-May, Eric Bogatin
Electrical Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

10:00 Break

10:20 A1-6
NOVEL 5X-LINE TECHNIQUE TO EXTRACT COPPER CONDUCTIVITY
Chun-Ting Wang Lee*[1], Bill Hargin[2], Heidi Barnes[3], Eric Bogatin[1], Melinda J. Piket-May[1]
[1]*Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Nan Ya Copper-Clad Laminates, Taipei, TAIWAN*
[3]*Keysight Technologies, Santa Rosa, CA*

10:40 A1-7
SPECTRUM SENSING WITH WLAN ACCESS POINTS
Ryan T. Jacobs*[1], Jason B. Coder[1], Vivian M. Musser[2]
[1]*Communications Technology Laboratory, National Institute of Standards and Technology, Boulder, CO*
[2]*Electrical and Computer Engineering, University of Maryland, College Park, MD*

11:00 A1-8
VARIABILITY OF SOUNDER MEASUREMENTS IN MANUFACTURING FACILITIES
Jeanne T. Quimby*[1], Alexandra E. Curtin[1], David R. Novotny[1], Kate A. Remley[1], Rick Candell[2]
[1]*CTL, National Institute of Standards and Technology, Boulder, CO*
[2]*National Institute of Standards and Technology, Gaithersburg, MD*

11:20 A1-9
A COMPARISON OF BROADBAND REALIZED GAIN MEASUREMENTS BETWEEN A NEAR-FIELD RANGE AND A NEWLY RENOVATED SHORT TAPERED CHAMBER
Theodore K. Anthony*
Antennas and RF Integration Technologies Branch, U.S. Army Research Lab, Adelphi, MD

Session B1: Numerical Methods
Room 1B40

Co-Chairs: Branislav Notaros, *Colorado State University*;
Melinda Piket-May, *University of Colorado*

08:20 B1-1
SEPARATION OF ELECTRIC AND MAGNETIC SURFACE CURRENTS IN EQUIVALENT EM PROBLEMS
Ravi C. Bollimuntha*[1], Mohammed F. Hadi[1,2,3], Melinda J. Piket-May[1], Atef Z. Elsherbeni[3]
[1]*Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO*
[2]*Electrical Engineering, Kuwait University, Kuwait City, KUWAIT*
[3]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*

08:40 B1-2
EXCITATION OF PLANE WAVES IN HIGHER ORDER FDTD GRIDS
Ravi C. Bollimuntha*[1], Mohammed F. Hadi[1,2,3], Melinda J. Piket-May[1], Atef Z. Elsherbeni[3]
[1]*Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO*
[2]*Electrical Engineering, Kuwait University, Kuwait City, KUWAIT*
[3]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*

09:00 B1-3
HIGH PERFORMANCE MULTI-CPU AND MULTI-GPU COMPUTING OF THE HIGH-ORDER FV24 ALGORITHM
Sanjay DMello*[1], Alec Weiss[1], Melinda Piket-May[1], Mohammed Hadi[1,2,3], Atef Elsherbeni[3]
[1]*Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Electrical Engineering, Kuwait University, Kuwait City, KUWAIT*
[3]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*

09:20 B1-4
COMPARATIVE ANALYSIS OF CUDA AND OPENCL FOR ELECTROMAGNETICS SIMULATIONS USING FDTD
Rohit P. Kandurwar*[1], Vinit S. Vyas[1], Melinda J. Piket-May[1], Mohammed F. Hadi[1,2,3], Atef Z. Elsherbeni[2], Daniel A. Connors[4]
[1]*Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO*
[2]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*
[3]*Electrical Engineering, Kuwait University, Kuwait City, KUWAIT*
[4]*Electrical Engineering, University of Colorado Denver, Denver, CO*

09:40 B1-5
A QUASI-MAGNETOSTATIC VOLUME INTEGRAL METHOD FOR SIMULATING NON-LINEAR HYSTERETIC AND MAGNETOSTRICTIVE MATERIALS
Stephen D. Gedney*[1], John C. Young[2], Robert J. Adams[2], Carl S. Scheider[3]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Electrical and Computer Engineering, University of Kentucky, Lexington, KY*
[3]*Physics, U.S. Naval Academy, Annapolis, MD*

10:00 Break

10:20 B1-6
DOUBLE-HIGHER-ORDER FINITE ELEMENT MODELING OF A CONFORMAL PERFECTLY MATCHED LAYER FOR ELECTROMAGNETIC SCATTERING SIMULATION
Aaron P. Smull*, Ana B. Manic, Sanja B. Manic, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

10:40 B1-7
A COMPREHENSIVE COMPARISON OF FFT-ACCELERATED INTEGRAL EQUATION METHODS VS. FDTD FOR BIOELECTROMAGNETICS
Jackson W. Massey*, Ali E. Yılmaz
Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX

11:00 B1-8
HUMAN MOTION DETECTION IN INDOOR ENVIRONMENT- A MODEL USING MULTILEVEL FAST MULTIPOLE ALGORITHM ON GRAPHICAL PROCESSING UNIT CLUSTER
Nghia H. Tran*, Tuan Phan, Ozlem Kilic
Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

11:20 B1-9
ANALYSIS OF A PERTURBATIVE TRANSFORMATION OPTICS-BASED SPECTRAL-DOMAIN TECHNIQUE FOR FIELD COMPUTATION IN TILTED PLANAR-LAYERED MEDIA
Kamalesh K. Sainath*, Fernando L. Teixeira
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

11:40 B1-10
ACCURATE AND VERSATILE HIGH-ORDER MODELING OF ELECTROMAGNETIC SCATTERING ON PLASMONIC NANOSTRUCTURES
Hamid T. Chorsi*, Stephen D. Gedney
Electrical Engineering, University of Colorado Denver, Denver, CO

Session B2: Emerging Applications of Phased Arrays
Room 200

Co-Chairs: Karl Warnick, *Brigham Young University;*
Richard Black, *Brigham Young University*

08:20 B2-1
BEAMFORMING FOR THE ASKAP RADIO TELESCOPE
A. P. Chippendale*[1], K. W. Bannister[1], S. Hegarty[2], I. Heywood[1,3], A. W. Hotan[1], J. Marvil[1], D. McConnell[1], R. J. Sault[1,4], P. Serra[1]
[1]*Astronomy and Space Science, CSIRO, Sydney, NSW, AUSTRALIA*
[2]*Centre for Astrophysics and Computing, Swinburne University of Technology, Melbourne, Victoria, AUSTRALIA*
[3] *Physics and Electronics, Rhodes University, Grahamstown, SOUTH AFRICA*
[4]*School of Physics, University of Melbourne, Melbourne, Victoria, AUSTRALIA*

08:40 B2-2
PERFORMANCE ANALYSIS OF A MM-WAVE PHASED ARRAY FEED FOR THE GREEN BANK TELESCOPE
Junming Diao*, Richard Black, Karl Warnick, Brian Jeffs, Neal Erickson
Electrical and Computer Engineering, Brigham Young University, Provo, UT

09:00 B2-3
PROGRESS TOWARDS DETECTION OF PULSARS AND FAST RADIO BURSTS WITH PHASED ARRAY FEEDS
Richard A. Black*[1], Brian D. Jeffs[1], Gregory Hellbourg[2]
[1]*Electrical and Computer Engineering, Brigham Young University, Provo, UT*
[2]*CSIRO Astronomy and Space Science, Sydney, NSW, AUSTRALIA*

09:20 B2-4
SPATIAL INTERFERENCE FILTERING : ADVANTAGES AND LIMITATIONS
Gregory Hellbourg*
Astronomy and Space Science, CSIRO, Marsfield NSW, AUSTRALIA

09:40 B2-5
NON-LINEAR INTERFERENCE MITIGATION USING ARRAYS
Peter S. Wyckoff*
PreDetection Solutions, Scottsdale, AZ

Session B3: Complex Media, Propagation and Metasufaces
Room 105

Co-Chairs: Filipo Capolino, *University of California Irvine*; Robert Burkholder, *The Ohio State University*

08:20 B3-1
SCATTERING ANOMALIES FOR RADIALLY ANISOTROPIC SPHERES
Ari Sihvola*[1], Henrik Wallen[1], Henrik Kettunen[2]
[1]*Radio Science and Engineering, Aalto University, Espoo, FINLAND*
[2]*Mathematics and Statistics, University of Helsinki, Helsinki, FINLAND*

08:40 B3-2
SCALAR POTENTIAL FORMULATION AND DEPOLARIZING DYAD ARTIFACT REMOVAL FOR A GYROTROPIC MEDIUM
Michael J. Havrilla*
Air Force Institute of Technology, Wright-Patterson AFB, OH

09:00 B3-3
TUNABLE GUIDED SURFACE PLASMON-POLARITON USING TWO-DIMENSIONAL HYPERBOLIC GRAPHENE METASURFACE
S. A Hassani Gangaraj*, Andrei Nemilentsau, George Hanson
Electrical Enginering, University of Wisconsin Milwaukee, Milwaukee, WI

09:20 B3-4
FOCUSED AZIMUTHALLY POLARIZED VECTOR BEAM AND ITS APPLICATION ON ARTIFICIAL OPTICAL MAGNETISM
Mehdi Veysi*, Caner Guclu, Filippo Capolino
Electrical Engineering and Computer Science, University of California Irvine, Irvine, CA

9-:40 B3-5
THEORY OF GAIN ENHANCEMENT IN PERIODIC STRUCTURES WITH DEGENERATE BAND EDGES
Mohamed Othman*, Mehdi Veysi, Filippo Capolino
University of California, Irvine, Irvine, CA

10:00 Break

10:20 B3-6
THEORY OF PHOTO-INDUCED FORCES IN TIP-SAMPLE JUNCTIONS
Faezeh Tork Ladani*[1], Junghoon Jahng[2], Vartkess A. Apkarian[3], Eric O. Potma[1,3]
[1]*Electrical Engineering and Computer Science, University of California Irvine, Irvine, CA*
[2]*Physics and Astronomy, University of California Irvine, Irvine, CA*
[3]*Chemistry, University of California Irvine, Irvine, CA*

10:40 B3-7
ESTIMATION OF HIGH FREQUENCY WAVE FIELDS USING GAUSSIAN RAY BUNDLES AND DELAUNAY TESSELLATION
Stephen D. Lynch, Jay Alford-Lago*
Atmospheric Propagation 55280, SSC Pacific, San Diego, CA

11:00 B3-8
EFFICIENT SECOND-HARMONIC GENERATION FROM NANOSTRUCTURED HYPERBOLIC METAMATERIALS ON THE QUANTUM SCALE
Mehdi Hajizadegan*, Maryam Sakhdari, Pai-Yen Chen
Electrical Engineering, Wayne State University, Detroit, MI

Session B4: Guided Waves and Waveguiding Structures
Room 155

Co-Chairs: Christos Christodoulou, *University of New Mexico*; Edward Rothwell, *Michigan State University*

08:20 B4-1
GSTC APPLIED TO A COAXIAL TRANSMISSION LINE
Nick J. Krull*, Edward F. Kuester
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

08:40 B4-2
A NEW WAVEGUIDE VERIFICATION STANDARD FOR THE CHARACTERIZATION OF MAGNETIC MATERIALS
Jonathan L. Frasch*, Edward J. Rothwell
Electrical and Computer Engineering, Michigan State University, East Lansing, MI

09:00 B4-3
ELECTROMAGNETIC CHARACTERIZATION OF MATERIALS USING A DUAL CHAMBERED HIGH TEMPERATURE WAVEGUIDE
Jeffrey S. Sovern*, Michael J. Havrilla, Milo W. Hyde
Air Force Institute of Technology, Wright-Patterson AFB, OH

09:20 B4-4
UWB DOUBLE RIDGE WAVEGUIDE COUPLER WITH LOW LOSS
Amin Darvazehban, Omid Manoochehri*, Farhad Farzami, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

09:40 B4-5
COMPUTATION OF THE SCATTERING PARAMETERS OF A SYSTEM OF WAVEGUIDE SECTIONS USING A RECURSION TECHNIQUE
Edward J. Rothwell*, Jonathan L. Frasch, Sean Ellison, Prem Chahal
Electrical and Computer Engineering, Michigan State University, East Lansing, MI

10:00 Break

10:20 B4-6
A MECHANICALLY TUNABLE MULTI-SPLIT-RING-SLOT WAVGUIDE DIRECTIONAL COUPLER FOR HIGH-POWER MICROWAVE APPLICATIONS
Xuyuan Pan*, Georgios Atmatzakis, Christos G. Christodoulou
Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM

10:40 B4-7
EXPERIMENTAL VALIDATION OF MODE DOMINANCE REVERSAL IN NOVEL SLOW WAVE STRUCTURE FOR HIGH POWER BACKWARD WAVE OSCILLATOR
Ushemadzoro Chipengo*, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

11:00 B4-8
INVESTIGATION OF SURFACE WAVE PROPAGATION ALONG A MULTIPLE-REPEATER WIRELESS POWER TRANSFER SYSTEM
Bin Xu*, Yang Li
Electrical and Computer Engineering, Baylor University, Waco, TX

11:20 B4-9
HIGH POWER MICROWAVE POLARIZATION ROTATOR
Hamide Seidfaraji*, Georgios Atmatzakis, Christos Christodoulou
Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM

11:40 B4-10
TRANSMISSION CHARACTERISTICS OF DIELECTRIC-COATED METAL ROD TRANSMISSION LINE FOR A FLEXIBLE TRANSMISSION MEDIUM AT MILLIMETER-WAVE FREQUENCIES
Futoshi Kuroki, Satoshi Kitabayashi*
National Institute of Technology, Kure College, Kure, JAPAN

Session B5: Reconfigurable Antennas and Circuits
Room 200

Co-Chairs: Xun Gong, *University of Central Florida*; Manos Tentzeris, *Georgia Tech*

10:20 B5-1
ULTRA-WIDEBAND RF FILTER FOR SELF-INTERFERENCE CANCELLATION IN STAR SYSTEMS
Stephen J. Watt*, Elias A. Alwan, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

10:40 B5-2
DESIGN OF A NOVEL ORIGAMI ULTRA-WIDEBAND MONOFILAR ANTENNA
Xueli Liu, Shun Yao, Stavros V. Georgakopoulos*
Florida International University, Miami, FL

11:00 B5-3
A RADIATION PATTERN RECONFIGURABLE ANTENNA FOR WLAN ACCESS
Joseph Costantine*[1,2], Rouwaida Kanj[1], Zahi Ghorayeb[1], Tala Al Bahar[1], Yara Itani[1], Youssef Tawk[3,2], Christos G. Christodoulou[2]
[1]*Electrical and Computer Engineering, American University of Beirut;, Beirut, LEBANON*
[2]*COSMIAC, University of New Mexico, Albuquerque, NM*
[3]*Electrical and Computer Engineering, Notre Dame University, Louaize, LEBANON*

11:20 B5-4
RECONFIGURABLE THZ ARRAY EMPLOYING VANADIUM DIOXIDE
Varittha Sanphuang*, Nima Ghalichechian, Niru K. Nahar, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

11:40 B5-5
RECONFIGURABLE SLOT-RING ANTENNAS FOR ARRAY APPLICATIONS
Xun Gong*, Mahmoud Shirazi, Tianjiao Li
Electrical Engineering and Computer Science, University of Central Florida, Orlando, FL

Session C1: Emerging Challenges in Reliability, Distributed Sensing, and Signal Processing
Room 1B51

Co-Chairs: Jean-Francois Chamberland, *Texas A&M University*; John Volakis, *The Ohio State University*

08:20 C1-1
AN EFFICIENT FINITE ELEMENT SCHEME FOR SIMULATING SUBSURFACE WIRELESS TELEMETRY IN WELL LOGGING APPLICATIONS
Jiefu Chen*
Electrical and Computer Engineering, University of Houston, Houston, TX

08:40 C1-2
HIGH DATA RATE MULTI-PATH TRANSMIT/RECEIVE SYSTEM WITH ON-SITE CODING
Dimitrios Siafarikas*, Elias A. Alwan, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

09:00 C1-3
NOTIONS OF PARALLEL COMPUTING AS A MEANS OF ENABLING SHORT DESIGN CYCLES IN RF-BASED INFERENCE SYSTEMS
Austin A. Taghavi*, Jean-Francois Chamberland, Gregory H. Huff
Electrical and Computer Engineering, Texas A&M University, College Station, TX

09:20 C1-4
DATA PROCESSING SOFTWARE FOR GEOPHYSICAL DATA FROM SATELLITE
Yuriy Shpadi[1], Pavel Inchin[1], Anatoly Streltsov*[2]
[1]*Scientific Space Systems Laboratory, Institute of Space Technique and Technology, Almaty, Almatinskaya oblast, KAZAKSTAN*
[2]*Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL*

09:40 C1-5
SPACE RADIATION ENVIRONMENTAL ANALYSIS OF CUBESAT AVIONICS COMPONENTS
James M. Byrne*
Aeronautics and Astronautics - Space Systems Lab, Massachusetts Institute of Technology (MIT), Cambridge, MA

10:00 Break

WEDNESDAY MORNING, continued

10:20 C1-6
EXPERIMENTAL VALIDATION OF DIGITAL BEAMFORMER PERFORMANCE WITH ULTRA-WIDEBAND ANTENNA ARRAYS USING ON-SITE CODING
Satheesh Bojja Venkatakrishnan*, Elias A. Alwan, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

10:40 C1-7
LEVERAGING RECONFIGURABLE ANTENNAS AND MACHINE LEARNING IN INFERENCE TASKS BASED ON WI-FI METADATA
Travis Taghavi*, Jean-Francois Chamberland, Gregory H. Huff
Electrical and Computer Engineering, Texas A&M University, College Station, TX

11:00 C1-8
CARDIAC RATE ESTIMATION USING CONTINUOUS WAVE RADAR AND ULTRA WIDEBAND RADAR AT DIFFERENT DISTANCES
Haofei Wang[1], Lingyun Ren*[2], Krishna Naishadham[3], Aly E. Fathy[2]
[1]*School of Information and Electronics, Beijing Institute of Technology, Beijing, CHINA*
[2]*Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN*
[3]*Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*

11:20 C1-9
SEARCH ALGORITHM COMPARISON FOR FAST OPTIMIZATION OF POWER AMPLIFIER LOAD IMPEDANCE AND INPUT POWER
Joseph Barkate*[1], Charles Baylis[1], Alexander Tsatsoulas[1], Zach Hayes[1], Larry Cohen[2], Robert Marks[1]
[1]*Wireless and Microwave Circuits and Systems Program, Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington, DC*

11:40 C1-10
VERTICALLY INTEGRATED RESEARCH IN RECONFIGURABLE LIQUID-METAL RF DEVICES
Kevin J. Cho*, Scott K. Clemens, Savath Saepoo, Kent J. Sarabia, Sasha S. Yamada, George B. Zhang, Matthew M. Moorefield, Ryan C. Gough, Aaron T. Ohta, Wayne A. Shiroma
Electrical Engineering, University of Hawaii at Manoa, Honolulu, HI

Session F1: RF Propagation Utilizing Numerical Weather Prediction I
Room 150

Co-Chairs: Tracy Haack, Naval Research Laboratory - Marine Meteorology Division;
Jonathan Gehman, The Johns Hopkins University - Applied Physics Laboratory

08:20 F1-1
MICROWAVE PWE PROPAGATION AND SCATTERING FROM ATMOSPHERIC TURBULENCE
Frank Ryan*
Applied Technology, Inc., San Diego, CA

08:40 F1-2
DIRECT RESOLUTION OF LOW-LEVEL RF REFRACTIVITY USING NWP
Nathaniel S. Winstead, Jonathan Z. Gehman*, Thomas R. Hanley
The Johns Hopkins University - Applied Physics Laboratory, Laurel, MD

09:00 F1-3
COMPARISON OF RF PREDICTIONS BASED ON TWO NUMERICAL WEATHER PREDICTION MODELS AND IN-SITU OBSERVATIONS IN THE NORTH SEA
Rick L. Navarro*[1], Amalia Barrios[1], Fok Bolderheij[2], Joris Derksen[2], Katherine Horgan[3], Vincent van Leijen[4], Robert Marshall[5], Ted Rogers[1], Fred Schoonderwoerd[4], Tjarda Wilbrink[4], Earl Williams[1], Victor Wiss[2]
[1]*Space and Naval Warfare Systems Center Pacific, San Diego, CA*
[2]*Netherlands Defense Academy (NLDA), Den Helder, NETHERLANDS*
[3]*Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA*
[4]*Defense Materiel Organisation (DMO), Den Helder, NETHERLANDS*
[5]*Mount Pleasant Meteorology, Mount Pleasant, VA*

09:20 F1-4
EVALUATION OF COAMPS USING MEASUREMENTS FROM THE CASPER PILOT EXPERIMENT
Marcela Ulate*[1], Qing Wang[1], Tracy Haack[2], Teddy Holt[2], John Kaligiros[1], Ryan Yamaguchi[1], Dick Lind[1]
[1]*Naval Postgraduate School, Monterey, CA*
[2]*Naval Research Laboratory, Monterey, CA*

09:40 F1-5
EVAPORATION AND MARINE LAYER DUCTING EFFECTS ON PROPAGATION DURING THE TAPS EXPERIMENT
Tracy Haack*[1], Andrew Kulessa[2], Hedley Hansen[3], Sally Garrett[4], Martin Veasey[5], Katherine Horgan[6], V. Russel Wiss[6], Jacques Claverie[7], Yvonick Hurtaud[8], Jorg Hacker[2]
[1]*Marine Meteorology Division, NRL, Monterey, CA*
[2]*School of the Environment, Flinders University, ARA, Adelaide, SA, AUSTRALIA*
[3]*DSTO, Edinburgh, SA, AUSTRALIA*
[4]*DTA, Auckland, NEW ZEALAND*
[5]*UK Met Office, Exeter, UNITED KINGDOM*
[6]*Dahlgren Division, NSWC, Dahlgren, VA*
[7]*CREC St-Cyr & IETR, Guer, FRANCE*
[8]*Maîtrise de l'information, DGA, Rennes, FRANCE*

10:00 Break

10:20 F1-6
EVALUATION OF VERTICAL REFRACTIVITY PROFILE BLENDING SCHEMES
Paul Frederickson*[1], Tracy Haack[2]
[1]*Meteorology, Naval Postgraduate School, Monterey, CA*
[2]*Marine Meteorology Division, Naval Research Laboratory, Monterey, CA*

10:40 F1-7
A NEW BLENDING ALGORITHM FOR EVAPORATIVE DUCT AND MESOSCALE MODEL PROFILES
Robin C. Cherrett*[1], Qing Wang[2], Hway-Jen Chen[2], Paul Frederickson[2]
[1]*Navy Fleet Weather Center, San Diego, CA*
[2]*Meteorology, Naval Postgraduate School, Monterey, CA*

11:00 F1-8
THE IMPACT OF UAV DATA ASSIMILATION ON RADIO FREQUENCY PROPAGATION PREDICTIONS DURING THE 2009 NEW ZEALAND SEA BREEZE TRIAL
Katherine L. Horgan*[1], Tracy Haack[2], Sally A. Garrett[3]
[1]*Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA*
[2]*Naval Research Laboratory Monterey, Monterey, CA*
[3]*Defence Technology Agency, Auckland, NEW ZEALAND*

11:20 F1-9
RADIO REFRACTIVITY IN STRATIFORM AND CONVECTIVE RAIN REVEALED BY MESOSCALE NUMERICAL WEATHER PREDICTION DATA
Robert E. Marshall*
Mount Pleasant Meteorology, Woodford, VA

Session H1: Physics of Radiation Belts I
Room 245

Co-Chairs: Mark Golkowski, *University of Colorado Denver*; Craig Kletzing, *University of Iowa*

08:20 H1-1
EVIDENCE FOR NONLINEAR VLF WAVE PHYSICS FROM EMFISIS INSTRUMENT SUITE ON BOARD VAN ALLEN PROBES
Chris Crabtree*[1], Erik Tejero[1], Gurudas Ganguli[1], George Hospodarsky[2], Craig Kletzing[2]
[1]*Division of Plasma Physics, Naval Research Laboratory, Washington, DC*
[2] *Physics and Astronomy, University of Iowa, Iowa City, IA*

08:40 H1-2
IN SITU STATISTICAL OBSERVATION OF PC1 PEARL PULSATIONS BY THE VAN ALLEN PROBES
Kristoff W. Paulson*[1], Charles W. Smith[1], Marc R. Lessard[1], Roy B. Torbert[2], Craig A. Kletzing[3], John R. Wygant[4]
[1]*Space Science Center, University of New Hampshire, Durham, NH*
[2]*Southwest Research Institute, Durham, NH*
[3]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[4]*University of Minnesota, Minneapolis, MN*

09:00 H1-3
OBSERVATIONS OF A GLOBAL COHERENCE SCALE MODULATING ELECTRON LOSS DUE TO PLASMASPHERIC HISS
Aaron W. Breneman*[1], Alexa J. Halford[2], Robyn Millan[2], Michael McCarthy[3], Joseph F. Fennell[4], John Sample[5], Leslie A. Woodger[2], George Hospodarsky[6], John Wygant[1], Cynthia Cattell[1], Jerry Goldstein[7], Craig Kletzing[6]
[1]*School of Physics and Astronomy, University of Minnesota, Minneapolis, MN*
[2]*Physics and Astronomy, Dartmouth College, Hanover, NH*
[3]*Earth and Space Sciences, University of Washington, Seattle, WA*
[4]*Space Sciences Lab, University of California, Berkeley, CA*
[5] *Physics and Astronomy, University of Iowa, Iowa City, IA*
[6]*Southwest Research Institution, Southwest Research Institution, San Antonio, TX*
[7]*The Laboratory for Atmospheric and Space Physics (LASP), University of Colorado, Boulder, CO*

09:20 H1-4
PLASMASPHERIC HISS WAVE AMPLITUDES INFERRED FROM LOW-ALTITUDE MEASUREMENTS OF ENERGETIC ELECTRONS
Maria de Soria-Santacruz Pich*[1], Wen Li[2], Richard M. Thorne[2]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*University of California Los Angeles, Los Angeles, CA*

09:40 H1-5
IMPROVED SPECTRAL ANALYSIS OF HISS AND CHORUS OBSERVATION IN GROUND-BASED DATA
Poorya Hosseini*, Mark Golkowski
Electrical Engineering, University of Colorado Denver, Denver, CO

10:00 Break

10:20 H1-6
EXCITATION OF DISCRETE AND BROADBAND WHISTLER WAVES IN A LABORATORY PLASMA
Xin An*[1], Bart Van Compernolle[2], Jacob Bortnik[1], Richard Thorne[1], Patrick Pribyl[2], Walter Gekelman[2]
[1]*Atmospheric and Oceanic Sciences, University of California, Los Angeles, Los Angeles, CA*
[2]*Physics, University of California, Los Angeles, Los Angeles, CA*

10:40 H1-7
LABORATORY INVESTIGATION OF NONLINEAR WHISTLER WAVE PROCESSES*
Bill Amatucci*, Erik Tejero, Chris Crabtree, Dave Blackwell, Guru Ganguli
Plasma Physics Division, Naval Research laboratory, Washington, DC

11:00 H1-8
WHISTLER-MODE WAVE SIMULATIONS
Roxanna L. Stein*, Miles T. Bengtson, Sara A. Rosborough, Morgan M. Matheny, Anatoly V. Streltsov
Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL

11:20 H1-9
EFFECT OF FINITE ELECTRON AND ION TEMPERATURE ON MAGNETOSPHERIC WHISTLER MODE RAY-TRACING
Ashanthi S. Maxworth*, Mark Golkowski
Electrical Engineering, University of Colorado Denver, Denver, CO

Session J1: Emerging Instrumentation and Techniques
Room 265

Co-Chairs: Steven Ellingson, *Virginia Tech;* Daniel P. Marrone, *University of Arizona*

08:20 J1-1
A GENERIC AND EFFICIENT "E-FIELD PARALLEL IMAGING CORRELATOR" SOFTWARE FOR NEXT-GENERATION RADIO TELESCOPES
Nithyanandan Thyagarajan*[1], Adam P. Beardsley[1], Judd D. Bowman[1], Miguel F. Morales[2]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Physics, University of Washington, Seattle, WA*

WEDNESDAY MORNING, continued

08:40 J1-2
THE EXTERNAL CALIBRATOR FOR HYDROGEN OBSERVATORIES
Daniel C. Jacobs*[1], Jacob Burba[1], Lauren Turner[1], Abraham Neben[2], Benjamin Stinnett[1], Marc Leatham[1], Michael Busch[1], Judd Bowman[1]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Kavli Institute for Astrophysics and Space Research, Massachusetts Institute of Technology, Cambridge, MA*

09:00 J1-3
CALIBRATING RADIO ARRAYS WITHOUT VISIBILITIES USING THE E-FIELD PARALLEL IMAGING CALIBRATION (EPICAL)
Adam P. Beardsley*[1], Nithyanandan Thyagarajan[1], Miguel F. Morales[2], Judd D. Bowman[1]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Physics, University of Washington, Seattle, WA*

09:20 J1-4
LOGNORMAL INSTRUMENTAL ERROR ARISING IN MULTISTAGE RADIO FREQUENCY RADIOMETERS
Bang D. Nhan*[1,2], Richard F. Bradley[2,3,4], Abhirup Datta[1], Jack O. Burns[1]
[1]*Center for Astrophysics and Space Astronomy, University of Colorado at Boulder, Boulder, CO*
[2]*Central Development Laboratory, National Radio Astronomy Observatory, Charlottesville, VA*
[3]*Astronomy, University of Virginia, Charlottesville, VA*
[4]*Electrical and Computer Engineering, University of Virginia, Charlottesville, VA*

09:40 J1-5
CO INTENSITY MAPPING: FIRST CONSTRAINTS ON THE MOLECULAR GAS POWER SPECTRUM AT RED-SHIFT 3
Daniel P. Marrone*
Astronomy, University of Arizona, Tucson, AZ

10:00 Break

10:20 J1-6
IMPROVED POWER EFFICIENCY FOR CRYOGENICS AT THE VLA
Denis R. Urbain, Wes Grammer, Steven Durand*
Electronics, National Radio Astronomy Observatory, Socorro, NM

10:40 J1-7
A NEW VHF ("4-BAND") FEED SYSTEM FOR THE VERY LARGE ARRAY
Steven W. Ellingson*
Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA

11:00 J1-8
MANUFACTURABLE CRYOGENIC SIGE LNA FOR RADIO ASTRONOMY AND SPACE COMMUNICATIONS
Andrew W. Janzen*, Sander Weinreb
Electrical Engineering, California Institute of Technology, Pasadena, CA

11:20 J1-9
NANOSATS FOR A LOW FREQUENCY SPACE-BASED RADIO INTERFEROMETER
Baptiste Cecconi*[1], Stavros Katsanevas[2], Denis Puy[3], Andre Laurens[4], Albert-Jan Boonstra[5], Marc Klein Wolt[6], Mark Bentum[7], Angelica Sicard[8], Jean-Louis Pincon[9], Marco Agnan[2], Martin Giard[10], Patrick Loumeau[11], Julien Girard[12], Cyril Tasse[13]
[1]*LESIA, Observatoire de Paris, Meudon, FRANCE*
[2]*APC, Universite Paris Diderot, Paris, FRANCE*
[3]*LUPM, Universite de Montpellier, Montpellier, FRANCE*
[4]*CNES, Toulouse, FRANCE*
[5]*ASTRON, Dwingeloo, NETHERLANDS*
[6]*Radboud University, Nijmegen, NETHERLANDS*
[7]*TU Twente, Twente, NETHERLANDS*
[8]*ONERA, Toulouse, FRANCE*
[9]*LPC2E, Universite d'Orleans, Orleans, FRANCE*
[10]*IRAP, Universite de Toulouse, Toulouse, FRANCE*
[11]*C2S, TelecomParisTech, Paris, FRANCE*
[12]*SAp/IRFU, CEA, Saclay, FRANCE*
[13]*GEPI, Observatoire de Paris, Meudon, FRANCE*

11:40 J1-10
DESIGN OF A COMPACT K BAND CRYOGENIC RECEIVER
Jun Shi*[1], Sander Weinreb[2]
[1] *Information Science and Technology, Southeast University, Nanjing, CHINA*
[2]*Electrical Engineering, California Institute of Technology, Pasadena, CA*

WEDNESDAY AFTERNOON, 6 January 2016

Session B6: Finite Arrays and Antenna Measurements
Room 1B40

Co-Chairs: Jennifer Bernhard, *University of Illinois at Urbana-Champaign;*
Atef Elsherbeni, *Colorado School of Mines*

13:20 B6-1
FAR FIELD OF LARGE, WIDEBAND, SCANNING ARRAYS
Randy Haupt*, Payam Nayeri
Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO

13:40 B6-2
FOURIER ITERATION BETWEEN TWO MEASUREMENT PLANE FIELDS OF AN ANTENNA WITH LIMITED MEASURED DATA
Sembiam R. Rengarajan*, Ronald J. Pogorzelski
Electrical and Computer Engineering, California State University, Northridge, CA

14:00 B6-3
BEAMFORMING WITH RADIATION MODES OF FINITE GROUND PLANES EXCITED BY HETEROGENEOUS ARRAYS
Kurt R. Schab*, Jennifer T. Bernhard
Electromagnetics Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL

14:20 B6-4
SPACE-FED ANTENNA ARRAY DESIGN AND ANALYSIS SOFTWARE PACKAGE
Kyle Patel*, Payam Nayeri, Atef Z. Elsherbeni
Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO

Session B7: Printed Antennas and Arrays
Room 200

Co-Chairs: Edward Kuester, *University of Colorado Boulder;*
Ozlem Kilic, *The Catholic University of America*

13:20 B7-1
STUDY OF REFECTION AND BANDWIDTH LIMITS FOR EXPONENTIALLY TAPERED TRANSMISSION LINES
Raymond J. Sprungle*[1,2], Edward F. Kuester[1]
[1]*Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Ball Aerospace & Technologies Corporation, Boulder, CO*

13:40 B7-2
MUTUAL COUPLING REDUCTION IN MICROSTRIP PATCH ANTENNA
Amin Darvazehban[1], Ahmad Emadoddin[2], Omid Manoochehri*[3], Danilo Erricolo[3]
[1]*Electrical and Computer Engineering, Amirkabir University of Technology, Tehran, IRAN*
[2]*Electrical and Computer Engineering, Shahed University, Tehran, IRAN*
[3]*Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL*

14:00 B7-3
A CONFORMAL MICRO-STRIP ROTMAN LENS DESIGN USING PARTICLE SWARM OPTIMIZATION (PSO)
Toan K. Vo Dai*, Tuan Nguyen, Khai Cao, Thinh Le, Ozlem Kilic
Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

14:20 B7-4
A COMPACT DIRECTIVE MICROSTRIP SLOT ANTENNA FOR TETRA-BAND APPLICATIONS
Hamid T. Chorsi, Ryan Jacobs*, Mark Golkowski
Electrical Engineering, University of Colorado Denver, Denver, CO

14:40 B7-5
HIGHER ORDER ANALYTICAL MODELS OF PLANAR MESH GRIDS
Omid Manoochehri*, Farhad Farzami, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

Session B8: Scattering
Room 105

Co-Chairs: Piergiorgio Uslenghi, *University of Illinois at Chicago*;
Danilo Erricolo, *University of Illinois at Chicago*

13:20 B8-1
THEORY OF CHARACTERISTIC MODES FOR ELECTROMAGNETIC SCATTERING OF SINGLE-WALLED CARBON NANOTUBES WITH REALISTIC SHAPES
Ahmed M. Hassan*[1], Fernando Vargas-Lara[2], Jack F. Douglas[2], Edward J. Garboczi[3]
[1]*Computer Science Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO*
[2]*Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD*
[3]*Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO*

13:40 B8-2
ELECTROMAGNETIC SCATTERING FROM SINGLE-WALLED CARBON NANOTUBE DIMERS
Ahmed M. Hassan*[1], Fernando Vargas-Lara[2], Jack F. Douglas[2], Edward J. Garboczi[3]
[1]*Computer Science Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO*
[2]*Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD*
[3]*Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO*

14:00 B8-3
OBSERVATIONS OF THE RADAR CROSS SECTION (RCS) PHENOMENA OF ANTENNAS THROUGH THE EYES OF CHARACTERISTIC MODES THEORY
Ezdeen A. Elghannai*, Roberto G. Rojas
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

14:20 B8-4
CALCULATION OF THE ULTIMATE INTRINSIC SIGNAL TO NOISE RATIO FOR A LOSSY ELLIPTIC CYLINDER
Switt Kittivittayakul*[1], Benedetto Grivo[2], Riccardo Lattanzi[2], Giuseppe Carluccio[2], Danilo Erricolo[1]
[1]*Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL*
[2]*Radiology/Center of Advanced Imaging Innovation and Research, New York University, New York, NY*

14:40 B8-5
SCATTERING BY TWO PARALLEL METALLIC HALF-PLANES PERPENDICULARLY TRUNCATED BY A METAL PLANE
Marco Poort*, Piergiorgio L. E. Uslenghi
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

15:00 Break

15:20 B8-6
ELECTROMAGNETIC SCATTERING BY A METALLIC QUARTER-CYLINDER LOCATED INSIDE A TRIHEDRAL METAL REFLECTOR
Piergiorgio L. E. Uslenghi*, Baker Al-Bahri
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

15:40 B8-7
EXACT SCATTERING FOR AN ELLIPTIC METAL CYLINDER AT THE INTERFACE BETWEEN ANTI-ISOREFRACTIVE HALF-SPACES
Seiran Khaledain*, Tadahiro Negishi, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

16:00 B8-8
EXACT SCATTERING FOR A METALLIC SPHEROID AT THE INTERFACE BETWEEN ANTI-ISOREFRACTIVE HALF-SPACES
Gargi S. Ghurye*, Tadahiro Negishi, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

16:20 B8-9
SUBROUTINES FOR THE COMPUTATION OF RADIAL MATHIEU FUNCTIONS FOR LARGE VALUES OF THE PARAMETER
Unnati C. Wadkar*, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

16:40 B8-10
NUMERICAL RESULTS FOR THE RADIATION BY A LINE SOURCE IN THE PRESENCE OF A SLOTTED METALLIC PLANE COVERED BY DPS AND DNG ELLIPTICAL LENSES
Brook Feyissa*, Danilo Erricolo, Tadahiro Negishi
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

17:00 B8-11
EXACT ELECTROMAGNETIC SCATTERING FROM A DIPOLE ANTENNA LOCATED INSIDE A MULTILAYER METAMATERIAL OBLATE SPHEROIDAL CAVITY
Yangqing Liu*, Tadahiro Negishi, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

17:20 B8-12
NUMERICAL RESULTS FOR THE RADIATION BY A DIPOLE ANTENNA ON THE AXIS OF A CIRCULAR HOLE IN A METALLIC PLANE COVERED BY DPS AND DNG OBLATE SPHEROIDAL LENSES
Farhad Farzami*, Tadahiro Negishi, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

Session B9: 3D Printed Antennas
Room 155

Co-Chairs: Jacob Adams, *North Carolina State University*; Hao Xin, *University of Arizona*

13:20 B9-1
ADDITIVELY MANUFACTURED FLEXIBLE & ORIGAMI-RECONFIGURABLE ANTENNAS AND RF SENSORS
Manos M. Tentzeris*, Ryan Bahr, Jimmy Hester, John Kimionis
Electrical and Computer Engineering, Georgia Tech, Atlanta, GA

13:40 B9-2
MATERIALS CHARACTERIZATION AND CONFORMAL ANTENNAS FOR 3D PRINTED ANTENNA APPLICATIONS
Corey Shemelya[1], Mike Zemba[2], Min Liang[3], Xiaoju Yu[3], Junqiang Wu[3], David Espalin[1], David Roberson[1], Ryan Wicker[1], Hao Xin[3], Eric MacDonald*[1]
[1]*The University of Texas at El Paso, El Paso, TX*
[2]*NASA Glenn Research Center, Cleveland, OH*
[3]*University of Arizona, Tucson, AZ*

14:00 B9-3
NOVEL ELECTROMAGNETIC STRUCTURES ENABLED BY 3D PRINTING TECHNOLOGY
Xiaoju Yu*, Junqiang Wu, Min Liang, Ahmed H. Abdelrahman, Hao Xin
Electrical and Computer Engineering, University of Arizona, Tucson, AZ

14:20 B9-4
DESIGN AND DEVELOPMENT OF TRIPLE MODE WAVEGUIDE HORN ANTENNA USING 3D PRINTING TECHNOLOGY
Alejandro T. Castro*, Satish K. Sharma, Behrouz Babakhani
Electrical and Computer Engineering, San Diego State University, San Diego, CA

14:40 B9-5
DIRECT DIGITAL MANUFACTURING OF A 2.45 GHZ PHASED ARRAY
Thomas Ketterl[1], Casey Perkowski[2], Paul Deffenbaugh[2], John Stratton[1], Joshua Stephenson[1], Kenneth Church[2], Thomas Weller*[1]
[1]*University of South Florida, Tampa, FL*
[2]*Sciperio, Inc., Orlando, FL*

15:00 Break

15:20 B9-6
USE OF LOW COST 3D PRINTERS IN ANTENNA RESEARCH.
Anders J. Johansson*
EIT, Lund University, Lund, SWEDEN

15:40 B9-7
THE ELECTRICAL PROPERTIES OF CARBON NANOTUBE AND GRAPHENE BASED FILAMENT FOR 3D PRINTED ANTENNAS
Patricia K. Moseh*[1], Chenyu Wang[1], Kenneth J. Wynne[1], Erdem Topsakal[2]
[1]*Chemical and Life Science Engineering, Virginia Commonwealth University, Richmond, VA*
[2]*Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA*

16:00 B9-8
3D PRINTED LIQUID METAL MOLDS FOR ANTENNA AND FEED PACKAGING
Collin Ladd[1], Dishit Parekh[1], Vivek Bharambe[2], Michael D. Dickey[1], Jacob J. Adams*[2]
[1]*Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC*
[2]*Electrical and Computer Engineering, North Carolina State University, Raleigh, NC*

Session B10: Uncertainty Quantification in CEM and Electronic Design Automation
Room 1B51

Co-Chairs: Jamesina Simpson, *University of Utah*; Sourajeet Roy, *Colorado State University*

13:20 B10-1
A CLASSIFICATION FRAMEWORK FOR METHODS OF UNCERTAINTY QUANTIFICATION IN COMPUTATIONAL ELECTROMAGNETICS
Sathya S. Ganta*, Barry D. Van Veen, Susan C. Hagness
Electrical and Computer Engineering, University of Wisconsin-Madison, Madison, WI

13:40 B10-2
TOWARDS HIGH-DIMENSIONAL UNCERTAINTY QUANTIFICATION: A TENSOR PERSPECTIVE
Zheng Zhang*[1], Luca Daniel[2]
[1]*Argonne National Laboratory, Lemont, IL*
[2]*Massachusetts Institute of Technology, Cambridge, MA*

14:00 B10-3
STOCHASTIC COLLOCATION METHOD FOR FINITE ELEMENT WAVEGUIDE ANALYSIS AND STOCHASTIC GALERKIN METHOD FOR FINITE DIFFERENCE CIRCUIT ANALYSIS
Xu Chen*, Jose E. Schutt-Aine, Andreas C. Cangellaris
Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL

Session B11: Wearable Antennas and Electronics
Room 1B40

Co-Chairs: Christos Christodoulou, *University of New Mexico*; Asimina Kiourti, *The Ohio State University*

15:20 B11-1
ANALYSIS OF MILIMETER-SIZE IMPLANTED LOOP ANTENNAS FOR BRAIN-MACHINE INTERFACE SYSTEMS
Lingnan Song*, Yahya Rahmat-Samii
Electrical Engineering, University of California, Los Angeles, Los Angeles, CA

15:40 B11-2
DUAL COIL FOR REMOTE PROBING OF SIGNALS USING RESISTIVE WIRELESS ANALOG PASSIVE SENSORS (RWAPS)
Bashir I. Morshed*
Electrical and Computer Engineering, The University of Memphis, Memphis, TN

16:00 B11-3
CONFORMAL STRONGLY COUPLED MAGNETIC RESONANT ANTENNAS FOR WEARABLE APPLICATIONS
Karina A. Quintana, Pablo J. Gonzalez*, Kun Bao, Stavros V. Georgakopoulos
Electrical and Computer Engineering, Florida International University, Miami, FL

16:20 B11-4
A NEW CLASS OF COLORFUL TEXTILE ANTENNAS FOR WEARABLE ELECTRONICS
Asimina Kiourti*, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:40 B11-5
NOVEL STRETCHABLE AND WEARABLE HAND GESTURE SENSORS & ANTENNAS
Manos M. Tentzeris*, Taoran Le, Ryan Bahr
Electrical and Computer Engineering, Georgia Tech, Atlanta, GA

Session BD1: Energy Harvesting Rectennas and Back-Ends
Room 200

Co-Chairs: Zoya Popovic, *University of Colorado Boulder*; John Volakis, *The Ohio State University*

15:20 BD1-1
AMBIENT ENERGY HARVESTING FLEXIBLE ADDITIVELY-MANUFACTURED TOPOLOGIES
Manos M. Tentzeris*, Jo Bito, Jimmy Hester
Electrical and Computer Engineering, Georgia Tech, Atlanta, GA

15:40 BD1-2
SINGLE-DIODE RECTENNAS WITH HIGH CONVERSION EFFICIENCIES AT VERY LOW INCIDENT POWER DENSITIES
Parisa Momenroodaki*, Ignacio Ramos, Zoya Popovic
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

16:00 BD1-3
WIRELESS POWER TO SENSORS EMBEDDED IN CONCRETE STRUCTURES
Rashed Bhuiyan, Xiaohua Jin, Md. R. Islam, Juan M. Caicedo, Mohammod Ali*
University of South Carolina, Columbia, SC

16:20 BD1-4
HIGH EFFICIENCY WIRELESS POWER HARVESTING AT LOW POWERS
Brock DeLong*[1], Qiaowei Yuan[2], John Volakis[1]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*National Institute of Technology, Sendai College, Sendai, JAPAN*

16:40 BD1-5
MID-INFRARED ENERGY HARVESTING AND CONVERSION USING RECTIFYING HYPERBOLIC METAMATERIALS
Maryam Sakhdari*, Mehdi Hajizadegan, Pai-Yen Chen
Electrical and Computer Engineering, Wayne State University, Detroit, MI

17:00 BD1-6
ENHANCING WIRELESS POWER TRANSFER THROUGH FIELD DISTRIBUTION DESIGN
Erik S. Gamez Rodriguez*, David A. Schurig, Gianluca Lazzi
Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

Session CDE1: Spectrum Issues, Developments, and Solutions
Room 151

Co-Chairs: Charles Baylis, *Baylor University*;
Gregory Huff, *Texas A&M University*

13:20 CDE1-1
CAN RADAR AND COMMUNICATION SYSTEMS HARMONIOUSLY CO-EXIST?
Shannon D. Blunt[1], Eric L. Mokole*[2]
[1]*University of Kansas, Lawrence, KS*
[2]*Independent Consultant, Burke, VA*

13:40 CDE1-2
A SURVEY OF RESEARCH AND DEVELOPMENT TO ENHANCE THE USE OF SPECTRUM
Lawrence S. Cohen*
Consultant, Gaithersburg, MD

14:00 CDE1-3
RECENT DEVELOPMENTS ON SPECTRAL CONTAINMENT OF RADAR SIGNALS
John Jakabosky*[1], Shannon D. Blunt[1], Eric L. Mokole[2], Chris Allen[1]
[1]*Electrical Engineering and Computer Science, University of Kansas, Lawrence, KS*
[2]*Independent Consultant, Burke, VA*

14:20 CDE1-4
JOINT OPTIMIZATION OF LOAD IMPEDANCE AND BIAS VOLTAGE FOR POWER-ADDED EFFICIENCY AND ADJACENT-CHANNEL POWER RATIO USING THE BIAS SMITH TUBE
Matthew Fellows[1], Sarvin Rezayat[1], Lucilia Lamers[1], Joseph Barkate[1], Charles Baylis*[1], Lawrence Cohen[2], Robert J. Marks III[1]
[1]*Electrical and Computer Engineering, Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington, DC*

14:40 CDE1-5
A SIMULTANEOUS CIRCUIT AND WAVEFORM OPTIMIZATION FOR RADAR SYSTEMS
Dylan Eustice[1], Charles Baylis*[1], Larry Cohen[2], Matthew Fellows[1], Joseph Barkate[1], Robert Marks II[1]
[1]*Electrical and Computer Engineering, Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington, DC*

15:00 Break

15:20 CDE1-6
MODELING AGGREGATE INTERFERENCE FROM LTE SYSTEMS
Joel Dumke*, Nicholas Kent, Dylan Hicks
Institute for Telecommunication Sciences, Boulder, CO

15:40 CDE1-7
A GENERALIZED METHOD FOR EVALUATING INTERFERENCE IN SPECTRUM SHARING AND MANAGEMENT APPLICATIONS
Nicholas N. DeMinco*
Institute for Telecommunication Sciences, Boulder, CO

16:00 CDE1-8
A SIMULATION STUDY OF THE LTE INTERFERENCE ON WIFI SIGNAL DETECTION
Yao Ma*, Daniel G. Kuester, Jason Coder, William F. Young
Communication Technology Laboratory, RF Technology Division, National Institute of Standards and Technology, Boulder, CO

16:20 CDE1-9
TESTING SPECTRUM SENSING NETWORKS BY UAV
Daniel G. Kuester*, Ryan T. Jacobs, Yao Ma, Jason Coder
Communication Technology Lab, RF Technology Division, National Institute of Standards and Technology, Boulder, CO

16:40 CDE1-10
WAVEFORMS FOR INTERFERENCE TESTING OF EMERGENCY RESPONDER SAFETY DEVICES
Luis A. Gonzalez[1], Audrey K. Puls*[1], William F. Young[2]
[1]*Electrical, Computer, and Energy Engineering, University of Colorado, Boulder, Boulder, CO*
[2]*Communications Technology Laboratory, National Institute of Standards and Technology, Boulder, CO*

Session F2: RF Propagation Utilizing Numerical Weather Prediction II
Room 150

Co-Chairs: Katherine Horgan, *Naval Surface Warfare Center Dahlgren Division*;
Qing Wang, *Naval Postgraduate School*

13:20 F2-1
VARIATIONAL ASSIMILATION OF GPS RADIO-OCCULTATION OBSERVATIONS IN RAINY CONDITIONS
Francois C. Vandenberghe*[1], Michel Aidonidis[2]
[1]*National Center for Atmospheric Research, Boulder, CO*
[2]*Meteo France, Brest, FRANCE*

13:40 F2-2
EVAPORATION AND ELEVATED DUCT PROPERTIES OVER THE SUBTROPICAL EASTERN PACIFIC OCEAN REGION USING MAGIC DATA
Denny P. Alappattu*, Qing Wang
Meteorology, Naval Postgraduate School, Monterey, CA

14:00 F2-3
CASPER PILOT EXPERIMENT RESULTS: ESTIMATION OF ATMOSPHERIC REFRACTIVITY USING PROPAGATION LOSS
Caglar Yardim*[1], Jon Pozderac[1], Robert Burkholder[1], Qing Wang[2]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Meteorology, Naval Postgraduate School, Monterey, CA*

14:20 F2-4
THE DESIGN OF CASPER FIELD PROGRAM FOR EM DUCTING RESEARCH
Qing Wang*[1], Robert Burkholder[2], Tony DePaolo[3], Harindra J. Fernando[4], Tracy Haack[5], Thomas Hanley[6], Teddy Holt[5], Katherine Horgan[7], Haflidi Jonsson[1], Djamal Khelif[8], Wendell Nuss[1], Ted Rogers[9], Ivan Savelyev[10], Kipp Shearman[11], Lian Shen[12], Caglar Yardim[2]
[1]*Naval Postgraduate School, Monterey, CA*
[2] *The Ohio State University, Columbus, OH*
[3]*Scripps Institution of Oceanography,, University of California, San Diego, San Diego, CA*

[4]*University of Notre Dame, Notre Dame, IN*
[5]*Naval Research Lab, Monterey, CA*
[6]*The Johns Hopkins University - Applied Physics Laboratory, Laurel, MD*
[7]*Dahlgren Division, Naval Surface Warfare Center, Dahlgren, VA*
[8]*University of California, Irvine, Irvine, CA*
[9]*SPAWAR SSC Pacific, San Diego, CA*
[10]*Naval Research Lab, Washington, DC*
[11]*Oregon State University, Corvallis, OR*
[12]*University of Minnesota, Minneapolis, MN*

14:40 F2-5
CASPER MEASUREMENT CAMPAIGN, OCTOBER 2015, DUCK, NORTH CAROLINA, USA
Edward Bertot*, Ted Rogers
Atmospheric Propagation, SSC Pacific, San Diego, CA

15:00 Break

15:20 F2-6
IN-SITU OBSERVATION OF SURFACE LAYER SCALAR PROFILES FOR CHARACTERIZING EVAPORATIVE DUCT PROPERTIES
Denny P. Alappattu*[1], Qing Wang[1], Rich Rainer[1], Ryan Yamaguchi[2], Dick Lind[1]
[1]*Meteorology, Naval Postgraduate School, Monterey, CA*
[2]*Mechanical and Aerospace Engineering, University of California Irvine, Irvine, CA*

15:40 F2-7
X-BAND BEACON-RECEIVER PHASED ARRAY EVAPORATION DUCT HEIGHT ESTIMATION
Jonathan M. Pozderac*[1], Joel T. Johnson[1], Caglar Yardim[1], Thomas C. Fu[2], Craig F. Merrill[2], Tom Cook[3], Tony de Paolo[3], Myles Syverud[3], Eric Terrill[3], Evan Walsh[3], Eric Gallimore[3]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Carderock Division, NSWC, Bethesda, MD*
[3]*Scripps Institution of Oceanography, University of California, San Diego, San Diego, CA*

16:00 F2-8
VERSATILE X-BAND RECEIVING ARRAY FOR EM PROPAGATION MEASUREMENTS IN THE MARINE ATMOSPHERIC BOUNDARY LAYER
Qi Wang*, Robert Burkholder, Caglar Yardim, Jon Pozderac
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:20 F2-9
ULTRA WIDE BAND LOWER ATMOSPHERIC PROPAGATION (LATPROP) SYSTEM
Luyao Xu*[1], Caglar Yardim[1], Swagato Mukherjee[1], Robert Burkholder[1], Jon Pozderac[1], Qing Wang[2]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Meteorology, Naval Postgraduate School, Monterey, CA*

16:40 F2-10
W-BAND PROPAGATION IN THE MARITIME ENVIRONMENT
Thomas R. Hanley*, Ian M. Hughes
The Johns Hopkins University - Applied Physics Laboratory, Laurel, MD

Session H2: Physics of Radiation Belts II
Room 245

Co-Chairs: Mark Golkowski, *University of Colorado Denver*; Craig Kletzing, *University of Iowa*

13:20 H2-1
OBSERVATIONS OF WHISTLER-MODE WAVES WITHIN DENSITY DUCTS BY THE VAN ALLEN PROBES
Sara A. Rosborough*, Miles T. Bengtson, Roxanne L. Stein, Morgan M. Matheny, Anatoly V. Streltsov
Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL

13:40 H2-2
DISTRIBUTIONS OF WAVE POWER IN THE INNER MAGNETOSPHERE AS ORGANIZED BY PLASMAPAUSE LOCATION
David M. Malaspina*[1], Allison N. Jaynes[1], Cory Boule[2], Craig Kletzing[3], Robert E. Ergun[1], John R. Wygant[4]
[1]*Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO*
[2]*Keene State College, Keene, NH*
[3]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[4]*Physics and Astronomy, University of Minnesota, Minneapolis, MN*

14:00 H2-3
THE ROLE OF SUBSTORMS AND WHISTLER-MODE CHORUS WAVES IN THE REBUILDING OF EARTH'S RADIATION BELT
Allison N. Jaynes*[1], Daniel N. Baker[1], Howard J. Singer[2], Juan V. Rodriguez[3], T. M. Loto'aniu[3], Ashar F. Ali[1], Scot R. Elkington[1], Xinlin Li[1], Shrikanth G. Kanekal[4], Joseph F. Fennell[5], Wen Li[6], Richard M. Thorne[6], Craig A. Kletzing[7], Seth G. Claudepierre[5], Harlan E. Spence[8], Geoff D. Reeves[9]
[1]*LASP, University of Colorado Boulder, Boulder, CO*
[2]*Space Weather Prediction Center, NOAA, Boulder, CO*
[3]*CIRES, University of Colorado Boulder, Boulder, CO*
[4]*NASA Goddard Space Flight Center, Greenbelt, MD*
[5]*Aerospace Corporation, Los Angeles, CA*
[6]*University of California Los Angeles, Los Angeles, CA*
[7]*University of Iowa, Iowa City, IA*
[8]*University of New Hampshire, Durham, NH*
[9]*Los Alamos National Laboratory, Los Alamos, NM*

14:20 H2-4
ULF WAVES IN THE PROTON RADIATION BELT
Anatoly V. Streltsov*[1], Joseph D. Huba[2]
[1]*Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL*
[2]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*

14:40 H2-5
ANALYSIS OF WHISTLER WAVES DETECTED BY THE VAN ALLEN PROBES IN EARTHS RADIATION BELTS
Morgan M. Matheny*, Miles T. Bengtson, Sara A. Rosborough, Roxanna L. Stein, Anatoly Streltsov
Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL

WEDNESDAY AFTERNOON, continued

Session J2: SKA Technical Development
Room 265

Co-Chairs: Eloy de Lera Acedo, *University of Cambridge*; Antony Schinckel, *CSIRO Astronomy and Space Science*

13:20 J2-1
THE MURCHISON WIDEFIELD ARRAY
Miguel F. Morales*
Physics, University of Washington, Seattle, WA

13:40 J2-2
HOLOGRAPHIC APERTURE ARRAY STATION CALIBRATION AT LOFAR
Michiel A. Brentjens*[1], David Bordenave[2]
[1]*Radio Observatory, Astron Netherlands Institute for Radio Astronomy, Dwingeloo, NETHERLANDS*
[2]*Physics and Astronomy, University of Washington, Seattle, WA*

14:00 J2-3
THE AUSTRALIAN SKA PATHFINDER - AN UPDATE
Antony E. T. Schinckel*, For The ASKAP Team
CSIRO Astronomy and Space Science, Epping, NSW, AUSTRALIA

14:20 J2-4
ASKAP'S PHASED ARRAY FEEDS FOR RADIO ASTRONOMY
Aaron P. Chippendale*, Aidan W. Hotan, For The ASKAP Team
Astronomy and Space Science, CSIRO, Sydney, NSW, AUSTRALIA

14:40 J2-5
MERKAT AS AN SKA-MID PRECURSOR
Justin L. Jonas*
Centre for Radio Astronomy Techniques & Technologies, Rhodes University, Grahamstown, SOUTH AFRICA

15:00 Break

15:20 J2-6
THE SKA LOW FREQUENCY APERTURE ARRAY
Eloy de Lera Acedo*[1], Andrew J. Faulkner[1], Jan Geralt bij de Vaate[2]
[1]*University of Cambridge, Cambridge, UNITED KINGDOM*
[2]*ASTRON, Dwingeloo, NETHERLANDS*

15:40 J2-7
SKA1 LOW CORRELATOR
John D. Bunton*
CASS, CSIRO, Epping, AUSTRALIA

16:00 J2-8
DATA TRANSPORT FOR THE SKA
Keith J. Grainge*
Physics and Astronomy, University of Manchester, Manchester, UNITED KINGDOM

16:20 J2-9
LATEST PERFORMANCE PREDICTION OF THE SINGLE PIXEL FEEDS FOR THE SKA1-MID ARRAY
Isak P. Theron*, Robert Lehmensiek
EMSS Antennas, Stellenbosch, SOUTH AFRICA

16:40 J2-10
WIDEBAND FEED SYSTEM DEVELOPMENT FOR SKA
Bhushan Billade*[1], Magnus Dahlgren[1], Jonas Flygare[1], Jian Yang[2], Bo Wastberg[1], Miroslav Pantaleev[1]
[1]*Earth and Space Science, Chalmers University of Technology, Gothenburg, SWEDEN*
[2]*Signals and Systems, Chalmers University of Technology, Gothenburg, SWEDEN*

17:00 J2-11
MID-FREQUENCY APERTURE ARRAY FOR THE SQUARE KILOMETRE ARRAY
Andrew J. Faulkner*[1], Eloy de LeraAcedo[1], Kris Zarb-Adami[2]
[1]*Cavendish Laboratory, University of Cambridge, Cambridge, UNITED KINGDOM*
[2]*University of Oxford, Oxford, UNITED KINGDOM*

17:20 J2-12
LOW NOISE PHASED-ARRAY FEED WITH CMOS LNAS
Leonid Belostotski*[1], Aaron J. Beaulieu[1], Tom Burgess[2], Bruce Veidt[2], James W. Haslett[1]
[1]*Electrical and Computer Engineering, University of Calgary, Calgary, Alberta, CANADA*
[2]*Herzberg, NRC, Penticton, BC, CANADA*

Business Meetings

17:00	*Commission E*	*Room 155*
17:00	*Commission F*	*Room 150*
18:00	*Commission A*	*Room 245*
18:00	*Commission C*	*Room 151*

RECEPTION

18:30-21:00
Engineering Center Lobby
(Beer and wine provided. Must have government issued ID and conference badge.)

THURSDAY MORNING, 7 January 2016

Plenary Session
Mathematics Auditorium (Math 100)

Ernest K. Smith USNC-URSI Student Paper Competition

Chair: Erdem Topsakal, *Virginia Commonwealth University*

8:20 Announcements

8:30 Rules and Guidelines of the Competition

8:40 Student Paper Presentations

9:40 Break

Meeting Highlight: Electromagnetics in Medicine

Co-Chairs: John Volakis, The Ohio State University
Mahta Moghaddam, University of Southern California

10:00 P1-1
WEAK MAGNETIC FIELDS EFFECTS ON BIOLOGICAL SYSTEMS
Frank S. Barnes*
Electrical, Computer, and Energy Engineering, University of Colorado at Boulder, Boulder, CO

10:50 P1-2
MINIATURE WIRELESS IMPLANTS FOR DIAGNOSIS AND THERAPY
Jung-Chih Chiao*
Electrical Engineering, University of Texas at Arlington, Arlington, TX

11:40 Awards Ceremony for Student Paper Competition

12:00 Lunch for Student Travel Awardees, USNC Officers and Commission Chairs (Colorado Room in the Center for Community)

THURSDAY AFTERNOON, 7 January 2016

Session B12: Advances in Computational EM and Emerging Applications
Room 1B40

Co-Chairs: Branislav Notaros, *Colorado State University*; Yahya Rahmat-Samii, *University of California, Los Angeles*

13:20 B12-1
GENERALIZED GAUGE A-PHI FORMULATION TO SOLVE ELECTROMAGNETICS PROBLEMS
Weng Cho Chew*
Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL

13:40 B12-2
USE OF LI'S IMPROVED LEVIN METHOD FOR HIGHLY OSCILLATORY REFLECTOR ANTENNA DIFFRACTION KERNEL
Arthur Densmore, Yahya Rahmat-Samii*
Electrical Engineering, University of California Los Angeles, Los Angeles, CA

14:00 B12-3
AN FFT-ACCELERATED MULTIREGION INTEGRAL-EQUATION METHOD FOR ANALYZING ANTENNAS IMPLANTED IN ANATOMICAL HUMAN MODELS
Jackson W. Massey*, Ali E. Yılmaz
Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX

14:20 B12-4
DISPERSION RELATION FOR CYLINDRICAL FDTD GRIDS
Mohammed F. Hadi*[1,2,3], Atef Z. Elsherbeni[2], Melinda J. Piket-May[3], Samir F. Mahmoud[1]
[1]*Electrical Engineering, Kuwait University, Kuwait, KUWAIT*
[2]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*
[3]*Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO*

14:40 B12-5
ACCELERATING GREEN'S FUNCTIONS FOR UNIAXIAL ANISOTROPIC LAYERED MEDIA USING SOMMERFELD AND RELATED IDENTITIES
Dawei Li*, Donald R. Wilton, David R. Jackson, Ji Chen
Electrical and Computer Engineering, University of Houston, Houston, TX

15:00 Break

15:20 B12-6
RECENT ADVANCES IN DISCONTINUOUS GALERKIN BOUNDARY ELEMENT METHODS FOR MAXWELL EQUATIONS
Zhen Peng*
Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM

15:40 B12-7
HARDWARE ACCELERATION OF AN FMM-FFT SOLVER USING CONSUMER-GRADE GPUS
Malcolm J. Miranda[1], Tayfun Ozdemir*[1], Robert J. Burkholder[2]
[1]*Virtual EM Inc., Ann Arbor, MI*
[2]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*

16:00 B12-8
GLOBAL 3-D FDTD EARTH-IONOSPHERE MODELS ON EXISTING PETASCALE AND FUTURE EXASCALE SUPERCOMPUTERS
Alireza Samimi[1], Jamesina J. Simpson*[2]
[1]*Nanometrics, Milpitas, CA*
[2]*Electrical and Computer Engineering, University of Utah, Salt Lake City, UT*

16:20 B12-9
APPLYING COMPUTATIONAL EM TO REMOTE SENSING AND CHARACTERIZATION OF ATMOSPHERIC PRECIPITATION IN SNOW AND RAIN OBSERVATION CAMPAIGNS
Branislav M. Notaros*, V. N. Bringi, Cameron Kleinkort, Gwo-Jong Huang, Merhala Thurai, Patrick Kennedy, Sanja B. Manic, Ana B. Manic, Elene Chobanyan, Nada J. Sekeljic, Milan M. Ilic
Electrical & Computer Engineering, Colorado State University, Fort Collins, CO

16:40 B12-10
R.O.S.E. BY ANY OTHER NAME
Jin-fa Lee*, Yongpin Chen, Xuezhe Tien, Ming Jiang
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

Session B13: Antennas for Small Satellites
Room 200

Co-Chairs: Reyhan Baktur, *Utah State University*; David Jackson, *University of Houston*

13:20 B13-1
CHARACTERIZATION OF KA-BAND MESH SURFACES FOR CUBESAT REFLECTOR ANTENNAS: FROM SIMPLE WIRE GRID MODEL TO COMPLEX KNITS
Vignesh Manohar*, Yahya Rahmat-Samii
Electrical Engineering, University of California Los Angeles, Los Angeles, CA

13:40 B13-2
STUDY OF INTEGRATING REFLECTARRAY WITH SOLAR CELL FOR SMALL SATELLITE APPLICATIONS
Taha Shahvirdi dizaj yekan*, Reyhan Baktur
Electrical and Computer Engineering, Utah State University, Logan, UT

14:00 B13-3
MICROSTRIP ANTENNAS FOR CUBESATS
Xinyu Liu*[1], Jingshen Liu[1], David R. Jackson[1], Ji Chen[1], Patrick W. Fink[2], Gregory Y. Lin[2]
[1]*Electrical and Computer Engineering, University of Houston, Houston, TX*
[2]*NASA Johnson Space Center, Houston, TX*

14:20 B13-4
A MULTI-FUNCTION MILLIMETER-WAVE PHASED ARRAY FOR SMALL SATELLITES
Markus H. Novak*[1], Félix A. Miranda[2], John L. Volakis[1]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*NASA Glenn Research Center, Cleveland, OH*

14:40 B13-5
POLARIZATION RECONFIGURABLE ANTENNA FOR SMALL SATELLITE APPLICATION
Taha Shahvirdi dizaj yekan*, Reyhan Baktur
Electrical and Computer Engineering, Utah State University, Logan, UT

15:00 Break

Session B14: Antenna Techniques and Measurements
Room 105

Co-Chairs: Steven Weiss, *U.S. Army Research Lab*; Gregory Mitchell, *U.S. Army Research Lab*

13:20 B14-1
SIMULATION AND MEASUREMENT OF A SELF-PHASED QUADRIFILAR HELIX ANTENNA FOR ENHANCED ON-THE-MOVE COMMUNICATIONS
Steven D. Keller, Steven J. Weiss*
U.S. Army Research Laboratory, Adelphi, MD

13:40 B14-2
MEASUREMENT OF A LOW-PROFILE TACSAT ANTENNA
Steven Weiss*
U.S. Army Research Laboratory, Adelphi, MD

14:00 B14-3
HF RESONANT STRUCTURE DESIGN USING CHARACTERISTIC MODES
Kristopher R. Buchanan, Carlos Flores*, Diana Acero, John Rockway
Electromagnetics Technology Branch, SSC-Pacific, San Diego, CA

14:20 B14-4
A DEPLOYABLE VIVALDI-FED CONICAL HORN ANTENNA FOR CUBESATS
Arjun Gupta*[1], Joseph Constantine[1], Youssef Tawk[1], Christos Christodoulou[1], Sergio Pellegrino[2], Maria Sakovsky[2]
[1]*Configurable Space Microsystems Innovations and Applications Center (COSMIAC), University of New Mexico, Albuquerque, NM*
[2]*Graduate Aerospace Laboratories, California Institute of Technology, Pasadena, CA*

14:40 B14-5
COMPACT ANTENNAS WITH REDUCED SELF INTERFERENCE FOR IN-BAND FULL-DUPLEX SYSTEMS
Gregory Makar*[1], Santosh Seran[2], Nghi Tran[3], Tutku Karacolak[1]
[1]*Engineering and Computer Science, Washington State University Vancouver, Vancouver, WA*
[2]*Electrical and Computer Engineering, Mississippi State University, Starkville, MS*
[3]*Electrical and Computer Engineering, University of Akron, Akron, OH*

15:00 Break

15:20 B14-6
IMPACT OF RADIATION QUALITY FACTOR ON THE TRANSIENT RADIATION FROM A DIRECTLY MODULATED ANTENNA
Shruti Srivastava*, Jacob J. Adams
Electrical and Computer Engineering, North Carolina State University, Raleigh, NC

Session C2: Compressive Sensing
Room 1B51
Co-Chairs: Ozlem Kilic, *The Catholic University of America*; Aly Fathy, *University of Tennessee*

13:20 C2-1
STEPPED-FREQUENCY CONTINUOUS WAVE RADAR BASED ON COMPRESSIVE SENSING
Lingyun Ren*[1], Haofei Wang[2], Vinh Dang[3], Ozlem Kilic[3], Aly E. Fathy[1]
[1]*Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN*
[2]*School of Information and Electronics, Beijing Institute of Technology, Beijing, CHINA*
[3]*Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC*

13:40 C2-2
COMPRESSIVE SENSING BASED APPROACH FOR THROUGH-WALL DETECTION OF HUMAN RESPIRATORY RATE: PERFORMANCE ANALYSIS
Vinh Dang*, Nghia Tran, Ozlem Kilic
Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

14:00 C2-3
RECONFIGURABLE ARRAY BASED COMPRESSIVE SENSING MILLIMETER WAVE SYSTEM
Min Liang*[1], Ying Li[2], Mark A. Neifeld[1], Hao Xin[1]
[1]*Electrical and Computer Engineering, University of Arizona, Tucson, AZ*
[2]*Electrical and Computer Engineering, University of Science and Technology of China, Hefei, CHINA*

14:20 C2-4
COMPRESSIVE SENSING IN RADAR IMAGING OF SUBSURFACE AND THROUGH-THE-WALL TARGETS
Ahmad Hoorfar*[1], Wenji Zhang[2]
[1]*Electrical and Computer Engineering, Villanova University, Villanova, PA*
[2]*Checkpoint Systems Inc., NJ*

14:40 C2-5
PHASE-SENSITIVE THZ IMAGING USING INTENSITY-ONLY MEASUREMENTS
Syed An Nazmus Saqueb*, Kubilay Sertel
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

15:00 Break

15:20 C2-6
SPARSE EEG SOURCE LOCALIZATION VIA RANGE SPACE ROTATION
Ahmed Al Hilli*
Electrical and Computer Engineering, Rutgers University, New Brunswick, NJ

Session F3: Methods and Models for Precipitation Sensing
Room 150

Co-Chairs: Chandrasekar V. Chandra, *Colorado State University*; Albin Gasiewski, *University of Colorado at Boulder*

13:20 F3-1
INTEGRATED REMOTE AND IN-SITU SENSING
Eric Frew*, Brian Argrow
Aerospace Engineering Systems, University of Colorado Boulder, Boulder, CO

13:40 F3-2
HIGH-FREQUENCY AIRBORNE MICROWAVE AND MILLIMETER-WAVE RADIOMETER (HAMMR) WEST COAST FLIGHT CAMPAIGN: INTEGRATED WATER VAPOR AND LIQUID WATER RETRIEVALS
Xavier Bosch-Lluis*[1], Steven C. Reising[1], Pekka Kangaslahti[2], Alan B. Tanner[2], Shannon T. Brown[2], Sharmila Padmanabhan[2], Oliver Montes[2], Thaddeus P. Johnson[1], Victoria D. Hadel[1], Karen Ng[1]
[1]*Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

14:00 F3-3
FEASIBILITY STUDY OF A MICROWAVE RADIOMETER FOR AVIATION SAFETY - MRAS
Marian Klein*[1], Vladimir G. Irisov[1], Albin J. Gasiewski[2]
[1]*Boulder Environmental Sciences and Technology, Boulder, CO*
[2]*Center for Environmental Technology, University of Colorado Boulder, Boulder, CO*

14:20 F3-4
CROSS VALIDATION OF GPM-DPR DUAL-FREQUENCY MEASUREMENTS WITH GROUND RADAR DUAL POLARIZATION MEASUREMENTS
Sounak K. Biswas*, V. Chandrasekar, Karthik Ganesan
Electrical and Computer Engineering, Colorado State University, Fort Collins CO

14:40 F3-5
ONGOING STUDIES OF WINTER PRECIPITATION WITHIN THE MASCRAD PROJECT AND ADVANCES TO THE OBSERVATION AND ANALYSIS PROCESS
Cameron Kleinkort*, Gwo-Jong Huang, Sanja B. Manić, Ana B. Manić, Patrick Kennedy, V. N. Bringi, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins CO

15:00 Break

15:20 F3-6
ANALYSIS OF SCATTERING CHARACTERISTICS OF ICE AND WATER RAIN PARTICLES USING SURFACE INTEGRAL EQUATION METHOD AND RADAR OBSERVATIONS
Sanja B. Manić*, Merhala Thurai, V. N. Bringi, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins CO

15:40 F3-7
SEPARATION OF CLOUD AND DRIZZLE USING SPECTRAL ANALYSIS FOR ARM CLOUD RADAR
V. Chandrasekar*, Shashank S. Joshil, Pratik Ramdasi
Electrical and Computer Engineering, Colorado State University, Fort Collins CO

16:00 F3-8
HIGH-RESOLUTION WIND RETRIEVAL IN THE LOWER TROPOSPHERE WITH CASA DFW URBAN RADAR NETWORK
Haonan Chen*, V. Chandrasekar, Shashank Joshil
Electrical and Computer Engineering, Colorado State University, Fort Collins CO

16:20 F3-9
ESTIMATION OF LINEAR DEPOLARIZATION RATIO AT ATTENUATING FREQUENCIES
Robert M. Beauchamp*, V. Chandrasekar
Electrical and Computer Engineering, Colorado State University, Fort Collins CO

16:40 F3-10
ATTENUATION CORRECTION FOR POLARIMETRIC RADAR OBSERVATIONS AT X-, KU-, AND KA-BAND FREQUENCIES
Haonan Chen*, V. Chandrasekar
Electrical and Computer Engineering, Colorado State University, Fort Collins CO

Session H3: Waves in Outer Solar System Plasmas
Math 100

Co-Chairs: William Kurth, *University of Iowa;* Robert Ergun, *University of Colorado Boulder*

13:20 H3-1
MODELING THE RADIO EMISSIONS OF JUPITER AND SATURN
Sebastien L. Hess*
DESP, ONERA - The French Aerospace Lab, Toulouse, FRANCE

13:40 H3-2
PLASMA WAVES IN SATURN'S MAGNETOSPHERE
George B. Hospodarsky*[1], Douglas Menietti[1], David Pisa[1,2], William S. Kurth[1], Donald A. Gurnett[1], Ann M. Persoon[1], Ondrej Santolik[2], Jared S. Leisner[1,3], Terrance F. Averkamp[1]
[1]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[2]*Institute of Atmospheric Physics CAS, Prague, CZECH REPUBLIC*
[3]*SDSE, LLC., Silver Spring, MD*

14:00 H3-3
PLASMA WAVES ASSOCIATED WITH DIONE'S MAGNETOSPHERIC INTERACTION
William S. Kurth*[1], George B. Hospodarsky[1], Patricia Schippers[2], Michel Moncuquet[2], Alain Lecacheux[2], Frank J. Crary[3], Krishan Khurana[4], Donald G. Mitchell[5]
[1]*Physics & Astronomy, University of Iowa, Iowa City, IA*
[2]*Observatoire de Paris, Meudon, FRANCE*
[3]*Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO*
[4]*Institute of Geophysics and Planetary Physics, University of California, Los Angeles, CA*
[5]*Applied Physics Laboratory, Laurel, MD*

14:20 H3-4
RADIO EMISSIONS AND ELECTRON PLASMA OSCILLATIONS DETECTED IN THE LOCAL INTERSTELLAR MEDIUM BY VOYAGER 1
Donald A. Gurnett*, William S. Kurth
Physics and Astronomy, University of Iowa, Iowa City, IA

14:40 H3-5
RADIATION FROM ELECTRON PHASE SPACE HOLES AS A POSSIBLE SOURCE OF JOVIAN S-BURSTS
Katherine A. Goodrich*, Robert E. Ergun
Astrophysical and Planetary Sciences, University of Colorado Boulder, Boulder, CO

Session H4: Waves and Instabilities in Laboratory and Space Plasmas
Math 100

Co-Chairs: Robert Pfaff, *NASA Goddard Space Flight Center*;
James LaBelle, *Dartmouth College*;
Erik Tejero, *Naval Research Laboratory*

15:20 H4-1
GPS AND RADAR DATA ANALYSIS OF MIDLATITUDE IONOSPHERIC PLASMA WAVE IRREGULARITIES
Wayne Scales*[1], Ahmed Eltrass[2], John Ruohoniemi[1], Joseph Baker[1], Philip Erickson[3]
[1]*Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA*
[2]*Electrical Engineering, Alexandria University, Alexandria, EGYPT*
[3]*Massachusetts Institute of Technology, Haystack Observatory, Westford, MA*

15:40 H4-2
EXPERIMENTAL VALIDATION OF ELECTROMAGNETIC ELECTRON-ION HYBRID INSTABILITY THEORY
Carl L. Enloe*, Erik M. Tejero, William E. Amatucci, Christopher E. Crabtree, Gurudas I. Ganguli
Plasma Physics Division, Naval Research laboratory, Washington, DC

16:00 H4-3
ANALYSIS OF SIDEBANDS FROM MAGNETOSPHERIC EMISSIONS TRIGGERED BY THE SIPLE STATION TRANSMITTER
Randall E. Wall*[1], Mark Golkowski[1], Maria Spasojevic[2], Andrew Gibby[3]
[1]*Electrical Engineering, University of Colorado - Denver, Denver, CO*
[2]*Electrical Engineering, Stanford University, Stanford, CA*
[3]*Arion Systems, Inc., Chantilly, VA*

16:20 H4-4
LABORATORY STUDY OF CHIRPING WHISTLER WAVES
Erik M. Tejero*[1], Chris Crabtree[1], Lon Enloe[1], Bill Amatucci[1], Guru Ganguli[1], Mark Golkowski[2]
[1]*Plasma Physics Division, Naval Research laboratory, Washington, DC*
[2]*Electrical Engineering, University of Colorado Denver, Denver, CO*

16:40 H4-5
CHARGE-CONSERVING RELATIVISTIC PIC ALGORITHM ON UNSTRUCTURED GRIDS
Dong-Yeop Na*[1], Haksu Moon[1], Fernando L. Teixeira[1], Yuri A. Omelchenko[2]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Trinum Research Inc., San Diego, CA*

Session HE1: Lightning and its Interactions with the Ionosphere
Room 151

Co-Chairs: Joseph Dwyer, *University of New Hampshire*;
Robert Moore, *University of Florida*;
Carl Siefring, *Naval Research Laboratory*

13:20 HE1-1
LOW-FREQUENCIES LIGHTNING DETECTION NETWORK IN KAZAKHSTAN FOR ATMOSPHERE, LITHOSPHERE AND IONOSPHERE RESEARCH SUPPORT
Anatoliy Lozbin[1], Alexander Inchin[1], Pavel Inchin[1], Anatoly Strletsov*[2]
[1]*Scientific Space System Lab, Institute of Space Techniques and Technologies, Almaty, KAZAKSTAN*
[2]*Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL*

13:40 HE1-2
REPORT OF A SECOND TERRESTRIAL GAMMA RAY FLASH INDUCED BY ROCKET-AND-WIRE TRIGGERED LIGHTNING
Brian Hare*[1], Martin Uman[1], Joseph Dwyer[2], Douglas Jordan[1], Jaime Caicedo[1], Felipe Carvalho[1], Robert Wilkes[1], Daniel Kotovsky[1], William Gamerota[1], John Pilkey[1], Terry Ngin[1], Robert Moore[1], Hamid Rassoul[3], Steve Cummer[4], Eric Grove[5], Mike Biggerstaff[6], Amitabh Nag[7]
[1]*University of Florida, Gainesville, FL*
[2]*University of New Hampshire, Durham, NH*
[3]*Florida Institude of Technology, Melbourne, FL*
[4]*Duke University, Durham, NC*
[5]*Naval Reaserch Laboratory, Washington, DC*
[6]*Oklahoma University, Norman, OK*
[7]*Vaisala, Helsinki, FINLAND*

14:00 HE1-3
ROLE OF MAGNETOSPHERIC DUCTS IN OBSERVATIONS OF ENERGETIC ELECTRON PRECIPITATION IN THE CONJUGATE HEMISPHERE
Hamid T. Chorsi*[1], Mark Golkowski[1], Robert C. Moore[2]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Electrical and Computer Engineering, University of Florida, Gainesville, FL*

14:20 HE1-4
RELATIVISTIC FEEDBACK DISCHARGES DRIVEN BY POSITIVE LEADERS
Joseph R. Dwyer*
University of New Hampshire, Durham, NH

14:40 HE1-5
X-RAY SOLAR FLARE INDUCED IONOSPHERIC PERTURBATIONS OBSERVED BY VLF SFERICS
Jackson C. McCormick*, Morris B. Cohen
Electrical and Computer Engineering, Georgia Tech, Atlanta, GA

15:00 Break

15:20 HE1-6
RARE TYPES OF TRANSIENT LUMINOUS EVENTS OBSERVED ABOVE TWO FLORIDA STORMS ON 12 SEPTEMBER 2014
Ningyu Liu*[1], Levi D. Boggs[1], Michael Splitt[2], Steven Lazarus[2], Chad Glenn[1], Hamid K. Rassoul[1], Steven A. Cummer[3]
[1]*Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL*
[2]*Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL*
[3]*Electrical and Computer Engineering, Duke University, Durham, NC*

15:40 HE1-7
MODIFICATION OF THE LOWER IONOSPHERIC CONDUCTIVITY BY THUNDERSTORM ELECTROSTATIC FIELDS
Mohammad A. Salem*, Ningyu Liu, Hamid K. Rassoul
Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL

16:00 HE1-8
POLARIZATION OF VLF TRANSMITTER SIGNALS AS AN IONOSPHERIC DIAGNOSTIC
Morris Cohen*[1], Mark Golkowski[2]
[1]*Electrical and Computer Engineering, Georgia Tech, Atlanta, GA*
[2]*Electrical Engineering, University of Colorado Denver, Denver, CO*

16:20 HE1-9
EFFECTS OF CONDUCTIVITY PERTURBATIONS IN TIME DEPENDENT GLOBAL ELECTRIC CIRCUIT MODEL
Jaroslav Jansky*, Victor P. Pasko
CSSL, Penn State University, University Park, PA

16:40 HE1-10
OBSERVATIONS AND SIMULATIONS OF WHISTLER-MODE WAVES INSIDE DENSITY DUCTS
Miles T. Bengtson*, Sara A. Rosborough, Roxanna L. Stein, Morgan M. Matheny, Anatoly V. Streltsov
Embry-Riddle Aeronautical University, Daytona Beach, FL

Session HG1: Ionospheric Modification and Remote Sensing
Room 245

Co-Chairs: Anatoly Streltsov, *Embry-Riddle Aeronautical University*;
Michael Sulzer, *Arecibo Observatory*;
Paul Bernhardt, *NRL*;
Valery Zavorotny, *NOAA/Earth System Research Laboratory*

13:20 HG1-1
HF-DRIVEN PLASMA TURBULENCE AND ARTIFICIAL IONOSPHERIC LAYERS
Evgeny V. Mishin*, Todd R. Pedersen
Air Force Research Laboratory, Albuquerque, NM

13:40 HG1-2
THE FUTURE OF HAARP IN ALASKA
Robert P. McCoy*
Geophysical Institute University of Alaska Fairbanks, Fairbanks AK

14:00 HG1-3
THE CHARGED AEROSOL RELEASE EXPERIMENT (CARE II) TO STUDY ARTIFICIAL DUSTY PLASMAS AND IRREGULARITIES IN THE UPPER ATMOSPHERE
Paul A. Bernhardt*[1], Carl L. Siefring[1], Stanley J. Briczinski[1], Robert H. Holzworth[2], Todd Anderson[2], Asti Bhatt[3]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Earth and Space Sciences, University of Washington, Seattle, WA*
[3]*Radar Science, SRI International, Menlo Park, CA*

14:20 HG1-4
AZIMUTH AND FREQUENCY DEPENDENCE OF ELF/VLF WAVES GENERATED AT THE HAARP FACILITY BY IONOSPHERIC ELECTROJET MODULATION
Mark Golkowski*[1], Ashanthi S. Maxworth[1], Morris B. Cohen[2], Robert C. Moore[3]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Georgia Institute of Technology, Atlanta, GA*
[3]*Electrical and Computer Engineering, University of Florida, Gainesville, FL*

14:40 HG1-5
MORPHOLOGY OF TLEs PRODUCING THUNDERSTORM OVER INDIAN REGION
Ajeet K. Maurya*[1,2], Rajesh Singh[2], Morris B. Cohen[1], Torsten Neubert[3], Oliver Charnion[3]
[1]*School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*
[2]*Dr K S K Geomagnetic Research Laboratory,, Indian Institute of Geomagnetism, Allahabad, INDIA*
[3]*Solar System Physics, Technical University of Denmark, Lyngby, DENMARK*

15:00 Break

15:20 HG1-6
MODIFICATION OF THE IONOSPHERE BY THE PRECURSORS OF STRONG EARTHQUAKES
Galina Y. Khachikyan[1], Beibit T. Zhumabayev[1], Anatoly V. Streltsov*[2]
[1]*Institute of Ionosphere, Almaty, KAZAKSTAN*
[2]*Embry-Riddle Aeronautical University, Daytona Beach, FL*

15:40 HG1-7
IONOSPHERIC DISTURBANCES OBSERVED WITH THE VLA LOW-BAND IONOSPHERIC AND TRANSIENT EXPERIMENT (VLITE)
Joseph Helmboldt*[1], Paul Ray[1], Tracy Clarke[1], Namir Kassim[1], Tony Mroczkowski[1], Emil Polisensky[1], Simona Giacintucci[1,2]
[1]*Naval Research Laboratory, Washington, DC*
[2]*Computational Physics Inc., Springfield, VA*

16:00 HG1-8
RECENT PROGRESS IN EARLY DETECTION OF NATURAL HAZARDS GENERATED TEC PERTURBATIONS
Attila Komjathy*[1], Yu-Ming Yang[1], Xing Meng[1], Olga Verkhoglyadova[1], Anthony Mannucci[1], Richard Langley[2]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*University of New Brunswick, Fredericton, NB, CANADA*

16:20 HG1-9
QUANTITATIVE COMPARISON OF IONOSPHERIC STORMS OVER NORTH AMERICA IN SOLAR CYCLES 23 AND 24 FROM A WAAS PERSPECTIVE
Lawrence Sparks*[1], Eric Altshuler[2]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*Sequoia Research, Torrance, CA*

Session J3: Digital Developments
Room 265

Co-Chairs: David MacMahon, *University of California, Berkeley;* Vereese van Tonder, *National Radio Astronomy Observatory*

13:20 J3-1
A LOW-POWER CORRELATOR ASIC FOR ARRAYS WITH MANY ANTENNAS
Larry R. D'Addario*, Douglas Wang
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

13:40 J3-2
PHASED-ARRAY 64-ELEMENT 20-MHZ RECEIVER FOR DATA CAPTURE AND REAL-TIME BEAMFORMING
Richard A. Black*, Jay M. Brady, Brian D. Jeffs, Junming Diao, Karl F. Warnick
Electrical and Computer Engineering, Brigham Young University, Provo, UT

14:00 J3-3
DIGITAL SIDEBAND SEPARATING DOWNCONVERSION FOR THE GREEN BANK TELESCOPE PHASED ARRAY FEED
Vereese van Tonder*
Electronics, National Radio Astronomy Observatory, Green Bank, WV

14:20 J3-4
COMMISSIONING AND TESTING OF SERENDIP VI INSTRUMENTATION
Kyle Archer*, Andrew Siemion, Dan Werthimer, Matt Lebofsky, Jeff Cobb, Zuhra Abdurashidova, Jack Hickish
Berkeley SETI Research Center, UC Berkeley, Berkeley, CA

14:40 J3-5
SETI INSTRUMENTATION FOR BREAKTHROUGH LISTEN
David H. E. MacMahon*
Radio Astronomy Lab, University of California, Berkeley, CA

Session J4: New Telescopes, Techniques, and Observations I
Room 265

Co-Chairs: David DeBoer, *University of California Berkeley;* Frank K. Schinzel, *University of New Mexico*

15:20 J4-1
NEW COOLED FEEDS FOR THE ALLEN TELESCOPE ARRAY
Jack Welch*[1], Matt Fleming[2], Chris Munson[3], Jill Tarter[3]
[1]*Radio Astronomy Laboratory, University of California Berkeley, Berkeley CA*
[2]*Minex Engineering, Antioch, CA*
[3]*SETI Institute, Mountain View, CA*

15:40 J4-2
ANTENNA SPECIFICATIONS FOR THE NEXT-GENERATION VERY LARGE ARRAY
Robert J. Selina, Jim Jackson*, Wes Grammer
New Mexico Electronics Division, National Radio Astronomy Observatory, Socorro, NM

16:00 J4-3
OPTIMIZATION OF SMALL REFLECTOR ANTENNAS FOR RADIO ASTRONOMY
Ahmed M. Soliman*, Sander Weinreb
Electrical Engineering, California Institute of Technology, Pasadena, CA

16:20 J4-4
THE STARBURST CORRELATOR: A VERSATILE DIGITAL BACK-END FOR WIDEBAND INTERFEROMETRY
Ryan Monroe*[1], Jackie R. Villadsen[1], Anthony C. Readhead[1], Dale E. Gary[2], Stephen J. S. Muchovej[1], Loko Kung[1], James Lamb[1], Gregg W. Hallinan[1], Sander Weinreb[1]
[1]*California Institute of Technology, Pasadena, CA*
[2]*New Jersey Institute of Technology, Newark, NJ*

16:40 J4-5
SKY NOISE SPECTRAL INDEX AND IONOSPHERIC VARIABILITY FROM 50-190 MHZ WITH EDGES DATA
Thomas J. Mozdzen*[1], Judd D. Bowman[1], Alan E. E. Rogers[2], Raul A. Monsalve[1]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*

17:00 J4-6
THE EXPANDED LONG WAVELENGTH ARRAY (ELWA)
Frank K. Schinzel*
University of New Mexico, Albuquerque, NM

Session K1: Medical Imaging and Therapy Systems
Room 155

Co-Chairs: John Stang, *University of Southern California*; Gianluca Lazzi, *University of Utah*

13:20 K1-1
SIMULATION AND EXPERIMENTAL RESULTS FOR HELICAL-ANTENNA RF COILS IN ULTRA-HIGH-FIELD MAGNETIC RESONANCE IMAGING APPLICATIONS
Pranav S. Athalye*[1], Nada J. Sekeljic[1], Milan M. Ilic[1,2], Andrew J. Kiruluta[3], Pierre-Francois Van de Moortele[4], Branislav M. Notaros[1]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*School of Electrical Engineering, University of Belgrade, Belgrade, Serbia, YUGOSLAVIA*
[3]*Radiology, Massachusetts General Hospital, Boston, MA*
[4]*Radiology, University of Minnesota, Minneapolis, MN*

13:40 K1-2
MICROWAVE INVERSE SCATTERING ALGORITHM WITH FULL-CAVITY NUMERICAL CHARACTERIZATIONS
Guanbo Chen*, John Stang, Mahta Moghaddam
Electrical Engineering, University of Southern California, Los Angeles, CA

14:00 K1-3
APPLICATION OF NON-CONTACT THERMOACOUSTIC IMAGING FOR EMBEDDED EXPLOSIVE DETECTION
Siddhartha Sirsi*[1], Ahmed H. Abdelrahman[1], Xiong Wang[1], Yexian Qin[2], Russel S. Witte[2], Hao Xin[1]
[1]*Electrical and Computer Engineering, University of Arizona, Tucson, AZ*
[2]*Medical Imaging, College of Medicine, University of Arizona, Tucson, AZ*

14:20 K1-4
EXPERIMENTAL STUDY FOR MICROWAVE-INDUCED THERMOACOUSTIC TOMOGRAPHY
Ryan T. Jacobs*, Mark Golkowski, Yiming Deng, Mohand Alzuhiri, Xiaoye Chen
Electrical Engineering, University of Colorado Denver, Denver, CO

14:40 K1-5
NUMERICAL MODEL FOR MICROWAVE INDUCED THERMOACOUSTIC IMAGING
Mohand Alzuhiri*, Yiming Deng, Mark Golkowski, Ryan Jacobs
Electrical Engineering, University of Colorado Denver, Denver, CO

15:00 Break

15:20 K1-6
3D PRINTED MICROWAVE HYPERTHERMIA APPLICATOR FOR CHEMO-THERMOTHERAPY OF THE BREAST
Umar Hasni*, Christopher J. Deloglos, Afroditi V. Filippas, Erdem Topsakal
Electrical & Computer Engineering, Virginia Commonwealth University, Richmond, VA

15:40 K1-7
THE EFFECT OF GLUCOSE ON THE ELECTRICAL PROPERTIES OF BLOOD PLASMA
Arthur W. French*, Afroditi V. Filippas, Erdem Topsakal
Virginia Commonwealth University, Richmond VA

16:00 K1-8
SELECTIVE ACTIVATION OF SCIATIC NERVE USING MAGNETIC MICROCOILS - A SIMULATION STUDY
Anil K. RamRakhyani, Pragya Kosta*, Gianluca Lazzi
Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

16:20 K1-9
A 3D COMPUTATIONAL MODEL FOR ANALYZING THE EFFECT OF EPHAPTIC COUPLING ON NEURAL STIMULATION
Andy Gilbert*, Kyle Loizos, Gianluca Lazzi
Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

Business Meetings

17:00	*Commission B*	*Room 1B40*
17:00	*Commission G*	*Room 200*
18:00	*Commission D*	*Room 105*
18:00	*Commission H*	*Room 245*
18:00	*Commission J*	*Room 265*
18:00	*Commission K*	*Room 155*

FRIDAY MORNING, 8 January 2016

Session B15: Antenna Design and Measurements
Room 1B40

Co-Chairs: Dejan Filipovic, *University of Colorado Boulder*; Sembiam Rengarajan, *California State University Northridge*

08:20 B15-1
LOW PROFILE METAFERRITE BELT ANTENNA FOR FIXED WING AIRCRAFT AT HF
Gregory Mitchell*
U.S. Army Research Laboratory, Adelphi, MD

08:40 B15-2
DESIGN AND PRACTICAL REALIZATION OF A TOP LOADED MONOPOLE ANTENNA FOR HF VEHICULAR COMMUNICATIONS
Bradley F. Allen*, Maxim Ignatenko, Dejan S. Filipovic
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

09:00 B15-3
IMPROVED DESIGN OF AN ULTRA-WIDEBAND PLANAR SLOT ANTENNA
William O. Coburn*
RDRL-SER-M, U.S. Army Research Laboratory, Adelphi, MD

09:20 B15-4
A 370 GHZ ON-CHIP RECTANGULAR-WAVEGUIDE-BASED SLOT ANTENNA
Saman Jafarlou*, Peyman Nazari, Payam Heydari
University of California Irvine, Irvine, CA

09:40 B15-5
FABRICATION AND TESTING OF A VEHICULAR LOW-PROFILE HF DOUBLE HALF LOOP ANTENNA
Richard Smith*, Saurabh Sanghai, Maxim Ignatenko, Dejan Filipovic
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

10:00 Break

10:20 B15-6
ANTI-JAMMING ANTENNA CONFIGURATIONS FOR GPS RECEIVERS ON SMALL UAVS
John Patton*[1], Amir I. Zaghloul[1,2]
[1]*Electrical and Computer Engineering, Virginia Tech, Falls Church, VA*
[2]*SEDD, US Army Research Laboratory, Adelphi, MD*

10:40 B15-7
HF/VHF ANTENNA CHARACTERIZATION FROM VERY-NEAR-FIELD MEASUREMENTS OVER ARBITRARY CLOSED SURFACES
Jihun Choi*, Kamal Sarabandi
Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI

11:00 B15-8
OPTIMIZATION OF CIRCULARLY POLARIZED PATCH AND ANNULAR RING ANTENNAS FOR IMPEDANCE MATCHING AND AXIAL RATIO
Jahin S. Habib*[1,2], Gregory Mitchell[1], Theodore K. Anthony[1], Amir I. Zaghloul[1,2]
[1]*SEDD, U.S. Army Research Laboratory, Adelphi, MD*
[2]*Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA*

11:20 B15-9
A NON-RESONANT SHORT MONOPOLE ANTENNA WITH LUMPED CIRCUIT FOR WIDEBAND IMPEDANCE MATCHING
Omid Manoochehri*[1], Farhad Farzami[1], Amin Darvazehban[2], Danilo Erricolo[1]
[1]*Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL*
[2]*Electrical and Computer Engineering, Amirkabir University of Technology, Tehran, IRAN*

11:40 B15-10
ADDRESSING MUTUAL COUPLING BETWEEN UWB PLANAR MONOPOLE ELEMENTS WITH AND WITHOUT METALLIC ENCLOSURES
Seth A. McCormick*, Amir I. Zaghloul
U.S. Army Research Laboratory, Adelphi, MD

Session B16: Terahertz Antennas and Applications
Room 200

Co-Chairs: Kubilay Sertel, *The Ohio State University*; Hao Xin, *University of Arizona*

08:20 B16-1
DESIGN, FABRICATION, AND PERFORMANCE OF TERAHERTZ ANTENNAS
Goutam Chattopadhyay*
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

08:40 B16-2
MICROFLUIDIC BASED HIGH GAIN BEAM-SCANNING ANTENNA ARRAYS FOR MM-WAVES AND BEYOND
Gokhan Mumcu*
Electrical Engineering, University of South Florida, Tampa, FL

09:00 B16-3
MONOLITHIC UWB PHASED ARRAYS FOR MMW AND THZ APPLICATIONS
Seckin Sahin*, Niru K. Nahar, Kubilay Sertel
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

09:20 B16-4
FAR-FIELD AND NEAR FIELD PERFORMANCE CHARACTERIZATION OF A THZ IMAGING SYSTEM
Mingguang Tuo*[1], Jitao Zhang[1,2], Min Liang[1], Wei-Ren Ng[1], Michael E. Gehm[1,3], Hao Xin[1]
[1]*Electrical and Computer Engineering, University of Arizona, Tucson, AZ*
[2]*Bioengineering, University of Maryland, College Park, MD*
[3]*Electrical and Computer Engineering, Duke University, Durham, NC*

09:40 B16-5
ON-WAFER, NON-CONTACT CHARACTERIZATION OF DIFFERENTIAL-MODE MMW AND THZ DEVICES AND INTEGRATED CIRCUITS
Cosan Caglayan*, Kubilay Sertel
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

10:00 Break

10:20 B16-6
NON-CONTACT CHARACTERIZATION OF TERA-HERTZ CIRCUITS USING E-PLANE PROBES
Georgios C. Trichopoulos*
Electrical, Computer, and Energy Engineering, Arizona State University, Tempe, AZ

10:40 B16-7
THZ SPATIAL FILTER WITH BIMATERIAL SWITCHING
Varittha Sanphuang*, Niru K. Nahar, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

Session C3: Advances in Radar Processing, Measurements, and Modeling Techniques
Room 1B51

Co-Chairs: Tegan Webster, *U.S. Naval Research Laboratory*;
Amir Zaghloul, *U.S. Army Research Laboratory*

08:20 C3-1
INVESTIGATION ON MEAN RADAR CROSS SECTION TROPOSPHERIC SCATTERING LOSS USING INTELLIGENTLY DISTRIBUTED ADHOC POLYMORPHIC ANTENNA ARRAYS
Kristopher R. Buchanan*[1], Nam Nicholas Mai[2], John Rockway[1], Greg Huff[3], Oren Sternberg[1]
[1]*Electromagnetics Technology Branch, SSC-Pacific, San Diego, CA*
[2]*Electrical and Computer Engineering, Johns Hopkns Universtiy, Elkridge, MD*
[3]*Electrical and Computer Engineering, Texas A&M University, College Station, TX*

08:40 C3-2
PRF SET SELECTION FOR MULTISTATIC RADAR
Paul Rademacher*, Tegan Webster, Thomas Higgins
Radar Division, United States Naval Research Laboratory, Washington, DC

09:00 C3-3
INVESTIGATION OF HUMAN MICRO-DOPPLER FEATURES IN FOLIAGED ENVIRONMENTS
Willis Troy*, David Lin, Michael Thompson, Li Yang
Electrical and Computer Engineering, Baylor University, Waco, TX

09:20 C3-4
COEXISTENCE BETWEEN RADAR AND LTE-U SYSTEMS: SURVEY ON THE 5 GHZ BAND
Mina Labib*[1], Anothony F. Martone[2], Jeffrey H. Reed[1], Amir I. Zaghloul[1,2]
[1]*Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA*
[2]*U.S. Army Research Laboratory, Adelphi, MD*

09:40 C3-5
AIRBORNE MULTISTATIC POLARIMETRIC RADAR MODELING
Tegan Webster*
Radar Division, U.S. Naval Research Laboratory, Washington, DC

Session F4: Nanosatellites for Remote Sensing
Room 150

Co-Chairs: William Blackwell, *MIT Lincoln Laboratory*;
Steven Reising, *Colorado State University*;
Todd Gaier, *Jet Propulsion Laboratory*

08:20 F4-1
DEVELOPMENT OF THE MICROWAVE RADIOMETER TECHNOLOGY ACCELERATION (MIRATA) CUBESAT FOR ALL-WEATHER ATMOSPHERIC SOUNDING
Kerri L. Cahoy*[1], William J. Blackwell[2], Anne D. Marinan[1]
[1]*AeroAstro, Massachusetts Institute of Technology, Cambridge, MA*
[2]*MIT Lincoln Laboratory, Lexington, MA*

08:40 F4-2
ADVANCED CUBESAT CAPABILITIES FOR PASSIVE MICROWAVE REMOTE SENSING OF THE ATMOSPHERE
William Blackwell*
MIT Lincoln Laboratory, Lexington, MA

09:00 F4-3
THE RAVAN CUBESAT MISSION: PROGRESS TOWARD A NEW MEASUREMENT OF EARTH OUTGOING RADIATION
William H. Swartz*[1], Lars P. Dyrud[2], Steven R. Lorentz[3], Dong L. Wu[4], Philip M. Huang[1], Stergios J. Papadakis[1], Allan W. Smith[3], David M. Deglau[1], Warren J. Wiscombe[4]
[1]*The Johns Hopkins University - Applied Physics Laboratory, Laurel, MD*
[2]*OmniEarth, Arlington, VA*
[3]*L-1 Standards and Technology, New Windsor, MD*
[4]*NASA Goddard Space Flight Center, Greenbelt, MD*

09:20 F4-4
MICROWAVE ATMOSPHERIC SOUNDER ON CUBESAT (MASC) PROTOTYPE
Sharmila Padmanabhan*, Shannon Brown, Pekka Kangaslahti, Robert Stachnik, Damon Russell, Richard Cofield, Boon Lim
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

09:40 F4-5
TEMPORAL EXPERIMENT FOR STORMS AND TROPICAL SYSTEMS TECHNOLOGY DEMONSTRATION (TEMPEST-D): RISK REDUCTION FOR 6U-CLASS CONSTELLATION MEASUREMENTS
Steven C. Reising*[1], Todd C. Gaier[2], Christian D. Kummerow[1], Sharmila Padmanabhan[2], Boon H. Lim[2], Shannon T. Brown[2], Chandrasekar V. Chandra[1]
[1]*Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

10:00 Break

10:20 F4-6
CYGNSS: NEW SATELLITE MISSION TO PROBE OCEAN WAVES AND WINDS
Valery Zavorotny*[1], Scott Gleason[2], Christopher Ruff[3], Maria-Paola Clarizia[3], Randy Rose[2], John Scherrer[2], Paul Chang[4], Zorana Jelenak[4]
[1]*Physical Sciences Division, NOAA/Earth System Research Laboratory, Boulder, CO*
[2]*Southwest Research Institute, Boulder, CO*
[3]*University of Michigan, Ann Arbor, MI*
[4]*NOAA/NESDIS/StAR, College Park, MD*

10:40 F4-7
TROPOSPHERIC WATER AND CLOUD ICE (TWICE) INSTRUMENT DEVELOPMENT FOR 6U CUBESAT DEPLOYMENT: BACK-END ELECTRONIC DESIGN AND TESTING
Mehmet Ogut*[1], Xavier Bosch-Lluis[1], Steven C. Reising[1], Pekka Kangaslahti[2], Erich Schlecht[2], Sharmila Padmanabhan[2], Richard Cofield[2], Nacer Chahat[2], Jonathan Jiang[2], Shannon T. Brown[2], William R. Deal[3], Alex Zamora[3], Kevin Leong[3], Sean Shih[3], Gerry Mei[3]
[1]*Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*Northrop Grumman Aerospace Systems, Redondo Beach, CA*

11:00 F4-8
PRECISION DESIGN, ANALYSIS AND MANUFACTURING OF QUASI-OPTIC LENS/REFLECTOR ANTENNA SYSTEMS FOR CUBESAT MMW/SMMW RADIOMETERS
Lavanya Periasamy*, Albin J. Gasiewski
Electrical, Computer, and Energy Engineering, University of Colorado, Boulder, Boulder, CO

11:20 F4-9
NWP-BASED SIMULATION OF MICROWAVE IMAGING CUBESAT FLEET OBSERVATIONS
Kun Zhang*, Albin J. Gasiewski
Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO

11:40 F4-10
GPS RADIO OCCULTATION ON A CUBESAT PLATFORM
Anne Marinan*[1], Kerri Cahoy[1,2]
[1]*AeroAstro, Massachusetts Institute of Technology, Cambridge, MA*
[2]*Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA*

Session F5: Propagation Modeling and Measurements
Room 1B51

Co-Chairs: Mark McFarland, *Institute for Telecommunication Sciences*; Michael Newkirk, *The Johns Hopkins University - Applied Physics Laboratory*

10:20 F5-1
A SIMPLIFIED PROPAGATION CHANNEL MODEL FOR EVALUATING MRC DIVERSITY CHARACTERISTICS IN SIMO OFDM WITH INSUFFICIENT GUARD INTERVAL
Le T. Phuc*, Yingxian Zheng, Yoshio Karasawa
Advanced Wireless and Communication Research Center, University of Electro-Communications, Tokyo, JAPAN

10:40 F5-2
IN-BUILDING PATH LOSS MODEL ANALYSIS: TESTING ASSUMPTIONS AND IDENTIFYING OUTLIERS IN PROPAGATION MODELS
Mark A. McFarland*[1], Bob Johnk[1], Jaydee Griffith[1], Ken Baker[2]
[1]*Theory Division, Institute for Telecommunication Sciences, Boulder, CO*
[2]*Interdisciplinary Telecom Program, University of Colorado Boulder, Boulder, CO*

11:00 F5-3
AN OPEN PATH THZ TRANSMISSOMETER FOR DETERMINISTIC AND RANDOM PROPAGATION STUDIES
Lawrence J. Scally*[1], Albin J. Gasiewski[2], Ali Gorashi[1], Dean Pizio[1]
[1]*Colorado Engineering, Inc., Colorado Springs, CO*
[2]*Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO*

11:20 F5-4
ESTIMATING REFRACTIVITY FROM PROPAGATION LOSS IN TURBULENT MEDIA
Mark A. Wagner*[1], Peter Gerstoft[1], Ted Rogers[2]
[1]*Scripps Institute of Oceanography, University of California San Diego, La Jolla, CA*
[2]*Space and Naval Warfare Systems Command, Point Loma, CA*

11:40 F5-5
GPS SIGNAL STRENGTH MEASUREMENTS
Teresa L. Rusyn*, Linh Vu
Institute for Telecommunication Sciences, Boulder, CO

Session GH1: Meteors, Orbital Debris, and Dusty Plasmas
Room 105

Co-Chairs: Julio Urbina, *Penn State*; Christopher Crabtree, *Naval Research Laboratory*

08:20 GH1-1
THE DUST ACCELERATOR FACILITY AT THE UNIVERSITY OF COLORADO
Mihaly Horanyi*
Physics, University of Colorado Boulder, Boulder, CO

08:40 GH1-2
PRELIMINARY EXPERIMENTS ON SOLITON GENERATION AND DETECTION IN SIMULATED LEO PLASMA FOR ORBITAL DEBRIS DETECTION
Eric D. Gillman*, Erik Tejero, Chris Crabtree, Guru Ganguli, Bill Amatucci
Plasma Physics, Naval Research Laboratory, Washington, DC

09:00 GH1-3
GROUND-BASED AND MICROGRAVITY STUDIES OF DUSTY PLASMA INSTABILITIES USING PARTICLE IMAGE VELOCIMETRY (PIV)
Edward Thomas*[1], Uwe Konopka[1], Spencer LeBlanc[1], Taylor Hall[1], Brian Lynch[1], Markus Thoma[2], Christina Knapek[3], Mikhail Pusstylnik[3], Martin Fink[3], Hubertus Thomas[3]
[1]*Auburn University, Auburn, AL*
[2]*Justus-Liebig-Universitat, Geissen, GERMANY*
[3]*Deutsches Zentrum fur Luft- und Raumfahrt e.V. (DLR), Oberpfaffenhofen, GERMANY*

09:20 GH1-4
ALL-SKY TRACKING OF IRREGULARITIES ASSOCIATED WITH MID-LATITUDE SPORADIC-E USING THE LONG WAVELENGTH ARRAY RADIO TELESCOPE
Joseph Helmboldt*[1], Gregory Taylor[2], Sophia Cockrell[2]
[1]*Naval Research Laboratory, Washington, DC*
[2]*University of New Mexico, Albuquerque, NM*

09:40 GH1-5
NUMERICAL SIMULATIONS OF METEOR HEAD PLASMA RADAR CROSS SECTIONS
Robert A. Marshall*[1], Sigrid Close[2], Paul Bernhardt[3], Peter Brown[4]
[1]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[2]*Aeronautics and Astronautics, Stanford University, Stanford, CA*
[3]*Naval Research Laboratory, Washington, DC*
[4]*Physics and Astronomy, University of Western Ontario, London, ON, CANADA*

10:00 Break

10:20 GH1-6
RANGE-SPREAD METEOR ECHOES FROM NON-FIELD-ALIGNED IRREGULARITIES
Ana M. Tarano*
Aeronautics and Astronautics, Stanford University, Stanford, CA

10:40 GH1-7
EFFECT OF NEUTRAL WIND SPEEDS ON THE CREATION OF METEOR TRAIL ECHOES
Julio V. Urbina*[1], Freddy R. Galindo[1], Lars P. Dyrud[2], Jonathan Fentzke[2]
[1]*Electrical Engineering, Penn State, University Park, PA*
[2]*OmniEarth, Arlington, VA*

11:00 GH1-8
EFFECT OF PLASMA TURBULENCE ON THE EVOLUTION OF SPECULAR METEOR ECHOES
Julio V. Urbina*[1], Freddy R. Galindo[1], Lars P. Dyrud[2], Jonathan Fentzke[2]
[1]*Electrical Engineering, Penn State, University Park, PA*
[2]*OmniEarth, Arlington, VA*

11:20 GH1-9
A BAYESIAN APPROACH TO SINGLE MEASUREMENT BLIND SOURCE SEPARATION
Andrew Nuttall*, Sigrid Close
Aeronautics and Astronautics, Stanford University, Stanford, CA

Session HFG1: GNSS, Radio Beacons and Remote Sensing
Room 245

Co-Chairs: Valery Zavorotny, *NOAA/Earth System Research Laboratory*;
Paul Bernhardt, *Naval Research Laboratory*;
Anthea Coster, *Massachusetts Institute of Technology*

08:20 HFG1-1
EARTH REMOTE SENSING WITH THE GLOBAL NAVIGATION SATELLITE SYSTEM REFLECTOMETRY
Cinzia Zuffada*[1], Rashmi Shah[1], Zhijin Li[1], Maria Paola Clarizia[2], Steve Lowe[1], Clara Chew[1]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*University of Michigan, Ann Arbor, MI*

08:40 HFG1-2
GNSS-REFLECTOMETRY WITH NASA'S SOIL MOISTURE ACTIVE/PASSIVE MISSION
Stephen T. Lowe*, Samuel Chan, Stephan Esterhuizen, Adam Freedman, Shadi Oveisgharan, Larry Young
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

09:00 HFG1-3
AN EXAMINATION OF TDS-1 GNSS-R RETURNS OVER LAND SURFACES
Jeonghwan Park*[1], Joel T. Johnson[1], Andrew O'Brien[1], Stephen T. Lowe[2]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

09:20 HFG1-4
SENSITIVITY OF GNSS REFLECTED SIGNALS TO CHANGES IN LAND SURFACE CHARACTERISTICS, AS RECORDED BY TECHDEMOSAT-1
Clara C. Chew*, Cinzia Zuffada, Anthony J. Mannucci, Rashmi Shah
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

09:40 HFG1-5
MEASUREMENT OF SURFACE REFLECTIVITY USING SIGNALS OF OPPORTUNITY
Rashmi Shah*[1], Simon Yueh[1], Xiaolan Xu[1], Yunjin Kim[1], Kelly Elder[2], James Garrison[3], Abi Komanduru[3]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*United States Forest Service, Fort Collins, CO*
[3]*Aeronautics and Astronautics, Purdue University, West Lafayette, IN*

10:00 Break

10:20 HFG1-6
CONSTELLATION OBSERVING SYSTEM FOR METEOROLOGY, IONOSPHERE AND CLIMATE: OVERVIEW OF THE COSMIC-2 MISSION
William S. Schreiner*
University Corporation for Atmospheric Research, Boulder, CO

10:40 HFG1-7
PROPCUBE RADIO BEACONS SATELLITES FOR IONOSPHERIC AND RADIO ASTRONOMICAL APPLICATIONS
Paul A. Bernhardt*[1], Namir Kassim[1], Mike Sulzer[2], John Abel[3]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Aeronomy, Arecibo Observatory, Arecibo, PUERTO RICO*
[3]*Nanosat, TYVAK, Irvine, CA*

11:00 HFG1-8
DISTRIBUTION OF COMMON-VOLUME LEO-BASED AND GROUND-BASED GNSS IONOSPHERE OBSERVATIONS
Brian Breitsch*
Electrical Engineering, Colorado State University, Fort Collins, CO

11:20 HFG1-9
A COMBINED GROUND AND SPACE IONOSPHERIC OBSERVATION NETWORK WITH INTER-SEGMENT COORDINATION (IONIC)
Andrew K. Kennedy*, Kerri L. Cahoy
Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA

11:40 HFG1-10
RECENT ADVANCES IN LARGE-SCALE GNSS PROCESSING
Anthea Coster*, Juha Vierinen, William Rideout, Victor Pankratius, Frank Lind, Philip Erickson
MIT Haystack Observatory, Westford, MA

Session J5: Timing and Transients
Room 265

Co-Chairs: Paul Demorest, *National Radio Astronomy Observatory*;
Peter Williams, *Harvard*

08:20 J5-1
TIMING AND TRANSIENTS
Paul Demorest*
National Radio Astronomy Observatory, Socorro, NM

08:40 J5-2
CHALLENGES AND SOLUTIONS: DESIGNING THE PULSAR SEARCH SUBELEMENT FOR THE SKA
Mitchell Mickaliger*[1], Time Domain Team[2]
[1]*The University of Manchester, Manchester, UNITED KINGDOM*
[2]*Various, Various, UNITED KINGDOM*

09:00 J5-3
ON THE BLIND DETECTION OF FRBS THROUGH SPATIAL FOURIER TRANSFORMS
Marwan Alkhweldi*[1], Richard Prestage[2], Ryan Lynch[2], Natalia A. Schmid[1]
[1]*Computer Science and Electrical Engineering, West Virginia University, Morgantown, WV*
[2]*National Radio Astronomy Observatory, Green Bank, WV*

09:20 J5-4
SEARCHING FOR SLOW AND FAST TRANSIENTS WITH THE VLA LOW BAND IONOSPHERIC AND TRANSIENT EXPERIMENT
Emil Polisensky*[1], Namir Kassim[1], Wendy Peters[1], Scott Hyman[2,3], Paul Ray[4], Julia Deneva[5], Fernando Cardoso[6], Simona Giacintucci[3], Joseph Helmboldt[1], Tony Mroczkowski[5], Emily Cleland[7], Tracy Clarke[1]
[1]*Remote Sensing Division, Naval Research Laboratory, Washington, DC*
[2]*Engineering and Physics, Sweet Briar College, Sweet Briar, VA*
[3]*Computational Physics Inc, Alexandria, VA*
[4]*Space Sciences Division, Naval Research Laboratory, Washington, DC*
[5]*National Research Council Postdoc, Washington, DC*
[6]*West Virginia University, Morgantown, WV*
[7]*Thomas Jefferson High School for Science and Technology, Alexandria, VA*

09:40 J5-5
PULSAR AND FAST RADIO BURST SCIENCE: THE CHIME TELESCOPE AND THE PALFA SURVEY
Erik C. Madsen*
Physics, McGill University, Montreal, QC, CANADA

Session J6: New Telescopes, Techniques, and Observations II
Room 265

Co-Chairs: Hsin C. Chiang, *University of KwaZulu-Natal;* David DeBoer, *University of California Berkeley*

10:20 J6-1
THE VLA LOW BAND IONOSPHERIC AND TRANSIENT EXPERIMENT (VLITE): A NEW COMMENSAL SYSTEM ON THE NRAO VLA
Tracy Clarke*[1], Namir Kassim[1], Paul Ray[2], Wendy Peters[1], Simona Giacintucci[3], Joseph Helmboldt[1], Tony Mroczkowski[4], Emil Polisensky[1]
[1]*Remote Sensing, Naval Research Laboratory, Washington, DC*
[2]*Space Sciences, Naval Research Laboratory, Washington, DC*
[3]*Computational Physics Inc, Springfield, VA*
[4]*NRC, Washington, DC*

10:40 J6-2
PRELIMINAY MEASUREMENTS WITH THE EDGES LOW-BAND INSTRUMENT
Raul A. Monsalve*[1], Judd D. Bowman[1], Alan E. E. Rogers[2], Thomas J. Mozdzen[1]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*

11:00 J6-3
HIRAX: THE HYDROGEN INTENSITY AND REAL-TIME ANALYSIS EXPERIMENT
Hsin C. Chiang*
Astrophysics & Cosmology Research Unit, University of KwaZulu-Natal, Durban, SOUTH AFRICA

11:20 J6-4
CONSTRAINING IGM HEATING WITH THE 21CM POWER SPECTRUM; PREDICTIONS AND FIRST OBSERVATIONS WITH THE MWA
Aaron Ewall-Wice*[1], Joshua Dillon[1,2], Jacqueline Hewitt[1], Adrian Liu[2], Avi Loeb[3], Andrei Mesinger[4], Abraham Neben[1], Andre Offringa[5], Jonathan Pober[6,7], Max Tegmark[1]
[1]*MIT Kavli Center for Astrophysics and Space Research, MIT, Cambridge, MA*
[2]*Astronomy, Berkeley, Berkeley, CA*
[3]*Center for Astrophysics, Harvard University, Cambridge, MA*
[4]*Scuolo Normale Superiore, Pisa, ITALY*
[5]*Netherlands Institute for Radio Astronomy, Dwingaloo, NETHERLANDS*
[6]*Physics, University of Washington, Seattle, WA*
[7]*Physics, Brown University, Providence, RI*

11:40 J6-5
ATACAMA LARGE MILLIMETER/SUBMILLIMETER ARRAY (ALMA): STATUS AND DEVELOPMENT
Pierre Cox*, Stuartt Corder, John Carpenter
Joint ALMA Observatory, Santiago de Chile, CHILE

Session K2: Implanted Sensors and Propagation Inside the Human Body
Room 155

Co-Chairs: Ozlem Kilic, *The Catholic University of America*; Majid Manteghi, *Virginia Tech*

08:20 K2-1
HUMAN VITAL SIGN DETECTION USING FAST FOURIER TRANSFORM
Tuan Phan*, Quang Nguyen, Nghia Tran, Ozlem Kilic
Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

08:40 K2-2
SIMULATION OF DYNAMIC ON-BODY WAVE PROPAGATIONS WITH EXPERIMENTAL VERIFICATIONS
George Lee*, Brian Garner, Yang Li
Engineering and Computer Science, Baylor University, Waco, TX

09:00 K2-3
EFFECTS OF BODY POSITION AND MOTION ON ON-BODY WIRELESS CHANNELS
Erik V. Forrister*
Mechanical Engineering, Baylor University, Waco, TX

09:20 K2-4
A WIRELESS POWER TRANSFER SYSTEM FOR IMPLANTED DEVICES
Majid Manteghi*
Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA

09:40 K2-5
MINIATURIZED FULLY-PASSIVE BRAIN IMPLANT FOR WIRELESS ACQUISITION OF LOW-LEVEL NEUROPOTENTIALS
Cedric W. Lee*, David E. Like, Asimina Kiourti, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

10:00 Break

10:20 K2-6
OPTICALLY TRANSPAGALLIUM-DOPED ZINC OXIDE (GZO) ANTENNAS FOR LONG-TERM IMPLANTATION
Ryan B. Green*, Arthur French, Mykyta Toporkov, Vitaliy Avrutin, Umit Ozgur, Hadis Morkoc, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

10:40 K2-7
A DEFORMABLE ANTENNA FOR STOMACH IMPLANTS
S. Dubey*
Electrical Engineering, University of Texas at Arlington, Arlington, TX

FRIDAY AFTERNOON, 8 January 2016

Session B17: Antenna Arrays
Room 1B40

Co-Chairs: Nader Behdad, *University of Wisconsin*;
Amir Zaghloul, *U.S. Army Research Lab*

13:20 B17-1
A PATTERN-RECONFIGURABLE, WIDEBAND, HIGH GAIN, PARASITIC ARRAY ANTENNA
Yen Le*, Sungkyun Lim
Electrical Engineering, Georgia Southern University, Statesboro, GA

13:40 B17-2
BANDWIDTH ENHANCEMENT OF PLATFORM-MOUNTED HF ANTENNAS USING THE THEORY OF CHARACTERISTIC MODES
Ting-Yen Shih*, Nader Behdad
Electrical and Computer Engineering, University of Wisconsin-Madison, Madison, WI

14:00 B17-3
18-40 GHZ PHASED ARRAY ANTENNA USING PRINTED CIRCUIT BOARD FABRICATION AND SURFACE-MOUNT MEMS PHASE SHIFTERS
Anas J. Abumunshar*, Woon-Gi Yeo, Niru K. Nahar, Kubilay Sertel
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

14:20 B17-4
A NOVEL ARRAY WITH 6:1 BANDWIDTH AND 70 DEGREE SCANNING USING FSS SUPERSTRATE
Ersin Yetisir*, Nima Ghalichechian, John J. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

14:40 B17-5
MODAL ANALYSIS OF A PLANAR, PRINTED ARRAY FOR WEATHER MEASUREMENT
Matilda Livadaru*, John L. Volakis
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

15:00 Break

15:20 B17-6
MACRO ELECTRO MECHANICAL SYSTEMS (MAEMS) BASED BEAM STEERING IN REFLECTARRAY ANTENNAS
Seyed Mohamad Amin Momeni Hasan Abadi*, John H. Booske, Nader Behdad
Electrical and Computer Engineering, University of Wisconsin-Madison, Madison, WI

15:40 B17-7
INVESTIGATION OF MODAL BEAM GENERATION FROM ORTHOGONAL MODES OF THE CIRCULAR CANONICAL FAMILY RANDOM ARRAY TOPOLOGY
Nam Nicholas Mai*[1], Kristopher Buchanan[2]
[1]*Electrical and Computer Engineering, Johns Hopkins University, Elkridge, MD*
[2]*Electromagnetics Technology Division, SPAWAR, San Diego, CA*

16:00 B17-8
INVESTIGATING BEAMFORMING GAINS OF FREQUENCY DIVERSE INTELLIGENTLY DISTRIBUTED ADHOC POLYMORPHIC ANTENNA ARRAYS
Timi Adeyemi*, Kris Buchanan, Nicholas Johnson, Michael Civerolo, John Rockway
Spawar System Center Pacific, San Diego, CA

Session F6: L-Band Microwave Remote Sensing of Land and Ocean Surfaces
Room 245

Co-Chairs: Simon Yueh, *Jet Propulsion Laboratory*;
David Le Vine, *NASA Goddard Space Flight Center*;
Roger Lang, *George Washington University*

13:20 F6-1
RECENT IMPROVEMENTS IN L-BAND OBSERVATIONS OF OCEAN SALINITY BY AQUARIUS
Emmanuel P. Dinnat*[1], David M. Le Vine[2], Yan Soldo[2], Gary Lagerloef[3], Thomas Meissner[4]
[1]*Cryospheric Sciences Lab, NASA Goddard Space Flight Center and Chapman University, Greenbelt, MD*
[2]*Cryospheric Sciences Lab, NASA Goddard Space Flight Center, Greenbelt, MD*
[3]*Earth and Space Research, Seattle, WA*
[4]*Remote Sensing Systems, Santa Rosa, CA*

13:40 F6-2
L-BAND GEOPHYSICAL MODEL FUNCTION FOR RETRIEVAL OF SEA SURFACE SALINITY AND WIND FROM SMAP DATA
Simon Yueh*, Alexander Fore, Wenqing Tang, Akiko Hayashi
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

14:00 F6-3
EVALUATION OF THE SMAP L1 RADAR BACKSCATTER DATA AND EFFECTS OF TERRAIN TOPOGRAPHY ON SOIL MOISTURE ESTIMATION
Ruzbeh Akbar*, Mahta Moghaddam
Electrical Engineering, University of Southern California, Los Angeles, CA

14:20 F6-4
SOIL MOISTURE RETRIEVAL USING L-BAND SMAP RADAR DATA: FORWARD MODEL EVALUATIONS AND INVERSION IMPROVEMENTS
Seungbum Kim*[1], Jakob Van Zyl[1], Mahta Moghaddam[2], Leung Tsang[3], Dara Entekhabi[4], Simon Yueh[1]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*University of Southern California, Los Angeles, CA*
[3]*University of Michigan, Ann Arbor, MI*
[4]*Massachusetts Institute of Technology, Cambridge, MA*

14:40 F6-5
MODELING AND ANALYSIS OF COHERENT BISTATIC SCATTERING FROM CROPLANDS AND FORESTS
Amir Azemati*, Mahta Moghaddam
Electrical Engineering, University of Southern California, Los Angeles, CA

15:00 Break

15:20 F6-6
POST-BETA STATUS OF THE SMAP PASSIVE SOIL MOISTURE PRODUCT
Steven Chan*[1], Rajat Bindlish[2], Peggy O'Neill[3], Eni Njoku[1], Tom Jackson[2], Andreas Colliander[1], Fan Chen[2]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*USDA ARS Hydrology and Remote Sensing Laboratory, Beltsville, MD*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*

15:40 F6-7
ANTENNA PATTERN CORRECTIONS FOR THE COMBINED RADAR / RADIOMETER (COMRAD) GROUND-BASED SMAP SIMULATOR
Mehmet Kurum*[1], Roger Lang[1], Peggy ONeill[2], Alicia Joseph[2], Michael Cosh[3], Wasyl Wasylkiwskyj[1], Mehmet Ogut[4]
[1]*Electrical and Computer Engineering, George Washington University, Washington, DC*
[2]*Hydrological Sciences Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD*
[3]*Hydrology and Remote Sensing Laboratory, USDA-ARS, Beltsville, MD*
[4]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*

16:00 F6-8
PALS (PASSIVE ACTIVE L-BAND SYSTEM) SOIL MOISTURE MEASUREMENTS IN SMAPVEX15 (SMAP VALIDATION EXPERIMENT 2015)
Andreas Colliander*[1], Sidharth Misra[1], Thomas Jackson[2], Chun-Sik Chae[1], Michael Cosh[2], Wade Crow[2], Simon Yueh[1]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*Hydrology and Remote Sensing Laboratory, USDA ARS, Beltsville, MD*

16:20 F6-9
L-BAND SOIL MOISTURE MAPPING USING A SMALL UNMANNED AERIAL SYSTEM
Eryan Dai*[1], Albin J. Gasiewski[1], Maciej Stachura[2], Jack Elston[2]
[1]*Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Black Swift Technologies (BST) LLC, Boulder, CO*

16:40 F6-10
A NONLINEAR COUNTS TO ANTENNA TEMPERATURE ALGORITHM FOR A TOTAL POWER RADIOMETER WITH EXTERNAL CALIBRATION AND NOISE DIODE INJECTION
Faisal A. Alquaied*, W.Linwood Jones
Electrical and Computer Engineering, University of Central Florida, Orlando, FL

Session F7: Complex and Random Media
Room 150

Co-Chairs: Saba Mudaliar, *Air Force Research Laboratory*; Akira Ishimaru, *University of Washington*

13:20 F7-1
NONLOCAL CONTRIBUTIONS TO 1-D ROUGH SURFACE SCATTERING
Gary S. Brown*, Kevin Diomedi
Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA

13:40 F7-2
PROBABILITY DENSITY FUNCTIONS OF BISTATIC ROUGH SURFACE SCATTERED FIELDS USING THE SMALL SLOPE APPROXIMATION
Hongkun Li*, Joel T. Johnson
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

14:00 F7-3
SENSITIVITY ANALYSIS OF P-BAND INTERFEROMETRIC SAR RESPONSE TO SOIL MOISTURE PROFILES AND SUBSURFACE RANDOM MEDIA
Richard H. Chen*, Mahta Moghaddam
Electrical Engineering, University of Southern California, Los Angeles, CA

14:20 F7-4
ROBUST NUMERICAL SPECTRAL-DOMAIN MODELING OF SUBSURFACE EM SENSORS IN PLANAR-LAYERED MEDIA BASED ON THE COMPLEX-PLANE METHOD OF WEIGHTED AVERAGES
Kamalesh K. Sainath*, Fernando L. Teixeira
Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

14:40 F7-5
BEAM FORMATION FOR ENHANCING EARLY?TIME DIFFUSION IN SHORT OPTICAL PULSE PROPAGATION THROUGH RANDOM PARTICULATE MEDIA
Elizabeth Bleszynski*, Marek Bleszynski, Thomas Jaroszewicz
Monopole Research, Thousand Oaks, CA

15:00 Break

15:20 F7-6
DOMAIN DERIVATIVES IN SCATTERING FROM ROUGH SURFACES
Saba Mudaliar*
Sensors Directorate, Air Force Research Laboratory, Dayton, OH

15:40 F7-7
ROBUST SPECTRAL-DOMAIN METHODOLOGY FOR NUMERICAL MODELING OF REMOTE SENSORS: APPLICATION TO CSEM PROSPECTION OF MARINE HYDROCARBON RESERVES
Kamalesh K. Sainath*, Dong-Yeop Na, Fernando L. Teixeira
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:00 F7-8
AN AUTONOMOUS CRYOBOT SYNTHETIC APERTURE RADAR FOR SUBSURFACE EXPLORATION OF EUROPA
Omkar P. Pradhan*, Albin J. Gasiewski, Srikumar Sandeep
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

16:20 F7-9
CALIBRATION OF THE ULTRA-WIDEBAND SOFTWARE DEFINED MICROWAVE RADIOMETER FOR ICE SHEET THERMOMETRY
Mark J. Andrews*, Joel T. Johnson, Hongkun Li, Mustafa Aksoy
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:40 F7-10
INDOOR SENSING WITH UWB OFDM RADAR: EXPERIMENTAL FREQUENCY-DOMAIN APPROACH
Dmitriy Garmatyuk[1], Saba Mudaliar*[2], Melissa Simms[1]
[1]*Miami University, Oxford, OH*
[2]*Air Force Research Laboratory, WPAFB, OH*

Session G1: Space Plasma Measurement Techniques
Room 105

Co-Chairs: Tom Gaussiran, *ARL:UT*;
Philip Erickson, *MIT Haystack Observatory*

13:20 G1-1
RESULTS OF COHERENT BACKSCATTER RADAR IMAGING USING CAPON'S METHOD AND MEASUREMENTS MADE BY THE SAO LUIS RADAR INTERFEROMETER
Gebreab K. Zewdie*, Fabiano S. Rodrigues
Electrical and Computer Engineering,The University of Texas at Dallas, Dallas, TX

13:40 G1-2
MODIFICATION OF THE LF TRANSMIT SITE AT DIXON TO SUPPORT RF PROPAGATION AND IONOSPHERE RESEARCH
Doeg Rodriguez[1], Nicholas Lumdsen*[1], Peder Hansen[2], Laura Lukes[3], Jill Nelson[4], K.c. Kerby-Patel[4], Filip Crowov[4], William Liles[5], John D. Rockway[1]
[1]*SSC Pacific, San Diego, CA*
[2]*Long Wave Inc., Oklahoma City, OK*
[3]*George Mason University, Fairfax, VA*
[4]*University of Massachusetts at Boston, Boston, MA*
[5]*Indepedent, Reston, VA*

14:00 G1-3
AN MF/HF ANTENNA ARRAY FOR RADIO AND RADAR IMAGING OF THE IONOSPHERE
Terence Bullett[1], Bjorn Gustavsson[2], Brett Isham*[3], Vasyl Belyey[4]
[1]*University of Colorado / NOAA, Boulder, CO*
[2]*University of Tromso, Tromso, NORWAY*
[3]*Interamerican University of Puerto Rico, Bayamon, PUERTO RICO*
[4]*Pinhole AS, Tromso, NORWAY*

14:20 G1-4
MEAN SPECTRAL CHARACTERISTICS OF ACOUSTIC GRAVITY WAVES IN THE THERMOSPHERE-IONOSPHERE DETERMINED FROM DYNASONDE DATA
Catalin Negrea*[1,2,3,4], Nikolay A. Zabotin[1,2]
[1]*Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO*
[2]*Cooperative Institute for Research in Environmental Sciences, University of Colorado at Boulder, Boulder, CO*
[3]*Space Weather Prediction Center, National Oceanic and Atmospheric Administration, Boulder, CO*
[4]*Institute of Space Science, Magurele, IF, ROMANIA*

14:40 G1-5
MEASURING IONOSPHERIC RESPONSE TO SOLAR FLARE WITH DYNASONDES
Nikolay A. Zabotin*, Terence W. Bullett
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:00 Break

15:20 G1-6
THE IMPULSE RESPONSES OF ELECTRONICALLY SCANNED AND DISH BASED ISR
John P. Swoboda*, Joshua Semeter
Electrical and Computer Engineering, Boston University, Boston, MA

15:40 G1-7
ATMOSPHERIC PLANETARY WAVES IMPACT ON IONOSPHERIC CORRECTION IN GPS
Andrey N. Lyakhov*[1], Tatiana V. Losseva[1], Alexei Chermenin[2]
[1]*Institute of Geospheres Dynamics, Moscow, RUSSIAN FEDERATION*
[2]*Aerophysics and Space Research, Moscow Institute of Physics and Technology, Moscow, RUSSIAN FEDERATION*

16:00 G1-8
ON THE STATISTICS OF INTENSITY SCINTILLATIONS FOR A TWO-COMPONENT IRREGULARITY POWER LAW SPECTRUM
Charles S. Carrano*, Charles L. Rino
Institute for Scientific Research, Boston College, Chestnut Hill, MA

16:20 G1-9
IMPACTS OF IONOSPHERE-THERMOSPHERE COUPLING ON IONOSPHERIC PREDICTABILITY IN AN ENSEMBLE DATA ASSIMILATION AND FORECASTING SYSTEM
Chih-Ting Hsu*[1], Tomoko Matsuo[2], Wenbin Wang[3], Xinan Yue[4], Jann-Yenq Liu[1]
[1]*Institute of Space Science, National Central University, Taoyuan, TAIWAN*
[2]*Space Weather Prediction Center, National Oceanic and Atmospheric Administration, Boulder, CO*
[3]*High Altitude Observatory, National Center for Atmospheric Research, Boulder, CO*
[4]*COSMIC program office, University Corporation for Atmospheric Research, Boulder, CO*

FRIDAY AFTERNOON, continued

16:40 G1-10
SCINTILLATION THEORY, IONOSPHERIC STRUCTURE CHARACTERIZATION, AND GLOBAL MODELS
Charles L. Rino*[1], Charles S. Carrano[2]
[1]*Institute for Scientific Research, Boston College, Menlo Park, CA*
[2]*Institute for Scientific Research, Boston College, Boston, MA*

Session J7: Atacama Large Millimeter Array - Systems and Science
Room 265

Co-Chairs: Jennifer Donovan Meyer, *National Radio Astronomy Observatory*; Anthony Remijan, *National Radio Astronomy Observatory*

13:20 J7-1
THE ALMA PHASING SYSTEM: A NEW CAPABILITY FOR HIGH ANGULAR RESOLUTION AND HIGH SENSIVITY SCIENCE
Sheperd Doeleman*[1], Jay Blanchard[2], Geoff Crew[3], Joe Greenberg[4], Michael Hecht[3], Mareki Honma[5], Makoto Inoue[6], Christophe Jacques[4], Richard Lacasse[4], Lynn Matthews[3], Matias Mora[4], Neil Nagar[2], Nicolas Pradel[6], Helge Rotteman[7], Chester Rusczcyk[3], Alejandro Saez[8], Robert Treacy[4], Alan Roy[7], Walter Alef[7], Ivan Marti-Vidal[9], Rurik Primiani[1]
[1]*Smithsonian Astrophysical Observatory, Cambridge, MA*
[2]*Universidad de Concepcion, Concepcion, CHILE*
[3]*MIT Haystack Observatory, Westford, MA*
[4]*National Radio Astronomy Observatory, Charlottesville, VA*
[5]*National Astronomical Observatory of Japan, Mitaka, Tokyo, JAPAN*
[6]*Academia Sinica Institute of Astronomy and Astrophysics, Taipei, TAIWAN*
[7]*Max Plank Institut f?r Radioastronomie, Bonn, GERMANY*
[8]*Joint ALMA Office, Vitacura, Santiago de Chile, CHILE*
[9]*Onsala Space Observatory, Onsala, SWEDEN*

13:40 J7-2
OBSERVING THE SUN WITH THE ALMA: A NEW TOOL FOR SOLAR PHYSICS
Timothy S. Bastian*
National Radio Astronomy Observatory, Charlottesville, VA

14:00 J7-3
EXPLORING THE SOLAR SYSTEM WITH ALMA
Arielle Moullet*
National Radio Astronomy Observatory, Charlottesville, SC

14:20 J7-4
VOLATILES IN PROTOPLANETARY DISKS AND THE C/N BUDGETS OF TERRESTRIAL WORLDS
Geoffrey A. Blake*
Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA

14:40 J7-5
WITNESSING THE FORMATION OF STARS AND PLANETS WITH ALMA
Laura M. Perez*
Max Planck Institute for Radio Astronomy, Bonn, GERMANY

15:00 Break

15:20 J7-6
UNRAVELLING THE MYSTERIES OF STAR AND PLANET FORMATION WITH ALMA
Doug I. Johnstone*
National Research Council Canada - Herzberg Astronomy and Astrophysics, Victoria, BC, CANADA

15:40 J7-7
SPECTRAL OBSERVATIONS OF STAR FORMATION WITH ALMA
James Di Francesco*
National Research Council of Canada, Victoria, BC, CANADA

16:00 J7-8
GETTING THE MOST OUT OF YOUR ALMA DATA WITH ADMIT: THE ALMA DATA MINING TOOLKIT
Leslie Looney*[1], Lee Mundy[2], Doug Friedel[1], Peter Teuben[2], Marc Pound[2], Lisa Xu[1], Kevin Rauch[2], Robert Harris[1], Jeff Kern[3]
[1]*University of Illinois Urbana-Champaign, Urbana, IL*
[2]*University of Maryland, College Park, MD*
[3]*National Radio Astronomy Observatory, Socorro, NM*

16:20 J7-9
PROBING MASSIVE STAR CLUSTER FORMATION WITH ALMA
Kelsey Johnson*
Astronomy, University of Virginia, Charlottesville, VA

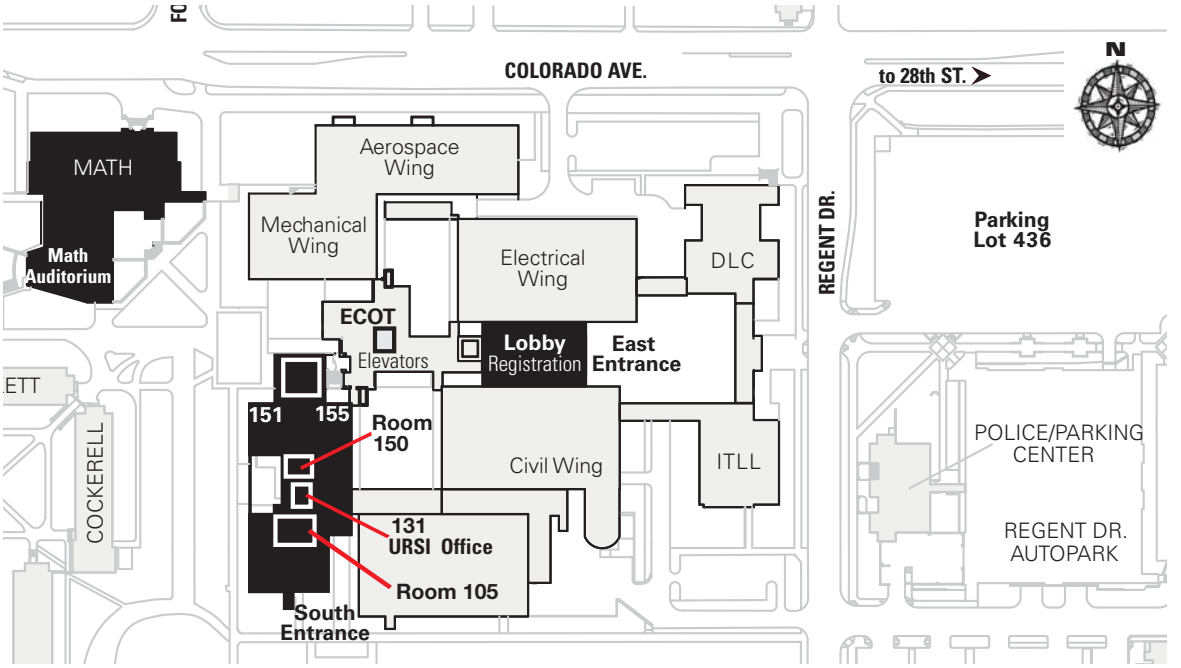
16:40 J7-10
GALAXY EVOLUTION ACROSS COSMIC TIME: THE IMPORTANT ROLE OF ALMA
Caitlin M. Casey*
Astronomy, University of Texas at Austin, Austin, TX

17:00 J7-11
DETECTING DARK MATTER SUBHALOS WITH ALMA OBSERVATIONS OF GRAVITATIONALLY LENSED GALAXIES
Yashar Hezaveh*
Kavli Institute for Particle Astrophysics and Cosmology, Stanford University, Stanford, CA

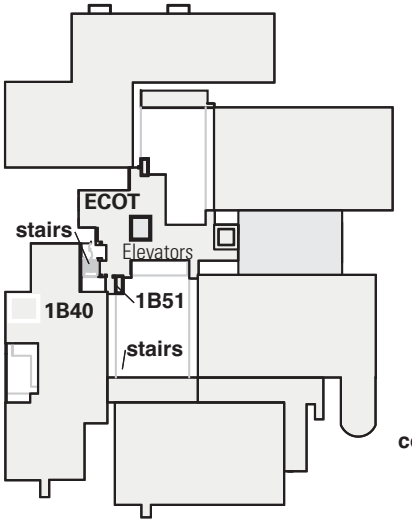
SATURDAY MORNING, 9 January 2016

08:00 – 11:00 USNC-URSI Executive Council, Breakfast Meeting, Millennium Hotel

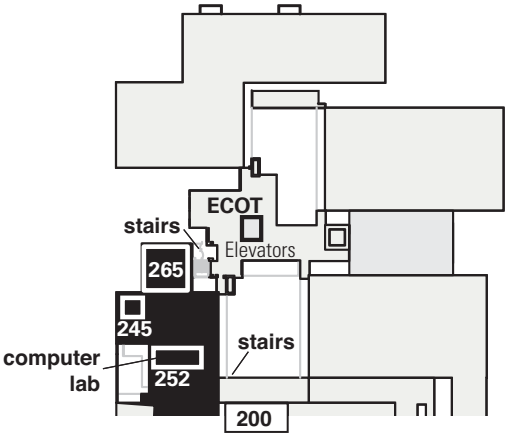
CU-Boulder Engineering Center (EC)



Main / First Floor



Ground / B Level



Second Floor

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