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*, Fernando Vargas-Lara, Jack F. Douglas, Edward J. Garboczi  
1Computer Science Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO  
2Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD  
3Applied 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
DETERMINING ACCURATE ESR VALUES OF CERAMIC DECOUPLING CAPACITORS
Sai Ram Anand Vempati*1, Sunil S. Kollipara2, Aleksandr Gafarov2, Melinda J. Piket-May1, Eric Bogatin1
1Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO
2Mentor Graphics Corporation, Longmont, CO

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

NOVEL 5X-LINE TECHNIQUE TO EXTRACT COPPER CONDUCTIVITY
Chun-Ting Wang Lee*, Bill Hargin2, Heidi Barnes3, Eric Bogatin1, Melinda J. Piket-May1
1Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO
2Nan Ya Copper-Clad Laminates, Taipei, TAIWAN
3Keysight Technologies, Santa Rosa, CA

SPECTRUM SENSING WITH WLAN ACCESS POINTS
Ryan T. Jacobs*1, Jason B. Coder1, Vivian M. Musser2
1Communications Technology Laboratory, National Institute of Standards and Technology, Boulder, CO
2Electrical and Computer Engineering, University of Maryland, College Park, MD

VARIABILITY OF SOUNDER MEASUREMENTS IN MANUFACTURING FACILITIES
Jeanne T. Quimby*, Alexandra E. Curtin1, David R. Novotny1, Kate A. Remley1, Rick Candell2
1CTL, National Institute of Standards and Technology, Boulder, CO
2National Institute of Standards and Technology, Gaithersburg, MD

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. Hadi1,2,3, Melinda J. Piket-May1, Atef Z. Elsherbeni3
1Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO
2Electrical Engineering, Kuwait University, Kuwait City, KUWAIT
3Electrical 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. Hadi1,2,3, Melinda J. Piket-May1, Atef Z. Elsherbeni3
1Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO
2Electrical Engineering, Kuwait University, Kuwait City, KUWAIT
3Electrical 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 Weiss1, Melinda Piket-May1, Mohammed Hadi1,2,3, Atef Elsherbeni3
1Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO
2Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO
3Electrical Engineering, Kuwait University, Kuwait City, KUWAIT

09:20 B1-4
COMPARATIVE ANALYSIS OF CUDA AND OPENCL FOR ELECTROMAGNETICS SIMULATIONS USING FDTD
Rohit P. Kandurwar*1, Vinit S. Vyas1, Melinda J. Piket-May1, Mohammed F. Hadi1,2,3, Atef Elsherbeni2, Daniel A. Connors4
1Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO
2Electrical and Computer Engineering, Colorado School of Mines, Golden, CO
3Electrical Engineering, Kuwait University, Kuwait City, KUWAIT
4Electrical 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. Young2, Robert J. Adams2, Carl S. Scheider3
1Electrical Engineering, University of Colorado Denver, Denver, CO
2Electrical and Computer Engineering, University of Kentucky, Lexington, KY
3Physics, 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 MULTIPOLAR 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*, K. W. Bannister¹, S. Hegarty², I. Heywood¹,³, A. W. Hotan¹, J. Marvil¹, D. McConnell¹, R. J. Sault¹,⁴, P. Serra¹
¹Astronomy and Space Science, CSIRO, Sydney, NSW, AUSTRALIA
²Centre for Astrophysics and Computing, Swinburne University of Technology, Melbourne, Victoria, AUSTRALIA
³Physics and Electronics, Rhodes University, Grahamstown, SOUTH AFRICA
⁴School 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. Jeffs¹, Gregory Hellbourg²
¹Electrical and Computer Engineering, Brigham Young University, Provo, UT
²CSIRO 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 Metasurfaces
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 Wallen¹, Henrik Kettunen²
¹Radio Science and Engineering, Aalto University, Espoo, FINLAND
²Mathematics 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 Engineering, 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

09:40  B3-5
THEORY OF GAIN ENHANCEMENT IN PERIODIC STRUCTURES WITH DEGENERATE BAND ENDES
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*, Junghoon Jahng2, Vartkess A. Apkarian3, Eric O. Potma1,3
1Electrical Engineering and Computer Science, University of California Irvine, Irvine, CA
2Physics and Astronomy, University of California Irvine, Irvine, CA
3Chemistry, 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
GSTC APPLIED TO A COAXIAL TRANSMISSION LINE
Nick J. Krull*, Edward F. Kuester
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

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

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

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

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

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

EXPERIMENTAL VALIDATION OF MODE DOMINANCE REVERSAL IN NOVEL SLOW WAVE STRUCTURE FOR HIGH POWER BACKWARD WAVE OSCILLATOR
Ushemadzoro Chipengo*, John L. Volakis
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 Kanj1, Zahi Ghorayeb1, Tala Al Bahar1, Yara Itani1, Youssef Tawk3,2, Christos G. Christodoulou2
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 Shpadi1, Pavel Inchin1, Anatoly Streltsov*2
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

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 Wang1, Lingyun Ren*2, Krishna Naishadham3, Aly E. Fathy2
1School of Information and Electronics, Beijing Institute of Technology, Beijing, CHINA
2Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN
3Electrical 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*, Charles Baylis1, Alexander Tsatsoulas1, Zach Hayes1, Larry Cohen2, Robert Marks1
1Wireless and Microwave Circuits and Systems Program, Baylor University, Waco, TX
2Naval Research Laboratory, Washington, DC

11:40 C1-10
VERTICALLY INTEGRATED RESEARCH IN RECONFIGURABLE LIQUID-METAL RF DEVICES
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 Barrios1, Fok Bolderheij2, Joris Derksen3, Katherine Horgan3, Vincent van Leijen4, Robert Marshall5, Ted Rogers1, Fred Schoonderwoerd4, Tjarda Wilbrink4, Earl Williams1, Victor Wiss2
1Space and Naval Warfare Systems Center Pacific, San Diego, CA
2Netherlands Defense Academy (NLDA), Den Helder, NETHERLANDS
3Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA
4Defense Materiel Organisation (DMO), Den Helder, NETHERLANDS
5Mount Pleasant Meteorology, Mount Pleasant, VA

09:20  F1-4
EVALUATION OF COAMPS USING MEASUREMENTS FROM THE CASPER PILOT EXPERIMENT
Marcela Ulate*,1 Qing Wang1, Tracy Haack2, Teddy Holt2, John Kaligiros1, Ryan Yamaguchi1, Dick Lind1
1Naval Postgraduate School, Monterey, CA
2Naval Research Laboratory, Monterey, CA

09:40  F1-5
EVAPORATION AND MARINE LAYER DUCTING EFFECTS ON PROPAGATION DURING THE TAPS EXPERIMENT
Tracy Haack*1, Andrew Kulesa2, Hedley Hansen3, Sally Garrett4, Martin Veasey5, Katherine Horgan6, V. Russel Wiss6, Jacques Claverie7, Yvonick Hurtaud8, Jorg Hacker2
1Marine Meteorology Division, NRL, Monterey, CA
2School of the Environment, Flinders University, ARA, Adelaide, SA, AUSTRALIA
3DSTO, Edinburgh, SA, AUSTRALIA
4DTA, Auckland, NEW ZEALAND
5UK Met Office, Exeter, UNITED KINGDOM
6Dahlgren Division, NSWC, Dahlgren, VA
7CREC St-Cyr & IETR, Guer, FRANCE
8Maîtrise de l’information, DGA, Rennes, FRANCE

10:00  Break

10:20  F1-6
EVALUATION OF VERTICAL REFRACTIVITY PROFILE BLENDING SCHEMES
Paul Frederickson*1, Tracy Haack2
1Meteorology, Naval Postgraduate School, Monterey, CA
2Marine 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 Wang2, Hway-Jen Chen2, Paul Frederickson2
1Navy Fleet Weather Center, San Diego, CA
2Meteorology, 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 Haack2, Sally A. Garrett3
1Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA
2Naval Research Laboratory Monterey, Monterey, CA
3Defence 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 Tejero¹, Gurudas Ganguli¹, George Hospodarsky², Craig Kletzing²
¹Division of Plasma Physics, Naval Research Laboratory, Washington, DC
²Physics 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. Smith¹, Marc R. Lessard¹, Roy B. Torbert²,
Craig A. Kletzing³, John R. Wygant⁴
¹Space Science Center, University of New Hampshire, Durham, NH
²Southwest Research Institute, Durham, NH
³Physics and Astronomy, University of Iowa, Iowa City, IA
⁴University 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. Halford², Robyn Millan², Michael McCarthy³,
Joseph F. Fennell⁴, John Sample⁵, Leslie A. Woodger², George Hospodarsky⁶, John Wygant¹,
Cynthia Cattell¹, Jerry Goldstein⁷, Craig Kletzing⁶
¹School of Physics and Astronomy, University of Minnesota, Minneapolis, MN
²Physics and Astronomy, Dartmouth College, Hanover, NH
³Earth and Space Sciences, University of Washington, Seattle, WA
⁴Space Sciences Lab, University of California, Berkeley, CA
⁵Physics and Astronomy, University of Iowa, Iowa City, IA
⁶Southwest Research Institution, Southwest Research Institution, San Antonio, TX
⁷The 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 Li², Richard M. Thorne²
¹Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
²University 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*, Bart Van Compernolle, Jacob Bortnik, Richard Thorne, Patrick Pribyl, Walter Gekelman
1Atmospheric and Oceanic Sciences, University of California, Los Angeles, Los Angeles, CA
2Physics, 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. Streletsov
Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL

11:20  H1-9
EFFECT OF FINITE ELECTRON AND ION TEMPERATURE ON MAGNETOSPHERIC WHISTLER MODE RAYTRACING
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*, Adam P. Beardsley, Judd D. Bowman, Miguel F. Morales
1School of Earth and Space Exploration, Arizona State University, Tempe, AZ
2Physics, University of Washington, Seattle, WA

08:40  J1-2
THE EXTERNAL CALIBRATOR FOR HYDROGEN OBSERVATORIES
Daniel C. Jacobs*, Jacob Burba, Lauren Turner, Abraham Neben, Benjamin Stinnett, Marc Leatham, Michael Busch, Judd Bowman
09:00 J1-3
CALIBRATING RADIO ARRAYS WITHOUT VISIBILITIES USING THE E-FIELD PARALLEL IMAGING CALIBRATION (EPICAL)
Adam P. Beardsley*, Nithyanandan Thyagarajan, Miguel F. Morales, Judd D. Bowman
1School of Earth and Space Exploration, Arizona State University, Tempe, AZ
2Physics, University of Washington, Seattle, WA

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

09:40 J1-5
CO INTENSITY MAPPING: FIRST CONSTRAINTS ON THE MOLECULAR GAS POWER SPECTRUM AT REDSHIFT 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 Katsanevas2, Denis Puy3, Andre Laurens4, Albert-Jan Boonstra5, Marc Klein Wolt6, Mark Bentum7, Angelica Sicard8, Jean-Louis Pincon9, Marco Agnan2, Martin Giard10, Patrick Loumeau11, Julien Girard12, Cyril Tasse13
1LESIA, Observatoire de Paris, Meudon, FRANCE
2APC, Universite Paris Diderot, Paris, FRANCE
3LUPM, Universite de Montpellier, Montpellier, FRANCE
4CNES, Toulouse, FRANCE
5ASTRON, Dwingeloo, NETHERLANDS
6Radboud University, Nijmegen, NETHERLANDS
7TU Twente, Twente, NETHERLANDS
8ONERA, Toulouse, FRANCE
9LPC2E, Universite d'Orleans, Orleans, FRANCE
10IRAP, Universite de Toulouse, Toulouse, FRANCE
11C2S, TelecomParisTech, Paris, FRANCE
12SAp/IRFU, CEA, Saclay, FRANCE
13GEPI, Observatoire de Paris, Meudon, FRANCE

11:40  J1-10
DESIGN OF A COMPACT K BAND CRYOGENIC RECEIVER
Jun Shi*1, Sander Weinreb2
1Information Science and Technology, Southeast University, Nanjing, CHINA
2Electrical 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. Kuester1
1Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO
2Ball Aerospace & Technologies Corporation, Boulder, CO

13:40  B7-2
MUTUAL COUPLING REDUCTION IN MICROSTRIP PATCH ANTENNA
Amin Darvazehban1, Ahmad Emadoddin2, Omid Manoochehri*3, Danilo Erricolo3
1Electrical and Computer Engineering, Amirkabir University of Technology, Tehran, IRAN
2Electrical and Computer Engineering, Shahed University, Tehran, IRAN
3Electrical 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-Lara², Jack F. Douglas², Edward J. Garboczi³
¹Computer Science Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO
²Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD
³Applied 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. Hassan¹, Fernando Vargas-Lara², Jack F. Douglas², Edward J. Garboczi³
¹Computer Science Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO
²Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD
³Applied 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*, Benedetto Grivo², Riccardo Lattanzi², Giuseppe Carluccio², Danilo Erricolo¹
1Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL
2Radiology/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
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*

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**Session B9: 3D Printed Antennas**
**Room 155**

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

13:20  B9-1
**ADDITIONAL 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 Shemelya¹, Mike Zemba², Min Liang³, Xiaoju Yu³, Junqiang Wu³, David Espalin¹, David Roberson¹, Ryan Wicker¹, Hao Xin³, 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 Ketterl¹, Casey Perkowski², Paul Deffenbaugh², John Stratton¹, Joshua Stephenson¹, Kenneth Church², Thomas Weller*¹
¹University of South Florida, Tampa, FL
²Sciperio, 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 Wang¹, Kenneth J. Wynne¹, Erdem Topsakal²
¹Chemical and Life Science Engineering, Virginia Commonwealth University, Richmond, VA
²Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

16:00 B9-8
3D PRINTED LIQUID METAL MOLDS FOR ANTENNA AND FEED PACKAGING
Collin Ladd¹, Dishit Parekh¹, Vivek Bharambe², Michael D. Dickey¹, Jacob J. Adams*²
¹Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC
²Electrical 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 Daniel²
¹Argonne National Laboratory, Lemont, IL
²Massachusetts 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*, Qiaowei Yuan, John Volakis*
1*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH
2National Institute of Technology, Sendai College, Sendai, JAPAN

16:40  BD1-5
**MID-INFRARED ENERGY HARVESTING AND CONVERSION USING RECTIFYING HYPERBOLIC METAMATERIALS**
Maryam Sakhrdari*, 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. Blunt¹, Eric L. Mokole*²
¹University of Kansas, Lawrence, KS
²Independent 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*, Shannon D. Blunt¹, Eric L. Mokole², Chris Allen¹
¹Electrical Engineering and Computer Science, University of Kansas, Lawrence, KS
²Independent 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 Fellows¹, Sarvin Rezayat¹, Lucilia Lamers¹, Joseph Barkate¹, Charles Baylis*¹,
Lawrence Cohen², Robert J. Marks III¹
¹Electrical and Computer Engineering, Baylor University, Waco, TX
²Naval Research Laboratory, Washington, DC

14:40 CDE1-5
A SIMULTANEOUS CIRCUIT AND WAVEFORM OPTIMIZATION FOR RADAR SYSTEMS
Dylan Eustice¹, Charles Baylis*¹, Larry Cohen², Matthew Fellows¹, Joseph Barkate¹,
Robert Marks II¹
¹Electrical and Computer Engineering, Baylor University, Waco, TX
²Naval 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*
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. Gonzalez¹, Audrey K. Puls*, William F. Young²
¹Electrical, Computer, and Energy Engineering, University of Colorado, Boulder, Boulder, CO
²Communications 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*, Michel Aidonidis²
¹National Center for Atmospheric Research, Boulder, CO
²Meteo 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 Yardim¹, Jon Pozderac¹, Robert Burkholder¹, Qing Wang²
14:20 F2-4
THE DESIGN OF CASPER FIELD PROGRAM FOR EM DUCTING RESEARCH
Qing Wang*1, Robert Burkholder2, Tony DePaolo3, Harindra J. Fernando4, Tracy Haack5, Thomas Hanley6, Teddy Holt7, Katherine Horgan7, Haflidi Jonsson1, Djamal Khelif8, Wendell Nuss1, Ted Rogers9, Ivan Savelyev10, Kipp Shearman11, Lian Shen12, Caglar Yardim2
1Naval Postgraduate School, Monterey, CA
2The Ohio State University, Columbus, OH
3Scripps Institution of Oceanography, University of California, San Diego, San Diego, CA
4University of Notre Dame, Notre Dame, IN
5Naval Research Lab, Monterey, CA
6The Johns Hopkins University - Applied Physics Laboratory, Laurel, MD
7Dahlgren Division, Naval Surface Warfare Center, Dahlgren, VA
8University of California, Irvine, Irvine, CA
9SPAWAR SSC Pacific, San Diego, CA
10Naval Research Lab, Washington, DC
11Oregon State University, Corvallis, OR
12University 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*, Qing Wang1, Rich Rainer1, Ryan Yamaguchi2, Dick Lind1
1Meteorology, Naval Postgraduate School, Monterey, CA
2Mechanical 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*, Joel T. Johnson1, Caglar Yardim1, Thomas C. Fu2, Craig F. Merrill2, Tom Cook3, Tony de Paolo3, Myles Syverud3, Eric Terrill3, Evan Walsh3, Eric Gallimore3
1ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH
2Carderock Division, NSWC, Bethesda, MD
3Scripps Institution of Oceanography, University of California, San Diego, San Diego, CA
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

ULTRA WIDE BAND LOWER ATMOSPHERIC PROPAGATION (LATPROP) SYSTEM
Luyao Xu*, Caglar Yardim, Swagato Mukherjee, Robert Burkholder, Jon Pozderac, Qing Wang

1ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH
2Meteorology, Naval Postgraduate School, Monterey, CA

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

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

DISTRIBUTIONS OF WAVE POWER IN THE INNER MAGNETOSPHERE AS ORGANIZED BY PLASMAPAUSE LOCATION
David M. Malaspina*, Allison N. Jaynes, Cory Boule, Craig Kletzing, Robert E. Ergun, John R. Wygant

1Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO
2Keene State College, Keene, NH
3Physics and Astronomy, University of Iowa, Iowa City, IA
4Physics and Astronomy, University of Minnesota, Minneapolis, MN
THE ROLE OF SUBSTORMS AND WHISTLER-MODE CHORUS WAVES IN THE REBUILDING OF EARTH’S RADIATION BELT

1LASP, University of Colorado Boulder, Boulder, CO
2Space Weather Prediction Center, NOAA, Boulder, CO
3CIRES, University of Colorado Boulder, Boulder, CO
4NASA Goddard Space Flight Center, Greenbelt, MD
5Aerospace Corporation, Los Angeles, CA
6University of California Los Angeles, Los Angeles, CA
7University of Iowa, Iowa City, IA
8University of New Hampshire, Durham, NH
9Los Alamos National Laboratory, Los Alamos, NM

14:20 H2-4
ULF WAVES IN THE PROTON RADIATION BELT
Anatoly V. Streltsov*, Joseph D. Huba
1Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL
2Plasma 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

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*, David Bordenave

1
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. Faulkner¹, Jan Geralt bij de Vaate²  
¹University of Cambridge, Cambridge, UNITED KINGDOM  
²ASTRON, 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 DAHLGREN1, JONAS FLYGARE1, JIAN YANG2, BO WASTBERG1, MIROSŁAW PANTALEEV1
1Earth and Space Science, Chalmers University of Technology, Gothenburg, SWEDEN
2Signals 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 LeraAcedo1, Kris Zarb-Adami2
1Cavendish Laboratory, University of Cambridge, Cambridge, UNITED KINGDOM
2University of Oxford, Oxford, UNITED KINGDOM

17:20  J2-12
LOW NOISE PHASED-ARRAY FEED WITH CMOS LNAs
Leonid Belostotski*, 1, Aaron J. Beaulieu1, Tom Burgess2, Bruce Veidt2, James W. Haslett1
1Electrical and Computer Engineering, University of Calgary, Calgary, Alberta, CANADA
2Herzberg, NRC, Penticton, BC, CANADA

Business Meetings

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<tr>
<th>Time</th>
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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. Yilmaz  
*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. Elsherbeni², Melinda J. Piket-May³, Samir F. Mahmoud¹
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. Miranda1, Tayfun Ozdemir*, Robert J. Burkholder2
1Virtual EM Inc., Ann Arbor, MI
2ElectroScience 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 Samimi1, Jamesina J. Simpson*2
1Nanometrics, Milpitas, CA
2Electrical 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
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 Yekan*, Reyhan Baktur
Electrical and Computer Engineering, Utah State University, Logan, UT

14:00 B13-3
MICROSTRIP ANTENNAS FOR CUBESATS
Xinyu Liu*, Jingshen Liu¹, David R. Jackson¹, Ji Chen¹, Patrick W. Fink², Gregory Y. Lin²
¹Electrical and Computer Engineering, University of Houston, Houston, TX
²NASA 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. Miranda², John L. Volakis¹
¹ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH
²NASA Glenn Research Center, Cleveland, OH

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

Session B14: Antenna Techniques and Measurements
Room 105
13:20  B14-1  
**SIMULATION AND MEASUREMENT OF A SELF-PHASED QUADRIFLAR 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*, Joseph Constantine1, Youssef Tawk1, Christos Christodoulou1,  
Sergio Pellegrino2, Maria Sakovsky2  
1*Configurable Space Microsystems Innovations and Applications Center (COSMIAC), University of New Mexico, Albuquerque, NM  
2Graduate 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*, Santosh Seran2, Nghi Tran3, Tutku Karacolak1  
1Engineering and Computer Science, Washington State University Vancouver, Vancouver, WA  
2Electrical and Computer Engineering, Mississippi State University, Starkville, MS  
3Electrical 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 COMPRESSION SENSING**
Lingyun Ren*, Haofei Wang, Vinh Dang, Ozlem Kilic, Aly E. Fathy
1Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN
2School of Information and Electronics, Beijing Institute of Technology, Beijing, CHINA
3Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

13:40 C2-2
**COMPRESSION 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 COMPRESSION SENSING MILLIMETER WAVE SYSTEM**
Min Liang*, Ying Li, Mark A. Neifeld, Hao Xin
1Electrical and Computer Engineering, University of Arizona, Tucson, AZ
2Electrical and Computer Engineering, University of Science and Technology of China, Hefei, CHINA

14:20 C2-4
**COMPRESSION SENSING IN RADAR IMAGING OF SUBSURFACE AND THROUGH-THE-WALL TARGETS**
Ahmad Hoorfar*, Wenji Zhang
1Electrical and Computer Engineering, Villanova University, Villanova, PA
2Checkpoint 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*, Steven C. Reising1, Pekka Kangaslahti2, Alan B. Tanner2,
Shannon T. Brown2, Sharmila Padmanabhan2, Oliver Montes2, Thaddeus P. Johnson1,
Victoria D. Hadel1, Karen Ng1
1Microwave Systems Laboratory, Colorado State University, Fort Collins, CO
2Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

14:00  F3-3
FEASIBILITY STUDY OF A MICROWAVE RADIOMETER FOR AVIATION SAFETY -
MRAS
Marian Klein*, Vladimir G. Irisov1, Albin J. Gasiewski2
1Boulder Environmental Sciences and Technology, Boulder, CO
2Center 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 Menietti¹, David Pisa¹², William S. Kurth¹, Donald A. Gurnett¹, Ann M. Persoon¹, Ondrej Santolik², Jared S. Leisner¹³, Terrance F. Averkamp¹
¹Physics and Astronomy, University of Iowa, Iowa City, IA
²Institute of Atmospheric Physics CAS, Prague, CZECH REPUBLIC
³SDSE, LLC., Silver Spring, MD

14:00 H3-3
PLASMA WAVES ASSOCIATED WITH DIONE’S MAGNETOSPHERIC INTERACTION
William S. Kurth*¹, George B. Hospodarsky¹, Patricia Schippers², Michel Moncuquet², Alain Lecacheux², Frank J. Crary³, Krishan Khurana⁴, Donald G. Mitchell⁵
¹Physics & Astronomy, University of Iowa, Iowa City, IA
²Observatoire de Paris, Meudon, FRANCE
³Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO
⁴Institute of Geophysics and Planetary Physics, University of California, Los Angeles, CA
⁵Applied 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 Eltrass², John Ruohoniemi¹, Joseph Baker¹, Philip Erickson³
¹Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA
²Electrical Engineering, Alexandria University, Alexandria, EGYPT
³Massachusetts 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*, Mark Golkowski1, Maria Spasojevic2, Andrew Gibby3
1Electrical Engineering, University of Colorado - Denver, Denver, CO  
2Electrical Engineering, Stanford University, Stanford, CA  
3Arion Systems, Inc., Chantilly, VA

16:20  H4-4
LABORATORY STUDY OF CHIRPING WHISTLER WAVES
Erik M. Tejero*, Chris Crabtree1, Lon Enloe1, Bill Amatucci1, Guru Ganguli1, Mark Golkowski2
1Plasma Physics Division, Naval Research Laboratory, Washington, DC  
2Electrical Engineering, University of Colorado Denver, Denver, CO

16:40  H4-5
CHARGE-CONSERVING RELATIVISTIC PIC ALGORITHM ON UNSTRUCTURED GRIDS
Dong-Yeop Na*, Haksu Moon1, Fernando L. Teixeira1, Yuri A. Omelchenko2
1ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH  
2Trinum 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 Lozbin1, Alexander Inchin1, Pavel Inchin1, Anatoly Strletsov*2
1Scientific Space System Lab, Institute of Space Techniques and Technologies, Almaty, KAZAKHSTAN  
2Physical 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*, Martin Uman1, Joseph Dwyer2, Douglas Jordan1, Jaime Caicedo1, Felipe Carvalho1, Robert Wilkes1, Daniel Kotovsky1, William Gamerota1, John Pilkey1, Terry Ngin1, Robert Moore1, Hamid Rassoul3, Steve Cummer4, Eric Grove5, Mike Biggerstaff6, Amitabh Nag7
1University of Florida, Gainesville, FL
2University of New Hampshire, Durham, NH
3Florida Institute of Technology, Melbourne, FL
4Duke University, Durham, NC
5Naval Reaserch Laboratory, Washington, DC
6Oklahoma University, Norman, OK
7Vaisala, Helsinki, FINLAND

14:00 HE1-3
ROLE OF MAGNETOSPHERIC DUCTS IN OBSERVATIONS OF ENERGETIC ELECTRON PRECIPITATION IN THE CONJUGATE HEMISPHERE
Hamid T. Chorsi*, Mark Golkowski1, Robert C. Moore2
1Electrical Engineering, University of Colorado Denver, Denver, CO
2Electrical 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*, Levi D. Boggs1, Michael Splitt2, Steven Lazarus2, Chad Glenn1, Hamid K. Rassoul1, Steven A. Cummer3
1Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL
2Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL
3Electrical 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*, Mark Golkowski
1Electrical and Computer Engineering, Georgia Tech, Atlanta, GA
2Electrical 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. Siefring¹, Stanley J. Briczinski¹, Robert H. Holzworth²,
Todd Anderson², Asti Bhatt³
¹Plasma Physics Division, Naval Research Laboratory, Washington, DC
²Earth and Space Sciences, University of Washington, Seattle, WA
³Radar 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. Maxworth¹, Morris B. Cohen², Robert C. Moore³
¹Electrical Engineering, University of Colorado Denver, Denver, CO
²Georgia Institute of Technology, Atlanta, GA
³Electrical and Computer Engineering, University of Florida, Gainesville, FL

14:40 HG1-5
MORPHOLOGY OF TLEs PRODUCING THUNDERSTORM OVER INDIAN REGION
Ajeet K. Maurya*¹², Rajesh Singh², Morris B. Cohen¹, Torsten Neubert³, Oliver Charnion³
¹School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA
²Dr K S K Geomagnetic Research Laboratory, Indian Institute of Geomagnetism, Allahabad, INDIA
³Solar 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. Khachikyan¹, Beibit T. Zhumabayev¹, Anatoly V. Streltsov*²
¹Institute of Ionosphere, Almaty, KAZAKSTAN
²Embry-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 Ray¹, Tracy Clarke¹, Namir Kassim¹, Tony Mroczkowski¹,
Emil Polisensky¹, Simona Giacintucci¹²
¹Naval Research Laboratory, Washington, DC
²Computational Physics Inc., Springfield, VA

16:00 HG1-8
RECENT PROGRESS IN EARLY DETECTION OF NATURAL HAZARDS GENERATED
TEC PERTURBATIONS
Attila Komjathy*¹, Yu-Ming Yang¹, Xing Meng¹, Olga Verkhoglyadova¹, Anthony Mannucci¹,
Richard Langley²
¹Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
²University of New Brunswick, Fredericton, NB, CANADA
QUANTITATIVE COMPARISON OF IONOSPHERIC STORMS OVER NORTH AMERICA IN SOLAR CYCLES 23 AND 24 FROM A WAAS PERSPECTIVE
Lawrence Sparks*, Eric Altshuler
1Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
2Sequoia 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, University of California, 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
15:20  J4-1
NEW COOLED FEEDS FOR THE ALLEN TELESCOPE ARRAY
Jack Welch*, Matt Fleming2, Chris Munson3, Jill Tarter3
1Radio Astronomy Laboratory, University of California Berkeley, Berkeley CA
2Minex Engineering, Antioch, CA
3SETI 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*, Jackie R. Villadsen1, Anthony C. Readhead1, Dale E. Gary2, Stephen J. S. Muchovej1, Loko Kung1, James Lamb1, Gregg W. Hallinan1, Sander Weinreb1
1California Institute of Technology, Pasadena, CA
2New 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*, Judd D. Bowman1, Alan E. E. Rogers2, Raul A. Monsalve1
1School of Earth and Space Exploration, Arizona State University, Tempe, AZ
2Haystack 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;
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. Sekeljic1, Milan M. Ilic1,2, Andrew J. Kiruluta3, Pierre-Francois Van de Moortele4, Branislav M. Notaros1
1Electrical and Computer Engineering, Colorado State University, Fort Collins, CO
2School of Electrical Engineering, University of Belgrade, Belgrade, Serbia, YUGOSLAVIA
3Radiology, Massachusetts General Hospital, Boston, MA
4Radiology, 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. Abdelrahman1, Xiong Wang1, Yexian Qin2, Russel S. Witte2, Hao Xin1
1Electrical and Computer Engineering, University of Arizona, Tucson, AZ
2Medical 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*, Afrodit 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 META FERRITE 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*, Amir I. Zaghloul1,2
1Electrical and Computer Engineering, Virginia Tech, Falls Church, VA
2SEDD, 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. Habib1,2, Gregory Mitchell1, Theodore K. Anthony1, Amir I. Zaghloul1,2
1SEDD, U.S. Army Research Laboratory, Adelphi, MD
2Electrical 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*, Farhad Farzami1, Amin Darvazehban2, Danilo Erricolo1
1Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL
2Electrical 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*, Jitao Zhang1,2, Min Liang1, Wei-Ren Ng1, Michael E. Gehm1,3, Hao Xin1
1Electrical and Computer Engineering, University of Arizona, Tucson, AZ
2Bioengineering, University of Maryland, College Park, MD
3Electrical 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 TERAHERTZ 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 Mai2, John Rockway1, Greg Huff3, Oren Sternberg1
1Electromagnetics Technology Branch, SSC-Pacific, San Diego, CA
2Electrical and Computer Engineering, Johns Hopkns Universtiy, Elkridge, MD
3Electrical 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. Martone2, Jeffrey H. Reed1, Amir I. Zaghloul1,2
1Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA
2U.S. Army Research Laboratory, Adelphi, MD
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 SOUNING
Kerri L. Cahoy*, William J. Blackwell, Anne D. Marinan
1AeroAstro, Massachusetts Institute of Technology, Cambridge, MA
2MIT 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*, Lars P. Dyrud, Steven R. Lorentz, Dong L. Wu, Philip M. Huang, Stergios J. Papadakis, Allan W. Smith, David M. Deglau, Warren J. Wiscombe
1The Johns Hopkins University - Applied Physics Laboratory, Laurel, MD
2OmniEarth, Arlington, VA
3L-1 Standards and Technology, New Windsor, MD
4NASA 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. Gaier², Christian D. Kummerow¹, Sharmila Padmanabhan², Boon H. Lim², Shannon T. Brown², Chandrasekar V. Chandra¹
¹Microwave Systems Laboratory, Colorado State University, Fort Collins, CO
²Jet 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 Gleason², Christopher Ruff³, Maria-Paola Clarizia³, Randy Rose², John Scherrer², Paul Chang⁴, Zorana Jelenak⁴
¹Physical Sciences Division, NOAA/Earth System Research Laboratory, Boulder, CO
²Southwest Research Institute, Boulder, CO
³University of Michigan, Ann Arbor, MI
⁴NOAA/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-Lluis¹, Steven C. Reising¹, Pekka Kangaslahti², Erich Schlecht², Sharmila Padmanabhan², Richard Cofield², Nacer Chahat², Jonathan Jiang², Shannon T. Brown², William R. Deal³, Alex Zamora³, Kevin Leong³, Sean Shih³, Gerry Mei³
¹Microwave Systems Laboratory, Colorado State University, Fort Collins, CO
²Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
³Northrop 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 Cahoy¹,²
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 Johnk1, Jaydee Griffith1, Ken Baker2
1Theory Division, Institute for Telecommunication Sciences, Boulder, CO
2Interdisciplinary 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. Gasiewski2, Ali Gorashi1, Dean Pizio1
1Colorado Engineering, Inc., Colorado Springs, CO
2Electrical, 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 Gerstoft1, Ted Rogers2
1Scripps Institute of Oceanography, University of California San Diego, La Jolla, CA
2Space 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
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*, Uwe Konopka¹, Spencer LeBlanc¹, Taylor Hall¹, Brian Lynch¹, Markus Thoma², Christina Knapke³, Mikhail Pusstynik³, Martin Fink³, Hubertus Thomas³
¹Auburn University, Auburn, AL
²Justus-Liebig-Universitat, Geissen, GERMANY
³Deutsches 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*, Gregory Taylor², Sophia Cockrell²
¹Naval Research Laboratory, Washington, DC
²University of New Mexico, Albuquerque, NM

09:40  GH1-5
NUMERICAL SIMULATIONS OF METEOR HEAD PLASMA RADAR CROSS SECTIONS
Robert A. Marshall*, Sigrid Close², Paul Bernhardt¹, Peter Brown⁴
¹Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO
²Aeronautics and Astronautics, Stanford University, Stanford, CA
³Naval Research Laboratory, Washington, DC
⁴Physics 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. Galindo1, Lars P. Dyrud2, Jonathan Fentzke2

1Electrical Engineering, Penn State, University Park, PA
2OmniEarth, Arlington, VA

**11:00 GH1-8**

**EFFECT OF PLASMA TURBULENCE ON THE EVOLUTION OF SPECULAR METEOR ECHOES**

Julio V. Urbina*1, Freddy R. Galindo1, Lars P. Dyrud2, Jonathan Fentzke2

1Electrical Engineering, Penn State, University Park, PA
2OmniEarth, 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

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**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*, Rashmi Shah1, Zhijin Li1, Maria Paola Clarizia2, Steve Lowe1, Clara Chew1
1Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
2University 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*, Joel T. Johnson1, Andrew O'Brien1, Stephen T. Lowe2

1Electrical Engineering, Penn State, University Park, PA
2OmniEarth, Arlington, VA
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*, Simon Yueh, Xiaolan Xu, Yunjin Kim, Kelly Elder, James Garrison
Abi Komanduru
1Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
2United States Forest Service, Fort Collins, CO
3Aeronautics 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, Namir Kassim, Mike Sulzer, John Abel
1Plasma Physics Division, Naval Research Laboratory, Washington, DC
2Aeronomy, Arecibo Observatory, Arecibo, PUERTO RICO
3Nanosat, TYVAK, Irvine, CA

11:00  HFG1-8
DISTRIBUTION OF COMMON-VOLUME LEO-BASED AND GROUND-BASED GNSS
IONOSPHERE OBSERVATIONS
Brian Bretsch*
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 Team²
¹The University of Manchester, Manchester, UNITED KINGDOM
²Various, Various, UNITED KINGDOM

09:00  J5-3
ON THE BLIND DETECTION OF FRBS THROUGH SPATIAL FOURIER TRANSFORMS
Marwan Alkhweldi*, Richard Prestage², Ryan Lynch², Natalia A. Schmid¹
¹Computer Science and Electrical Engineering, West Virginia University, Morgantown, WV
²National 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*, Namir Kassim¹, Wendy Peters¹, Scott Hyman²³, Paul Ray⁴, Julia Deneva⁵, Fernando Cardoso⁶, Simona Giacintucci³, Joseph Helmboldt¹, Tony Mroczkowski⁵, Emily Cleland⁷, Tracy Clarke¹
¹Remote Sensing Division, Naval Research Laboratory, Washington, DC
²Engineering and Physics, Sweet Briar College, Sweet Briar, VA
³Computational Physics Inc, Alexandria, VA
⁴Space Sciences Division, Naval Research Laboratory, Washington, DC
⁵National Research Council Postdoc, Washington, DC
⁶West Virginia University, Morgantown, WV
⁷Thomas 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 Kassim1, Paul Ray2, Wendy Peters1, Simona Giacintucci3, Joseph Helmboldt1, Tony Mroczkowski4, Emil Polisensky1
1Remote Sensing, Naval Research Laboratory, Washington, DC
2Space Sciences, Naval Research Laboratory, Washington, DC
3Computational Physics Inc, Springfield, VA
4NRC, Washington, DC

10:40 J6-2
PRELIMINARY MEASUREMENTS WITH THE EDGES LOW-BAND INSTRUMENT
Raul A. Monsalve*1, Judd D. Bowman1, Alan E. E. Rogers2, Thomas J. Mozdzen1
1School of Earth and Space Exploration, Arizona State University, Tempe, AZ
2Haystack 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 Dillon1,2, Jacqueline Hewitt1, Adrian Liu3, Avi Loeb3, Andrei Mesinger4, Abraham Neben1, Andre Offringa5, Jonathan Pober5,7, Max Tegmark1
1MIT Kavli Center for Astrophysics and Space Research, MIT, Cambridge, MA
2Astronomy, Berkeley, Berkeley, CA
3Center for Astrophysics, Harvard University, Cambridge, MA
4Scuolo Normale Superiore, Pisa, ITALY
5Netherlands Institute for Radio Astronomy, Dwingaloo, NETHERLANDS
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
*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 Ghaliechechian, 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*, Kristopher Buchanan
1Electrical and Computer Engineering, Johns Hopkins University, Elkridge, MD
2Electromagnetics 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*, David M. Le Vine, Yan Soldo, Gary Lagerloef, Thomas Meissner
1Cryospheric Sciences Lab, NASA Goddard Space Flight Center and Chapman University, Greenbelt, MD
2Cryospheric Sciences Lab, NASA Goddard Space Flight Center, Greenbelt, MD
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*, Jakob Van Zyl1, Mahta Moghaddam2, Leung Tsang2, Dara Entekhabi4, Simon Yueh1
1Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
2University of Southern California, Los Angeles, CA
3University of Michigan, Ann Arbor, MI
4Massachusetts 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*, Rajat Bindlish2, Peggy O'Neill3, Eni Njoku1, Tom Jackson2, Andreas Colliander1, Fan Chen2
1Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
2USDA ARS Hydrology and Remote Sensing Laboratory, Beltsville, MD
3NASA 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*, Roger Lang1, Peggy O'Neill2, Alicia Joseph2, Michael Cosh3, Wasyl Wasylkiwskyj1, Mehmet Ogut4
16:00  F6-8
**PALS (PASSIVE ACTIVE L-BAND SYSTEM) SOIL MOISTURE MEASUREMENTS IN SMAPVEX15 (SMAP VALIDATION EXPERIMENT 2015)**
Andreas Colliander¹, Sidharth Misra¹, Thomas Jackson², Chun-Sik Chae¹, Michael Cosh², Wade Crow², Simon Yueh¹
¹Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
²Hydrology and Remote Sensing Laboratory, USDA ARS, Beltsville, MD

16:20  F6-9
**L-BAND SOIL MOISTURE MAPPING USING A SMALL UNMANNED AERIAL SYSTEM**
Eryan Dai¹, Albin J. Gasiewski¹, Maciej Stachura², Jack Elston²
¹Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO
²Black 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
Ömker 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
INDOOR SENSING WITH UWB OFDM RADAR: EXPERIMENTAL FREQUENCY-DOMAIN APPROACH
Dmitriy Garmatyuk¹, Saba Mudaliar*², Melissa Simms¹
¹Miami University, Oxford, OH
²Air Force Research Laboratory, WPAFB, OH

Session G1: Space Plasma Measurement Techniques
Room 105
Co-Chairs: Tom Gaussiran, ARL:UT; Philip Erickson, MIT Haystack Observatory

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

MODIFICATION OF THE LF TRANSMIT SITE AT DIXON TO SUPPORT RF PROPAGATION AND IONOSPHERE RESEARCH
Doeg Rodriguez¹, Nicholas Lumdsen*¹, Peder Hansen², Laura Lukes³, Jill Nelson⁴, K.c. Kerby-Patel⁴, Filip Crowov⁴, William Liles⁵, John D. Rockway¹
¹SSC Pacific, San Diego, CA
²Long Wave Inc., Oklahoma City, OK
³George Mason University, Fairfax, VA
⁴University of Massachusetts at Boston, Boston, MA
⁵Indepedent, Reston, VA

AN MF/HF ANTENNA ARRAY FOR RADIO AND RADAR IMAGING OF THE IONOSPHERE
Terence Bullett¹, Bjorn Gustavsson², Brett Isham*³, Vasyl Belyey⁴
¹University of Colorado / NOAA, Boulder, CO
²University of Tromso, Tromso, NORWAY
³Interamerican University of Puerto Rico, Bayamon, PUERTO RICO
⁴Pinhole 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. Zabotin1,2

1Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO
2Cooperative Institute for Research in Environmental Sciences, University of Colorado at Boulder, Boulder, CO
3Space Weather Prediction Center, National Oceanic and Atmospheric Administration, Boulder, CO
4Institute of Space Science, Magurele, IF, ROMANIA

14:40 G1-5
MEASURING IONOSPHERIC RESPONSE TO SOLAR FLARE WITH DYNASONDES
Nikolay A. Zabotin*, Terence W. Bullet
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*, Tatiana V. Losseva1, Alexei Chermenin2
1Institute of Geospheres Dynamics, Moscow, RUSSIAN FEDERATION
2Aerophysics 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*, Tomoko Matsuo2, Wenbin Wang3, Xianan Yue4, Jann-Yenq Liu1
1Institute of Space Science, National Central University, Taoyuan, TAIWAN
2Space Weather Prediction Center, National Oceanic and Atmospheric Administration, Boulder, CO
3High Altitude Observatory, National Center for Atmospheric Research, Boulder, CO
4COSMIC program office, University Corporation for Atmospheric Research, Boulder, CO
16:40  G1-10
SCINTILLATION THEORY, IONOSPHERIC STRUCTURE CHARACTERIZATION, AND GLOBAL MODELS
Charles L. Rino*1, Charles S. Carrano2
1Institute for Scientific Research, Boston College, Menlo Park, CA
2Institute 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 Blanchard2, Geoff Crew3, Joe Greenberg4, Michael Hecht3,
Mareki Honma5, Makoto Inoue6, Christophe Jacques4, Richard Lacasse4, Lynn Matthews3,
Matias Mora4, Neil Nagar2, Nicolas Pradel6, Helge Rotteman7, Chester Rusczyk3,
Alejandro Saez8, Robert Treacy4, Alan Roy5, Walter Alef7, Ivan Marti-Vidal9, Rurik Primiani1
1Smithsonian Astrophysical Observatory, Cambridge, MA
2Universidad de Concepcion, Concepcion, CHILE
3MIT Haystack Observatory, Westford, MA
4National Radio Astronomy Observatory, Charlottesville, VA
5National Astronomical Observatory of Japan, Mitaka, Tokyo, JAPAN
6Academia Sinica Institute of Astronomy and Astrophysics, Taipei, TAIWAN
7Max Plank Institut f?r Radioastronomie, Bonn, GERMANY
8Joint ALMA Office, Vitacura, Santiago de Chile, CHILE
9Onsala 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*
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 Mundy², Doug Friedel¹, Peter Teuben², Marc Pound², Lisa Xu¹, Kevin Rauch², Robert Harris¹, Jeff Kern³
¹University of Illinois Urbana-Champaign, Urbana, IL
²University of Maryland, College Park, MD
³National 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