National Radio Science Meeting
4-7 January 2017
University of Colorado Boulder
Sponsored by USNC-URSI

TUESDAY EVENING, 3 January 2017

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

WEDNESDAY MORNING, 4 January 2017

Session H1: Waves and Turbulence in Space and Laboratory Plasmas I
Room 265

Co-Chairs: Bill Amatucci, *Naval Research Laboratory*;
Stephen Vincena, *University of California Los Angeles*

08:20 H1-1
KINETIC ALFVEN WAVES AND THE ACCELERATION OF AURORAL PARTICLES
Robert L. Lysak*, Yan Song
School of Physics and Astronomy, University of Minnesota, Minneapolis, MN

08:40 H1-2
ELECTROMAGNETIC TURBULENCE AND TRANSPORT IN HIGH β LABORATORY PLASMAS
Troy Carter*[1], Giovanni Rossi[1], Mj Pueschel[2], Paul Terry[2], Frank Jenko[1]
[1]*Physics and Astronomy, University of California Los Angeles, Los Angeles, CA*
[2]*Physics, University of Wisconsin, Madison, Madison, WI*

09:00 H1-3
GENERATION OF ALFVENIC QUASI-STATIONARY ELECTROMAGNETIC PLASMA STRUCTURES AND AURORAL PARTICLE ACCELERATION
Yan Song*, Robert L. Lysak
School of Physics and Astronomy, University of Minnesota, Minneapolis, MN

09:20 H1-4
NONLINEAR INTERACTIONS OF KINK-UNSTABLE FLUX ROPES AND SHEAR ALFVEN WAVES

Stephen Vincena*
University of California Los Angeles, Los Angeles, CA

09:40 H1-5
ELECTRON SLOSHING ASSOCIATED WITH INERTIAL ALFVEN WAVES
J. W. R. Schroeder*[1], F. Skiff[1], G. G. Howes[1], C. A. Kletzing[1], T. A. Carter[2], S. Vincena[2], S. Dorfman[2]
[1]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[2]*Physics and Astronomy, University of California, Los Angeles, CA*

10:00 Break

10:20 H1-6
TWO DIMENSIONAL LIF MEASUREMENTS AND POTENTIAL STRUCTURE OF ION BEAM FORMATION IN AN ARGON HELICON PLASMA
Evan M. Aguirre*[1], Timothy Good[2], Earl E. Scime[1]
[1]*Physics and Astronomy, West Virginia University, Morgantown WV*
[2]*Physics, Gettysburg College, Gettysburg PA*

10:40 H1-7
IN-FLIGHT INSTABILITIES OF DOUBLE PROBE ELECTRIC FIELD INSTRUMENTS: A SURVEY OF OBSERVATIONS AND ANALYSES
John W. Bonnell*
Space Sciences Laboratory, University of California, Berkeley, Berkeley, CA

11:00 H1-8
MAGNETOHYDRODYNAMIC INSTABILITIES IN JETS AND BUBBLES USING A COMPACT COAXIAL PLASMA GUN IN A BACKGROUND MAGNETIZED PLASMA
Mark Gilmore*[1], Yue Zhang[1], Dustin M. Fisher[1], Ben Walllace[1], Scott C. Hsu[2]
[1]*University of New Mexico, Albuquerque, NM*
[2]*Los Alamos National Laboratory, Los Alamos, NM*

Session B1: Advanced Theory and Applications of Metamaterials
Room 1B40
Co-Chairs: Ashwin Iyer, *University of Alberta;*
Filippo Capolino, *University of California, Irvine*

08:20 B1-1
BINARY HUYGENS' METASURFACE: A SIMPLE AND EFFICIENT RETROREFLECTOR AT NEAR-GRAZING ANGLES
Alex M. H. Wong*, Philip Christian, George V. Eleftheriades
Electrical and Computer Engineering, University of Toronto, Toronto, CANADA

08:40 B1-2
PERTURBATION THEORY APPLIED TO DIELECTRIC METAMATERIAL RESONATORS

Salvatore Campione, Larry K. Warne*, Lorena I. Basilio, William L. Langston, Michael B. Sinclair
Sandia National Laboratories, Albuquerque NM

09:00 B1-3
BROADBAND METAMATERIAL ABSORBERS IN THE VISIBLE SPECTRUM: EFFECT OF NANOPARTICLE SHAPE
Chinmay Garud*[1], Ahmed M. Hassan[1], Edward Garboczi[2]
[1]Computer Science and Electrical Engineering, University of Missouri Kansas City, Kansas City, MO
[2]Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO

09:20 B1-4
ENHANCED TRANSMISSION INTO LAYERED-PLASMONIC METAMATERIALS THROUGH K-SPACE HARMONIC COUPLING
Iman Aghanejad, Kenneth J. Chau, Loic Markley*
School of Engineering, University of British Columbia, Kelowna, BC, CANADA

09:40 B1-5
UNIVERSAL SPIN-MOMENTUM LOCKING OF LIGHT
Zubin Jacob*, Todd V. Mechelen
Electrical and Computer Engineering, Purdue University, West Lafayette, IN

10:00 Break

10:20 B1-6
NOVEL PROPAGATION MODEL OF DEGENERATE BAND EDGE MODES USING DUAL NON-IDENTICAL PAIR OF COUPLED TRANSMISSION LINES
Muhammed R. Zuboraj*, Kubilay Sertel, John L. Volakis
Electrical and Computer Engineering, Electroscience Laboratory, Columbus, OH

10:40 B1-7
THEORY OF EXCEPTIONAL POINTS OF DEGENERACY IN COUPLED WAVEGUIDES WITH BALANCED GAIN AND LOSS
Mohamed Othman*, Filippo Capolino
Electrical Engineering and Computer Science, University of California Irvine, Irvine, CA

11:00 B1-8
BOUNDARY CONDITIONS FOR MULTIPOLAR MEDIA DETERMINED FROM MAXWELL'S EQUATIONS AND CONSTITUTIVE RELATIONS
Arthur D. Yaghjian*
Electromagnetics Research Consultant, Concord, MA

11:20 B1-9

DESIGN OF DUAL-BAND LINEARLY AND CIRCULARLY POLARIZED MICROSTRIP PATCH ANTENNAS USING UNIPLANAR METAMATERIAL-BASED EBGS
Stuart Barth, Braden P. Smyth, Ashwin K. Iyer*
Electrical and Computer Engineering, University of Alberta, Edmonton, AB, CANADA

11:40 B1-10
RF CONTROLLED ATOM-VAPOR BASED MATERIAL FOR ELECTRIC FIELD METROLOGY
Christopher L. Holloway*, Matt T. Simons, Josh A. Gordon
National Institute of Standards and Technology, Boulder, CO

Session B2: Advances in CEM and Emerging Applications
Room 200
Co-Chairs: Branislav Notaros, *Colorado State University*;
Yahya Rahmat-Samii, *University of California Los Angeles*

08:20 B2-1
SURFACE INTEGRAL EQUATION DISCONTINUOUS GALERKIN (IEDG) METHOD WITH IMPEDANCE BOUNDARY CONDITION
Xuezhe Tien, Yongpin Chen, Jin-Fa Lee*
Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio

08:40 B2-2
COMPUTATIONAL ELECTROMAGNETICS WITH DISCRETE EXTERIOR CALCULUS
Shu Chen*[1], Weng C. Chew[2]
[1]*Physics, UIUC, Urbana-Champaign*
[2]*Electrical and Computer Engineering, UIUC, Urbana-Champaign*

09:00 B2-3
TOWARD NEXT-GENERATION BENCHMARKING OF CEM METHODS: COMPARING COMPUTATIONAL COSTS
Jackson W. Massey, Anton Menshov, Ali E. Yılmaz*
Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX

09:20 B2-4
FDTD ACCELERATION USING MATLAB AND PARALLEL COMPUTING TOOLBOX ON GPU CARDS
Joseph E. Diener*, Atef Z. Elsherbeni
Electrical Engineering and Computer Science, Colorado School of Mines, Golden, Colorado

09:40 B2-5
SYNTHESIZING THIN DIELECTRIC LENSES FOR CONICAL SCANNING BEAMS: A HYBRID NUMERICAL ALGORITHM
Jordan F. Budhu*, Yahya Rahmat-Samii
University of California Los Angeles, Los Angeles, CA

10:00 Break

10:20 B2-6
CHAOTIC HIGH-FIDELITY AND QUANTITATIVE STATISTICAL ANALYSIS IN WAVE SYSTEMS
Zhen Peng*[1], Shen Lin[1], Thomas Antonsen[2]
[1]*Electrical and Computer Engineering, University of New Mexico, Albuquerque, New Mexico*
[2]*University of Maryland College Park, MD*

10:40 B2-7
FIGURE OF MERIT FOR COMPUTATIONAL ELECTROMAGNETICS SOLVERS
Tayfun Ozdemir*[1], Robert J. Burkholder[2]
[1]*Virtual EM Inc., Ann Arbor, MI*
[2]*Ohio State University, Columbus, OH*

11:00 B2-8
PARALLEL COMPUTATION IN HIERARCHICALLY SEMISEPERABLE METHODS FOR SURFACE INTEGRAL EQUATIONS
Aaron P. Smull*, Ana B. Manic, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

11:20 B2-9
DIAGNOSING SPURIOUS CHERENKOV RADIATION FROM NUMERICAL DISPERSION ON UNSTRUCTURED GRIDS
Dong-Yeop Na*[1], Fernando L. Teixeira[1], Yuri A. Omelchenko[2]
[1]*The Ohio State University, Columbus, OH*
[2]*Trinum Research Inc., San Diego CA*

11:40 B2-10
FULL-WAVE SIMULATION OF METALLIC NANOPARTICLES USING QUADRILATERAL BARYCENTRIC BASIS FUNCTIONS
Michael Wei*, Weng C. Chew
Electrical and Computer Engineering, University of Illinois Urbana-Champaign, Champaign, IL

Session B3: Antennas
Room 245
Co-Chairs: Dejan Filipovic, *University of Colorado Boulder*;
Karl Warnick, *Brigham Young University*

08:20 B3-1
TRANSMITTING A BASEBAND SIGNAL THROUGH AN ELECTRICALLY SMALL ANTENNA
Majid Manteghi*
Virginia Tech, Blacksburg

08:40 B3-2
A REMOTE RADIATION PATTERN MEASUREMENT TECHNIQUE FOR ELECTRICALLY SMALL ANTENNAS
Majid Manteghi*
Virginia Tech, Blacksburg, VA

09:00 B3-3
EXPERIMENTAL DEMONSTRATION OF A SUPERDIRECTIVE HORN ANTENNA DESIGNED BY POYNTING STREAMLINE METHOD
Junming Diao*, Karl F. Warnick
ECEN, Brigham Young University, Provo, UT

09:20 B3-4
QUALITY FACTOR CALCULATIONS FOR THE CHARACTERISTIC MODES OF DIELECTRIC RESONATOR ANTENNAS
Binbin Yang*, Jacob J. Adams
Electrical and Computer Engineering, North Carolina State University, Raleigh, NC

09:40 B3-5
TUNABLE SIW CAVITY BACKED ACTIVE ANTENNA WITH CIRCULAR POLARIZATION
Farhad Farzami*, Seiran Khaledian, Besma Smida, Danilo Erricolo
University of Illinois at Chicago, Chicago, IL

10:00 Break

10:20 B3-6
MULTI-DIRECTIONAL, MULTI-POLARIZATION, AND MULTI-BAND RF ENERGY HARVESTING: MODELING AND DEVELOPMENT OF A HEMISPHERICAL MONOPOLE ARRAY
Bohan Zhang*, Joshua M. Kovitz, Yahya Rahmat-Samii
University of California Los Angeles, Los Angeles, CA

10:40 B3-7
FEED STUDY FOR WIDEBAND MILLIMETER-WAVE LUNEBURG LENS
Milica Notaros*, Carlos Mulero Hernandez, Maxim Ignatenko, Dejan S. Filipovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

11:00 B3-8
NOVEL LOW-PROFILE SURFACE-CONFORMING LEAKY-WAVE ANTENNAS FOR VERY HIGH PEAK POWER APPLICATIONS
Robert A. Koslover*[1], Sammuel M. Jalali[2], Greg R. Raith[3]
[1]*Scientific Applications & Research Associates (SARA), Inc., Tyler, TX*
[2]*Scientific Applications & Research Associates (SARA), Inc., Cypress, CA*
[3]*Scientific Applications & Research Associates (SARA), Inc., Irvine, CA*

11:20 B3-9
MODIFICATION, MODELING, AND MEASUREMENT OF A BALANCED ANTIPODAL VIVALDI FOR A MULTI-CHANNEL RECEIVER
Seth A. McCormick*[1], William O. Coburn[2]
[1]*United States Army Research Laboratory, Adelphi, MD*
[2]*General Technical Services LLC, Wall, NJ*

11:40 B3-10
COUPLING REDUCTION TECHNIQUES FOR WIDEBAND SIMULTANEOUS TRANSMIT AND RECEIVE ANTENNA SUBSYSTEMS
Prathap Valale Prasannakumar*, Mohamed A. Elmansouri, Dejan S. Filipovic
University of Colorado Boulder, Boulder, CO

Session FGH1: GNSS and Radio Beacon Remote Sensing I
Room 105

Co-Chairs: Clara Chew, *NASA Jet Propulsion Laboratory*;
Carl Siefring, *Naval Research Laboratory*;
Atilla Komjathy, *NASA Jet Propulsion Laboratory*

08:20 FGH1-1
JOINT ESTIMATION OF IONOSPHERE TEC, RECEIVER INTER-FREQUENCY BIASES, AND CARRIER AMBIGUITIES USING 3-FREQUENCY GPS MEASUREMENTS
Brian Breitsch*, Jade Morton
Electrical Engineering, Colorado State University, Fort Collins, CO

08:40 FGH1-2
MULTI-CONSTELLATION GNSS TEC MEASUREMENTS
YuXiang Peng*[1,2], Xavier E. Gomez[1], Wayne A. Scales[1,2]
[1]*Electrical & Computer Engineering, Virginia Tech, Blacksburg, VA*
[2]*Center for Space Science and Engineering Research, Virginia Tech, Blacksburg, VA*

09:00 FGH1-3
PFISR GPS TRACKING MODE FOR RESEARCHING HIGH-LATITUDE IONOSPHERIC ELECTRON DENSITY GRADIENTS ASSOCIATED WITH GPS SCINTILLATION
Diana C. Loucks*[1], Scott Palo[1], Marcin Pilinski[2], Geoff Crowley[2], Irfan Azeem[2], Don Hampton[3]
[1]*Aerospace Engineering Sciences, University of Colorado at Boulder, Boulder, CO*
[2]*Atmospheric & Space Technology Research Assoicates (ASTRA), Boulder, CO*
[3]*Geophysical Institute, University of Alask Fairbanks, Fairbanks, AK*

09:20 FGH1-4
USING GPS TEC MEASUREMENTS TO PROBE IONOSPHERIC STRUCTURE ASSOCIATED WITH SCINTILLATION
Erin H. Lay*[1], Peter A. Parker[1], Max E. Light[2]

[1]*ISR-2, Los Alamos National Laboratory, Los Alamos, NM*
[2]*AOT-AE, Los Alamos National Laboratory, Los Alamos, NM*

09:40 FGH1-5
ESTIMATION OF IONOSPHERIC IRREGULARITIES WITH A SCINTILLATION AURORAL GPS ARRAY
Yang Su*[1], Seebany Datta-Barua[1], Gary Bust[2], Kshitija Deshpande[3]
[1]*Illinois Institute of Technology, Chicago, IL*
[2]*Johns Hopkins University Applied Physics Laboratory, Laurel, MD*
[3]*Virginia Polytechnic Institute and State University, Blacksburg, VA*

10:00 Break

10:20 FGH1-6
THE RAMIFICATIONS OF CONFIGURATION-SPACE MODELS FOR GNSS SCINTILLATION
Charles L. Rino*, Charles S. Carrano, Keith M. Groves
Institute for Scientific Research, Boston, MA

10:40 FGH1-7
ASSESSMENT OF THE IMPACT OF FORMOSAT-7/COSMIC-2 GNSS RO OBSERVATIONS ON IONOSPHERE SPECIFICATION AND FORECAST USING OBSERVING SYSTEM SIMULATION EXPERIMENTS
Chih-Ting Hsu*[1], Tomoko Matsuo[2,3], Xinan Yue[4], Jann-Yenq Liu[1]
[1]*National Central University, Institute of Space Science, Tauyuan, TAIWAN*
[2]*University of Colorado at Boulder, Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder, Boulder, CO*
[3]*National Oceanic and Atmospheric Administration, Space Weather Prediction Center, Boulder, CO*
[4]*Chines Academy of Sciences, Institute of Geology and Geophysics, Beijing, CHINA*

11:00 FGH1-8
AIRBORNE MEASUREMENT OF SEA SURFACE MEAN SQUARE SLOPE IN 2008 HURRICANE IKE USING GNSS REFLECTIONS AND WIDE-SWATH RADAR ALTIMETER
Scott Gleason*[1], Valery Zavorotny[2], Dennis Akos[3], Edward Walsh[2]
[1]*Southwest Research Institute, Boulder, CO*
[2]*ESRL, NOAA, Boulder, CO*
[3]*University of Colorado Boulder, Boulder, CO*

11:20 FGH1-9
BEHAVIOR OF GNSS SIGNALS REFLECTED FROM AN OCEAN SURFACE AT WEAK WINDS
Valery U. Zavorotny*, Alexander G. Voronovich
NOAA/Earth System Research Laboratory, Boulder, CO

Session F1: RF Propagation Utilizing Numerical Weather Prediction
Room 150

Co-Chairs: Katherine Horgan, *Naval Surface Warfare Center Dahlgren Division*;
Tracy Haack, *Naval Research Laboratory - Marine Meteorology Division*

08:20 F1-1

RADIO FREQUENCY PROPAGATION MEASUREMENTS AND MODELING DURING THE TAPS 2013 FIELD CAMPAIGN

Tracy Haack*[1], Rachel Norris[1,2], Hedley Hansen[3], Andrew Kulessa[3,4]
[1]*Marine Meteorology Division, Naval Research Laboratory, Monterey, CA*
[2]*Electrical and Computer Engineering, University of Michigan, Ann Arbor, MI*
[3]*Cyber and Electronic Warfare Division, Defence Science and Technology Organisation, Adelaide, Queensland, AUSTRALIA*
[4]*Airborne Research Australia, Adelaide, Queensland, AUSTRALIA*

08:40 F1-2

MULTI-WAVELENGTH STUDY OF SPATIO-TEMPORAL RADIO FREQUENCY EMITTER DETECTION RANGE USING NUMERICAL WEATHER PREDICTION FORECASTS OF NON-STANDARD PROPAGATION

Rob Marshall*
Mount Pleasant Meteorology, Woodford, VA

09:00 F1-3

ANALYSIS OF US NAVY EM AND NWP MODELS USING WALLOPS 2000 EXPERIMENTATION DATA

Steven Strang*[1], Tracy Haack[2], Zach Liebowitz[1]
[1]*Naval Research Lab, Washington, DC*
[2]*Naval Research Lab, Monterey, CA*

09:20 F1-4

A REVIEW OF REFRACTIVITY STRUCTURE MATCHING AS A PRE-PROCESSING COMPONENT WHEN CONSIDERING ITS USE WITH NUMERICAL WEATHER PREDICTION

Katherine Horgan*, Edward Burgess, William Thornton, Victor Wiss
Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA

09:40 F1-5

UPDATES AND VALIDATION FOR THE NAVY ATMOSPHERIC VERTICAL SURFACE LAYER MODEL (NAVSLAM)

Paul A. Frederickson*
Meteorology, Naval Postgraduate School, Monterey, CA

10:00 Break

10:20 F1-6

HULL-MOUNTED SEA SURFACE MEASUREMENTS IN THE NORTH ATLANTIC FOR RF PERFORMANCE PREDICTIONS

Rick L. Navarro*[1], Amalia Barrios[1], Katherine Horgan[2], Vincent van Leijen[3], Erik van de Pol[3], Tjarda Wilbrink[3], Fok Bolderheij[4], Earl M. Williams[1]
[1]*Space and Naval Warfare Systems Center Pacific, San Diego, CA*
[2]*Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA*
[3]*Knowledge, Innovation, eXperimentation and Simulation (KIXS), Defense Material Organisation, Den Helder, NL, NETHERLANDS*
[4]*Netherlands Defense Academy, Den Helder, NL, NETHERLANDS*

10:40 F1-7

ROUGH OCEAN SURFACE EFFECTS ON GENETIC ALGORITHM INVERSIONS FOR ESTIMATING EVAPORATION DUCT REFRACTIVITY PROFILES

Stephen E. Penton*, Erin E. Hackett
Coastal and Marine Systems Science, Coastal Carolina University, Conway, SC

11:00 F1-8

FURTHER STUDIES OF THE X-BAND BEACON-RECEIVER PHASED ARRAY AND EVAPORATION DUCT HEIGHT ESTIMATION

Jonathan M. Pozderac*[1], Joel T. Johnson[1], Caglar Yardim[1], Craig F. Merrill[2], Tom Cook[3], Tony de Paolo[3], Eric Terrill[3], Frank J. Ryan[4], Paul Frederickson[5]
[1]*ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Carderock Division, NSWC, West Bethesdam, MD*
[3]*UC San Diego, Scripps Institution of Oceanography, San Diego, CA*
[4]*Applied Technology Inc., San Diego, CA*
[5]*Meteorology, Naval Postgraduate School, Monterey, CA*

11:20 F1-9

A TECHNIQUE TO EVALUATE NUMERICAL WEATHER PREDICTION PERFORMANCE: AN ENGINEERING PERSPECTIVE

Stephanie Billingsley*[1], Katherine Horgan[1], William Thornton[1], Qing Wang[2], Tracey Haack[3]
[1]*Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA*
[2]*Naval Postgraduate School, Monterey, CA*
[3]*Marine Meteorology Division, Naval Research Laboratory, Monterey, CA*

11:40 F1-10

NUMERICAL COMPUTATION OF FADING DEPTH FOR TROPOSPHERIC SCINTILLATION

Swagato Mukherjee*[1], Caglar Yardim[1], Qing Wang[2]
[1]*Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Naval Postgraduate School, Monterey, CA*

Session D1: Solid-State RF Power Amplifiers

Room 135

Co-Chairs: Zoya Popovic, *University of Colorado Boulder*;

Charles Baylis, *Baylor University*

08:20 D1-1
DEVELOPMENT OF A WIDEBAND CLASS-E POWER AMPLIFIER WITH HIGH EFFICIENCY
Farshid Tamjid*, Matthew Richardson, Ahmadreza Ghahremani, Aly E. Fathy
Electrical Engineering and Computer Science, University of Tennessee Knoxville, Knoxville, TN

08:40 D1-2
OPTIMIZATION OF LOAD IMPEDANCE AND BIAS VOLTAGE FOR POWER-ADDED EFFICIENCY, DELIVERED POWER, AND ADJACENT-CHANNEL POWER RATIO USING THE BIAS SMITH TUBE
Matthew W. Fellows*[1], Sarvin Rezayat[1], Alicia Magee[1], Charles Baylis[1], Lawrence Cohen[2], Robert J. Marks II[1]
[1]*Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington, DC*

09:00 D1-3
A 52GHZ MMIC POWER AMPLIFIER WITH 28DBM OUTPUT POWER USING 90-NM GAN-ON-SIC TECHNOLOGY
Mauricio E. Pinto*, Zoya Popovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

09:20 D1-4
CAVITY AND AMPLIFIER DESIGN FOR A SOLID-STATE MICROWAVE OVEN
Dubari Borah, Priya Vemparala Guruswamy, Patrick Bluem, Matthew Cullen*, Zoya Popovic
Electrical Engineering, University of Colorado Boulder, Boulder, CO

09:40 D1-5
HIGH POWER TEST OF X-BAND ACCELERATOR CAVITY POWERED BY SOLID STATE RF SOURCE
Mohamed Othman*[1,2], Emilio A. Nanni[2], Valery Dolgashev[2], Sami Tantawi[2], Jeff Neilson[2]
[1]*University of California, Irvine, Irvine, CA*
[2]*SLAC National Accelerator Laboratory, Menlo Park, CA*

Session B4: Scattering
Room 151

Co-Chairs: Alex Yuffa, *National Institute of Standards and Technology*; Piergiorgio Uslenghi, *University of Illinois at Chicago*

08:20 B4-1
ELECTROMAGNETIC SCATTERING BY A TRUNCATED CONCAVE PARABOLIC CYLINDER
Piergiorgio L. E. Uslenghi*
University of Illinois at Chicago, Chicago, IL

08:40 B4-2
SCATTERING OF SHORT PULSES BY CANONICAL METALLIC OBJECTS
D V. Giri*[1], F M. Tesche[2], W D. Prather[3]
[1]*PRO-TECH, ALAMO*
[2]*EM Consultant (Retired), Lakeville, CT*
[3]*Air Force Research Laboratory, Kirtland AFB, NM*

09:00 B4-3
SCATTERING BY A SKEW TRIHEDRAL REFLECTOR
Piergiorgio L. E. Uslenghi*
University of Illinois at Chicago, Chicago, IL

09:20 B4-4
SURFACE INTEGRAL EQUATION FORMULATION OF ELECTROMAGNETIC SCATTERING FOR CLOAKING APPLICATIONS
Alex J. Yuffa*
RF Technology Division, National Institute of Standards and Technology, Boulder, CO

09:40 B4-5
METALLIC OGIVAL RESONATORS PARTIALLY FILLED WITH DNG METAMATERIAL
Piergiorgio L. E. Uslenghi*
University of Illinois at Chicago, Chicago, IL

Session G1: Space-based Ionospheric Measurements
Room 155
Co-Chairs: Paul Bernhardt, *Naval Research Laboratory*;
Nicolas Lee, *Stanford University*

08:20 G1-1
A PROPAGATION MODEL FOR GEOLOCATING IONOSPHERIC IRREGULARITIES ALONG RADIO OCCULTATION RAY-PATHS
Charles S. Carrano*, Keith M. Groves, Charles L. Rino, William J. McNeil
Boston College, Chestnut Hill, MA

08:40 G1-2
OVERVIEW OF DATA RECORDED TO-DATE BY THE E-POP RADIO RECEIVER INSTRUMENT (RRI)
Gordon James*[1], Gareth Perry[2], Andrew Yau[2]
[1]*Retired, Ottawa, ON, CANADA*
[2]*Physics and Astronomy, University of Calgary, Calgary, AB, CANADA*

09:00 G1-3
DETECTION OF SMALL-SCALE PLASMA DENSITY IRREGULARITIES WITH E-POP RRI

Gareth W. Perry*, Harry G. James, Robert G. Gillies, Andrew W. Yau
Physics and Astronomy, University of Calgary, Calgary, Alberta, CANADA

09:20 G1-4
HF RADAR FOR LARGE AREA SEA MAPPING WITH GROUND-IONOSPHERE-OCEAN-SPACE (GIOS)
Paul A. Bernhardt*[1], Stanley J. Briczinski[1], Carl L. Siefring[1], Donald E. Barrick[2], Jehu Bryant[3], Andrew Howarth[4], H G. James[4], Andrew Yau[4]
[1]*Code 6754, Naval Research Laboratory, Washington, DC*
[2]*Code Oceans Systems, Menlo Park, CA*
[3]*Raytheon IIS, Chesapeake, VA*
[4]*Physics and Astronomy, University of Calgary, Calgary, AB, CANADA*

09:40 G1-5
THE INFLUENCE OF ATMOSPHERIC GRAVITY WAVES EXCITED BY DEEP CONVECTION ON THE IONOSPHERE
Sharon Vadas*
CoRA, NorthWest Research Associates/CoRA, Boulder, CO

10:00 Break

10:20 G1-6
THE IONOSPHERIC CONNECTION EXPLORER: MISSION DESIGN AND PERFORMANCE
Thomas J. Immel*
University of California Berkeley, Berkeley, CA

10:40 G1-7
GLOBAL-SCALE QUANTIFICATION OF IONOSPHERIC STATE FROM UV REMOTE SENSING ONBOARD THE IONOSPHERIC CONNECTION EXPLORER (ICON)
Farzad Kamalabadi*[1], Andrew W. Stephan[2], Robert R. Meier[2], Jianqi Qin[1], Jonathan J. Makela[1], Stephen B. Mende[3], Harald U. Frey[3], Jerry Edelstein[3], Eric Korpela[3], Scott England[3], Thomas J. Immel[3]
[1]*University of Illinois at Urbana-Champaign, Urbana, IL*
[2]*Naval Research Laboratory, Washington, DC*
[3]*University of California, Berkeley, CA*

11:00 G1-8
ADVANCING IONOSPHERIC OBSERVATIONS WITH THE GLOBAL-SCALE OBSERVATIONS OF THE LIMB AND DISK (GOLD) MISSION
Richard W. Eastes*[1], Alan G. Burns[2], Stanley C. Solomon[2], William E. McClintock[3]
[1]*Florida Space Institute, University of Central Florida, Orlando, FL*
[2]*High Altitude Observatory, National Center for Atmospheric Research, Boulder, CO*
[3]*Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO*

11:20 G1-9

IT-SPINS: A CUBESAT MISSION TO IMAGE THE NOCTURNAL IONOSPHERE
Gary S. Bust[1], Romina Nikoukar*[1], Rick Doe[2], David M. Klumpar[3]
[1]*Johns Hopkins University Applied Physics Laboratory, Laurel, MD*
[2]*SRI International, Menlo Park, CA*
[3]*Montana State University, Bozeman, MT*

11:40 G1-10
DETAILED CHARACTERISTICS OF RADIATION BELT ELECTRONS REVEALED BY CSSWE/REPTILE MEASUREMENTS
Kun Zhang*[1,2], Xinlin Li[1,2], Quintin Schiller[3], David Gerhardt[2], Hong Zhao[1], Robyn Millan[4]
[1]*LASP, University of Colorado, Boulder, Boulder, CO*
[2]*Aerospace Engineering Sciences, University of Colorado, Boulder, Boulder, CO*
[3]*Heliophysics Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*Physics and Astronomy, Dartmouth College, Hanover, NH*

Session J1: New Telescopes, Techniques and Technology I
Math 100
Co-Chairs: David DeBoer, *University of California*;
Jeffery Mangum, *National Radio Astronomy Observatory*

08:20 J1-1
MURCHISON WIDEFIELD ARRAY: HIGHLIGHTS AND PLANS
Randall B. Wayth, Adrian Sutinjo*
ICRAR/Curtin Institute of Radio Astronomy, Curtin University, Perth, WA, AUSTRALIA

08:40 J1-2
ENABLING DETECTION OF THE EPOCH OF REIONIZATION WITH NEXT-GENERATION RADIO INSTRUMENTS
Nithyanandan Thyagarajan*[1], Aaron R. Parsons[2], David R. DeBoer[2], Judd D. Bowman[1]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Astronomy, University of California, Berkeley, Berkeley, CA*

09:00 J1-3
MEERKAT STATUS UPDATE
Schalk W. Esterhuyse*
Engineering, SKA South Africa, Pinelands, SOUTH AFRICA

09:20 J1-4
PROGRESS ON HIRAX, THE HYDROGEN INTENSITY AND REAL-TIME ANALYSIS EXPERIMENT
Benjamin R. Saliwanchik*
Mathematics, Statistics, and Computer Science, University of KwaZulu-Natal, Durban, KwaZulu-Natal, SOUTH AFRICA

09:40 J1-5

ADVANCES IN 21CM EOR IMAGING PIPELINES
Adam P. Beardsley*
Arizona State University, Tempe, AZ

10:00 Break

10:20 J1-6
MITIGATING SPECTRAL LEAKAGE IN DELAY FILTERED PAPER-64 VISIBILITIES USING FOREGROUND SUBTRACTION
Joshua R. Kerrigan*, Jonathan C. Pober
Physics, Brown University, Providence, RI

10:40 J1-7
INTERFEROMETRIC BANDPASS CALIBRATION WITH REDUNDANT BASELINES FOR 21 CM COSMOLOGY
Joshua S. Dillon*, Hydrogen Epoch of Reionization Array (HERA) Collaboration
University of California Berkeley, Berkeley, CA

11:00 J1-8
CONSTRAINING THE GLOBAL REDSHIFTED 21-CM SIGNAL WITH EDGES IN THE RANGE $14.8 > Z > 6.5$
Raul A. Monsalve*[1], Judd D. Bowman[2], Alan E. E. Rogers[3], Thomas J. Mozdzen[2]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Arizona State University, Tempe, AZ*
[3]*Massachusetts Institute of Technology, Westford, MA*

11:20 J1-9
CALIBRATION REQUIREMENTS FOR DETECTING THE 21CM EPOCH OF REIONIZATION POWER SPECTRUM AND IMPLICATIONS FOR THE SKA
Nichole Barry*[1], Bryna Hazelton[1,2], Ian Sullivan[3], Miguel F. Morales[1], Jonathan C. Pober[4]
[1]*Physics, University of Washington, Seattle, WA*
[2]*eScience Institute, University of Washington, Seattle, WA*
[3]*Astronomy, University of Washington, Seattle, WA*
[4]*Physics, Brown University, Providence, RI*

11:40 J1-10
SEARCHING FOR COSMIC DAWN FROM THE SUB-ANTARCTIC WITH SCI-HI
Hsin C. Chiang*
University of KwaZulu-Natal, Durban, SOUTH AFRICA

12:00 J1-11
RESULTS FROM THE LATEST COMMISSIONING RUN OF A CRYOGENICALLY COOLED PHASED ARRAY FEED FOR THE GREEN BANK TELESCOPE
Nickolas M. Pingel*[1], Richard Black[2], Dj Pisano[1], Brian Jeffs[2]
[1]*Astronomy, West Virginia University, Morgantown, WV*
[2]*Electrical Engineering, Brigham Young University, Provo, UT*

Session D2: Linear and Nonlinear Devices
Room 135
Co-Chairs: Zoya Popovic, *University of Colorado Boulder*;
Leonardo Ranzani, *Raytheon BBN Technologies*

10:20 D2-1
SUPERCONDUCTING PARAMETRIC DEVICES FOR QUANTUM INFORMATION PROCESSING
Leonardo M. Ranzani*, Kin C. Fong, Thomas A. Ohki
Raytheon BBN Technologies, Cambridge, MA

10:40 D2-2
ENHANCEMENT OF BACKSCATTER TAGS EFFICIENCY BY MEANS OF LOW-POWER TRANSISTOR-BASED REFLECTION AMPLIFIER AND QPSK MODULATOR
Seiran Khaledain*, Farhad Farzami, Besma Smida, Danilo Erricolo
University of Illinois at Chicago, Chicago, Illinois

11:00 D2-3
STUDY OF NONLINEAR TRANSMISSION LINE PARAMETERS AND THEIR EFFECT ON OUTPUT HARMONIC GENERATION
Caitlyn Cooke, Philip Zurek*, Zoya Popovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

11:20 D2-4
COMPARISON OF GAIN OPTIMIZATION TECHNIQUES ON RECONFIGURABLE POWER AMPLIFIERS WITH A REAL-TIME VARACTOR TUNING NETWORK
Zachary Hays*[1], Lucilia Lamers[1], Charles Baylis[1], Robert Marks[1], Ed Viveiros[2], Ali Darwish[2], John Penn[2], Abigail Hedden[2]
[1]*WMCS, Baylor University, Waco, TX*
[2]*Army Research Laboratory, Adelphi, MD*

11:40 D2-5
PARITY-TIME-RECIPROCAL SYMMETRY IN RADIO-FREQUENCY ELECTRONICS
Maryam Sakhdari*, Pai-Yen Chen
Electrical and Computer Engineering, Wayne State University, Detroit, MI

12:00 D2-6
BREAKDOWN LIMITED CAPACITORS
Richard W. Kenyon*, Frank Barnes
University of Colorado Boulder, Boulder, CO

Session B5: Liquid Metal Antennas

Room 151
Co-Chairs: Jacob Adams, *North Carolina State University*;
William Davis, *Virginia Tech*

10:20 B5-1
DESIGN AND ANALYSIS OF FEED TECHNIQUES FOR RECONFIGURABLE LIQUID-METAL MONOPOLE ANTENNAS
Jonathan T. Thews*[1], Alan J. Michaels[1], William Davis[2]
[1]*Hume Center, Virginia Tech, Blacksburg, VA*
[2]*Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA*

10:40 B5-2
ANALYSIS OF THE LINEARITY AND TUNING RANGE OF FREQUENCY RECONFIGURABLE ANTENNAS USING LIQUID METALS
Meng Wang*, Ian Kilgore, Michael B. Steer, Jacob J. Adams
Electrical and Computer Engineering, North Carolina State University, Raleigh, NC

11:00 B5-3
HIGHLY TUNABLE, ULTRASTRETCHABLE LIQUID METAL WIRE ANTENNAS
Clifford A. Muchler*[1], Ying Liu[2], Michael D. Dickey[2], Jacob J. Adams[1]
[1]*Electrical and Computer Engineering, North Carolina State University, Raleigh NC*
[2]*Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC*

11:20 B5-4
ANALYSIS OF PARASITIC EFFECTS OF SODIUM HYDROXIDE (NAOH) ELECTROLYTE ON LIQUID-METAL MONOPOLE ANTENNAS
Jonathan T. Thews*, Alan J. Michaels
Hume Center, Virginia Tech, Blacksburg, VA

11:40 B5-5
CONFORMAL LOG PERIODIC FOLDED SLOT ARRAY ANTENNA WITH FRESH WATER FILLED CAVITY BACKING FOR OPERATION IN GLACIAL ICE
Omkar P. Pradhan*, Albin J. Gasiewski, Srikumar Sandeep
University of Colorado Boulder, Boulder, CO

WEDNESDAY AFTERNOON, 4 January 2017

Session H2: Physics of the Radiation Belts I
Room 265
Co-Chairs: Christopher Crabtree, *Naval Research Laboratory*;
Craig Kletzing, *University of Iowa*

13:20 H2-1
OBSERVATIONS OF ENERGETIC ELECTRON PRECIPITATION BY THE BARREL BALLOON CAMPAIGNS
John Sample*[1], Robyn Millan[2]

[1]*Montana State University, Bozeman, MT*
[2]*Dartmouth College, Hanover, NH*

13:40 H2-2
VAN ALLEN PROBE MULTIPOINT MEASUREMENTS OF THE SPATIAL AND COHERENCE SCALES OF EMIC WAVES
Lauren W. Blum*[1], John W. Bonnell[2], Oleksiy Agapitov[2]
[1]*NASA/GSFC, Greenbelt, MD*
[2]*Space Sciences Lab, University of California Berkeley, Berkeley, CA*

14:00 H2-3
VAN ALLEN PROBES OBSERVATIONS OF OXYGEN CYCLOTRON HARMONIC WAVES IN THE INNER MAGNETOSPHERE
Maria E. Usanova*[1], David M. Malaspina[1], Allison N. Jaynes[1], Robert Bruder[2], Ian R. Mann[3], John R. Wygant[4], Robert E. Ergun[1]
[1]*LASP, Boulder, CO*
[2]*University of Colorado, Boulder, CO*
[3]*University of Alberta, Edmonton, AB, CANADA*
[4]*University of Minnesota, Minneapolis, MN*

14:20 H2-4
THE VIRTUES OF PARAMETERIZING PLASMASPHERIC HISS (AND OTHER INNER MAGNETOSPHERE WAVE MODES) BY PLASMAPAUSE LOCATION
David M. Malaspina*[1], Allison N. Jaynes[1], Jacob Bortnik[2], Robert E. Ergun[1], Craig Kletzing[3], John R. Wygant[4]
[1]*Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO*
[2]*Atmospheric and Oceanic Sciences, University of California, Los Angeles, Los Angeles, CA*
[3]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[4]*Physics and Astronomy, University of Minnesota, Minneapolis, MN*

14:40 H2-5
USING COLD PLASMA THEORY AND WHISTLER MODE WAVES TO CHARACTERIZE THE ANTENNA-SHEATH IMPEDANCE OF THE VAN ALLEN PROBES EFW INSTRUMENT
David P. Hartley*[1], Craig A. Kletzing[1], William S. Kurth[1], George B. Hospodarsky[1], Scott R. Bounds[1], Terrance F. Averkamp[1], John W. Bonnell[2], Ondrej Santolik[3,4], John R. Wygant[5]
[1]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[2]*Space Sciences Laboratory, University of California, Berkeley, CA*
[3]*Space Physics, Institute of Atmospheric Physics, Prague, CZECH REPUBLIC*
[4]*Mathematics and Physics, Charles University, Prague, CZECH REPUBLIC*
[5]*Physics and Astronomy, University of Minnesota, Minneapolis, MN*

15:00 Break

15:20 H2-6

MODELING VERY LOW FREQUENCY RADIO INPUTS TO THE RADIATION BELTS
Michael J. Starks*[1], Alan G. Ling[2], Steven M. O'Malley[2]
[1]*Space Vehicles Directorate, Air Force Research Laboratory, Kirtland AFB, NM*
[2]*Atmospheric and Environmental Research, Inc, Lexington, MA*

15:40 H2-7
WARM PLASMA RAYTRACING OF WHISTLER MODE WAVES IN THE EARTH'S MAGNETOSPHERE
Ashanthi S. Maxworth*, Mark Golkowski
Electrical Engineering, University of Colorado Denver, Denver, CO

16:00 H2-8
WHISTLER-MODE WAVES DETECTED BY THE VAN ALLEN PROBES SATELLITES INSIDE DENSITY DUCTS IN THE MAGNETOSPHERE
Anatoly V. Streltsov*, Miles T. Bengtson
Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL

16:20 H2-9
A NEW APPROACH TO LOCATE IONOSPHERIC EXIT POINTS OF MAGNETOSPHERIC WHISTLER MODE EMISSIONS
Poorya Hosseini*, Hamid Chorsi, Mark Golkowski, Stephen Gedney
Electrical Engineering, University of Colorado Denver, Denver, CO

16:40 H2-10
STUDYING THE RELATIONSHIP BETWEEN ENERGETIC PARTICLE INJECTIONS, CHORUS, AND OUTER RADIATION BELT ELECTRONS WITH NASA'S MMS AND VAN ALLEN PROBES
Drew L. Turner*[1], Joe Fennell[1], J. Bernard Blake[1], Allison Jaynes[2], Dan Baker[2], Rick Wilder[2], Geoff Reeves[3], Wen Li[4], Craig Kletzing[5], Ian Cohen[6], Barry Mauk[6]
[1]*The Aerospace Corporation, El Segundo, CA*
[2]*LASP - University of Colorado, Boulder, CO*
[3]*Los Alamos National Lab, Los Alamos, NM*
[4]*University of California, Los Angeles, Los Angeles, CA*
[5]*University of Iowa, Iowa City, IA*
[6]*Applied Physics Lab, Laurel, MD*

Session B6: Complex Media and Nanoelectromagnetics
Room 1B40
Co-Chairs: Edward Kuester, *Univ. of Colorado*;
Christos Argyropoulos, *University of Texas at Austin*

13:20 B6-1
A NOVEL V-BAND SINGLE-LAYER CP-FPC MADE OF CIRCULAR-POLARIZED CAPACITIVE-METALLIC FSS WITH A LINEAR-POLARIZED FEEDING ANTENNA
Saman Kabiri*, Alister Hosseini, Evangelos Kornaros, Franco De Flaviis

University of California Irvine, Irvine, CA

13:40 B6-2
POLARIZATION-INSENSITIVE KU-BAND FREQUENCY SELECTIVE SURFACE (FSS)
Atieh Talebzadeh*[1], Ali Foudazi[2], Kristen M. Donnell[2], David J. Pommerenke[1]
[1]*Electrical and Computer Engineering, Missouri University of Science and Technology, EMC Lab, Rolla, MO*
[2]*Electrical and Computer Engineering, Missouri University of Science and Technology, Applied Microwave Nondestructive Testing Laboratory (AMNTL), Rolla, MO*

14:00 B6-3
GRAPHENE METASURFACES TO DESIGN BROADBAND POLARIZERS AND NON-RECIPROCAL DEVICES
Tianjing Guo*, Christos Argyropoulos
Electrical and Computer Engineering, University of Nebraska-Lincoln, Lincoln, NE

14:20 B6-4
MUTUAL COUPLING REDUCTION IN APERTURE-COUPLED PATCH ANTENNAS FED BY ORTHOGONAL SIW LINE BY METASURFACE
Ali Foudazi*, Kristen M. Donnell
Electrical and Computer Engineering, Missouri University of Sceicene and Technology, Applied Microwave Nondestructive Testing Laboratory (AMNTL), Rolla, MO

14:40 B6-5
NONLINEAR PLASMONIC METASURFACES TO ENHANCE FOUR-WAVE MIXING
Boyuan Jin*, Christos Argyropoulos
Electrical and Computer Engineering, University of Nebraska - Lincoln, Lincoln, NE

15:00 Break

15:20 B6-6
GIANT FIELD AND RADIATIVE EMISSION ENHANCEMENT IN ANISOTROPIC EPSILON-NEAR-ZERO SLABS
Mohammad Kamandi*, Caner Guclu, Filippo Capolino
University of California Irvine, Irvine, CA

15:40 B6-7
EXTRAORDINARY TRANSMISSION OF AN ELECTROMAGNETIC WAVE THROUGH A DIELECTRIC -LOADED SLOT IN A METALLIC SHIELD OF FINITE THICKNESS
Abdulaziz Haddab*, Edward Kuester
University of Colorado Boulder, Boulder, CO

16:00 B6-8
MAGNETIC NANOANTENNAS EXCITED BY AZIMUTHALLY POLARIZED BEAMS
Mehdi Veysi*, Caner Guclu, Mahsa Darvishzadeh-Varcheie, Filippo Capolino
University of California Irvine, Irvine, CA

16:20 B6-9
SUPERRADIANCE, SUBRADIANCE AND PT-SYMMETRY WITH PLASMONIC NANOCHANNELS
Ying Li*, Christos Argyropoulos
Electrical and Computer Engineering, University of Nebraska-Lincoln, Lincoln, NE

16:40 B6-10
CHARACTERISTIC MODE ANALYSIS OF CONDUCTIVE NANOWIRES AND MICROWIRES
Daniel S. Kiddle*[1], Ethan J. Wilcox[1], Ahmed M. Hassan[1], Edward J. Garboczi[2]
[1]*Computer Science Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO*
[2]*(2) Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO*

17:00 B6-11
ELECTROMAGNETIC SCATTERING FROM CRUMPLED GRAPHENE FLAKES
Kalyan C. Durbhakula*[1], Ahmed M. Hassan[1], Deb Chatterjee[1], Fernando Vargas- Lara[2], Jack F. Douglas[2], Edward J. Garboczi[3]
[1]*Computer Science and Electrical Engineering, University of Missouri - Kansas City, Kansas City, MO*
[2]*Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD*
[3]*Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO*

Session B7: Magnetic Resonance Imaging
Room 200
Co-Chairs: Branislav Notaros, *Colorado State University*;
Zoya Popovic, *University of Colorado Boulder*;
Erdem Topsakal, *Virginia Commonwealth University*

13:20 B7-1
HIGH POWER, HIGH SPEED CONTROL DEVICE MODELS FOR MRI APPLICATIONS
Robert Caverly*
Villanova University, Villanova, PA

13:40 B7-2
ELECTROMAGNETIC ANALYSIS OF ACTIVE IMPLANTABLE MEDICAL DEVICES DURING MRI EXPOSURE USING A SCHUR-COMPLEMENT INTEGRAL-EQUATION METHOD
Jackson W. Massey*[1], Yaniv Brick[2], Ali E. Yılmaz[1,2]

[1]*Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX*
[2]*Institute of Computational Engineering and Sciences, The University of Texas at Austin, Austin, TX*

14:00 B7-3
STANDARDIZED PHANTOMS FOR QUANTITATIVE MRI
Kathryn E. Keenan*, Michael A. Boss, Karl F. Stupic, Stephen E. Russek
National Institute of Standards and Technology, Boulder, CO

14:20 B7-4
UNCONVENTIONAL DESIGNS OF RF PROBES FOR HIGH-FIELD MRI TO ENHANCE MAGNETIC FIELD UNIFORMITY
Elena Semouchkina*[1], Navid Gandji[1], Bahram Seifi[1], Gangchea Lee[2], Seokwon Jung[2], Michael Lanagan[2], Thomas Neuberger[2]
[1]*Michigan Technological University, Houghton, MI*
[2]*Pennsylvania State University, University Park, PA*

14:40 B7-5
EXCITATION PROBES FOR ULTRA-HIGH FIELD MAGNETIC RESONANCE IMAGING
Patrick Bluem*[1], Andrew Kiruluta[2], Pierre-Francois Van de Moortele[3], Gregor Adriany[3], Zoya Popovic[1]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Harvard University, Cambridge, MA*
[3]*Center for Magnetic Resonance Research, University of Minnesota, Minneapolis, MN*

15:00 Break

15:20 B7-6
MAGNETIC RESONANCE IMAGING AT THE BOUNDARY OF QUASI-STATIC TO FAR-FIELD RF REGIME
Andrew M. Kiruluta*[1], Patrick Bluem[2], Zoya Popovic[2], Pierre-Francois Van de Moortel[3], Branislav M. Notaros[4]
[1]*Physics, Harvard University, Cambridge MA*
[2]*ECEE, University of Colorado, Boulder, CO*
[3]*Radiology, University of Minnesota, Minneapolis, MN*
[4]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*

15:40 B7-7
IMPROVEMENTS TO TRAVELING-WAVE MRI SENSITIVITY AND HOMOGENEITY USING THIN METAMATERIAL BORE LINERS
Justin G. Pollock[1], Navid Hosseini[2], Nicola De Zanche[1], Ashwin K. Iyer*[1]
[1]*Electrical and Computer Engineering, University of Alberta, Edmonton, Alberta, CANADA*
[2]*Electrical and Electronics Engineering, Middle East Technical University, Ankara, TURKEY*

16:00 B7-8

ELECTRO-TEXTILES AS POTENTIAL CANDIDATE OF FLEXIBLE MRI RF COIL FOR STROKE PREVENTION
Daisong Zhang*, Yahya Rahmat-Samii
Electrical Engineering, University of California Los Angeles, Los Angeles, CA

16:20 B7-9
HIGH AND ULTRA-HIGH FIELD MAGNETIC RESONANCE IMAGING RF COIL DESIGNS AND OPTIMIZATION
Pranav S. Athalye*[1], Milan M. Ilic[1,2], Andrew J. M. Kiruluta[3], Pierre-Francois Van de Moortele[4], Branislav M. Notaros[1]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*Electrical Engineering, University of Belgrade, Belgrade, Serbia, YUGOSLAVIA*
[3]*Radiology, Massachusetts General Hospital, Harvard Medical school, Boston, MA*
[4]*Radiology, University of Minnesota, Minneapolis, MN*

Session B8: Inverse Scattering and Remote Sensing
Room 245
Co-Chairs: Piergiorgio Uslenghi, *University of Illinois at Chicago*;
Pai-Yen Chen, *University of Texas at Austin*

13:20 B8-1
EFFICIENT MICROWAVE BIOMEDICAL IMAGING THROUGH SPARSE RECONSTRUCTION OF FREQUENCY INDEPENDENT PARAMETERS
Md Asiful Islam*, Asimina Kiourti, John L. Volakis
Electroscience Lab, The Ohio State University, Columbus, OH

13:40 B8-2
INCORPORATING MULTIPLE SCATTERING IN IMAGING WITH ITERATIVE BORN METHODS
Mert Hidayetoglu*, Anthony Podkowa, Michael L. Oelze, Levent Gurel, Wen-Mei Hwu, Weng Cho Chew
Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL

14:00 B8-3
IMAGING PERFORMANCE COMPARISON IN REINFORCED CONCRETE PILLARS USING GROUND PENETRATING RADAR AND RADIO FREQUENCY TOMOGRAPHY
Tadahiro Negishi[1], Gianluca Gennarelli[2], Yangqing Liu[1], Danilo Erricolo*[1], Francesco Soldovieri[2]
[1]*Electrical and computer Engineering, University of Illinois Chicago, Chicago, IL*
[2]*Institute for Electromagnetic Sensing of the Environment, National Research Council, Napoli, ITALY*

14:20 B8-4
ULTRASENSITIVE PARITY-TIME SYMMETRIC WIRELESS MICROSENSORS
Mehdi Hajizadegan*, Pai-Yen Chen

Wayne State University, Detroit, MI

14:40 B8-5
NOVEL MULTI-FREQUENCY ELECTROMAGNETIC COUPLER FOR POWER AND DATA TRANSMISSION
Christopher S. Deloglos*, Afroditi V. Filippas
Virginia Commonwealth University, Richmond, VA

Session B9: Antenna Arrays I
Room 105
Session Co-Chairs: Randy Haupt, Colorado School of Mines;
Dejan Filipovic, *University of Colorado Boulder*

13:20 B9-1
ARRAY OF SLOT PAIRS IN A RECTANGULAR WAVEGUIDE FOR OMNIDIRECTIONAL RADIATION
Sembiam R. Rengarajan*[1], Jeffrey Pawlan[2]
[1]*California State University, Northridge, CA*
[2]*Pawlan Communications, San Jose, CA*

13:40 B9-2
INVESTIGATION AND MEASUREMENT OF A SEA WATER ANTENNA ARRAY
Kristopher R. Buchanan, Timi Adeyemi*, Carlos Flores
Electromagnetics Technology Branch, SSC Pacific, San Diego CA

14:00 B9-3
INVESTIGATION OF THE HIGH FREQUENCY RADIATIVE CAPABILITIES OF A TWO MAST CANONICAL SUPERSTRUCTURE
Kristopher R. Buchanan, Carlos Flores*, Timi Adeyemi, Sara Wheeland
Electromagnetics Technology Branch, SSC Pacific, San Diego CA

14:20 B9-4
A DUAL POLARIZATION MASSIVE MIMO PANEL ARRAY ANTENNA AT KA-BAND WITH BEAMFORMING CAPABILITY
Sandhya Krishna, Satish K. Sharma*
Electrical and Computer Engineering, San Diego State University, San Diego, CA

14:40 B9-5
PULSE DISPERSION IN PHASED AND TIMED ARRAYS
Payam Nayeri*, Randy L. Haupt
Colorado School of Mines, Golden, CO

15:00 Break

15:20 B9-6

COMPROMISE BETWEEN PEAK SIDELOBE LEVEL AND ELEMENT NUMBER AND DENSITY FOR ELECTRICALLY SCANNED ROTATIONAL APERIODIC SUBARRAYS
Junming Diao*, Jakob W. Kunzler, Karl F. Warnick
ECEN, Brigham Young University, Provo, UT

15:40 B9-7
UAV SWARM-BASED ANTENNA SYSTEM
Tsotne Kvelashvili*, Ozlem Kilic, Baris C. Secim, Erion Plaku
Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

16:00 B9-8
HIGH GAIN OMNIDIRECTIONAL ARRAY ANTENNA WITH LOW SIDE LOBE LEVELS IN THE ELEVATION PLANE
Omid Manoochehri*[1], Amin Darvazehban[2], Farhad Farzami[1], Danilo Erricolo[1]
[1]*Electrical and computer Engineering, University of Illinois Chicago, Chicago, IL*
[2]*Electrical and Computer Engineering, Amirkabir University of Technology, Tehran, IRAN*

16:20 B9-9
HIGH GAIN MINIATURIZED MULTI-BEAM LUNEBURG LENS ANTENNA FOR SATELLITE COMMUNICATIONS
Omid Manoochehri*[1], Amin Darvazehban[2], Farhad Farzami[1], Danilo Erricolo[1]
[1]*Electrical and computer Engineering, University of Illinois Chicago, Chicago, IL*
[2]*Electrical and Computer Engineering, Amirkabir University of Technology, Tehran, IRAN*

Session K1: Electromagnetic Imaging and Sensing Applications in Medicine
Room 150

Co-Chairs: Magda El-Shenawi, *Univeristy of Arkansas*;
Mahta Moghaddam, *University of Southern California*

13:20 K1-1
NANOPARTICLE-ENHANCED TERAHERTZ IMAGING OF BREAST CANCER PHANTOMS
Tyler Bowman*[1], Alec Walter[1], Olga Shenderova[2], Nicholas Nunn[2], Gary McGuire[2], Magda El-Shenawee[1]
[1]*Electrical Engineering, University of Arkansas, Fayetteville, AR*
[2]*Adamas Nanotechnologies, Inc., Raleigh, NC*

13:40 K1-2
TERAHERTZ IMAGING OF FRESHLY EXCISED MURINE BREAST CANCER TUMORS
Tyler Bowman*[1], Sruthi Ravindranathan[2], David Zaharoff[2], Narasimhan Rajaram[2], Keith Bailey[3], Magda El-Shenawee[1]
[1]*Electrical Engineering, University of Arkansas, Fayetteville, AR*
[2]*Biomedical Engineering, University of Arkansas, Fayetteville, AR*
[3]*Oklahoma Animal Disease Diagnostics Laboratory, Oklahoma State University, Stillwater, OK*

14:00 K1-3
TERAHERTZ SPECTROSCOPY FOR THE CHARACTERIZATION OF MICRODIAMOND AND NANO-ONION PARTICLES
Alec Walter*[1], Tyler Bowman[1], Olga Shenderova[2], Nicholas Nunn[2], Gary McGuire[2], Magda El-Shenawee[1]
[1]*Electrical Engineering, University of Arkansas, Fayetteville, AR*
[2]*Adamas Nanotechnologies, Inc., Raleigh, NC*

14:20 K1-4
TERAHERTZ IMAGING FOR DEFECT IDENTIFICATION IN LIQUID-STERILIZING MEMBRANE DEVICES
Nathan Burford[1], Tyler Bowman*[2], Robert Beitle[3], Magda El-Shenawee[2]
[1]*Microelectronics-Photonics Program, University of Arkansas, Fayetteville, AR*
[2]*Electrical Engineering, University of Arkansas, Fayetteville, AR*
[3]*Chemical Engineering, University of Arkansas, Fayetteville, AR*

14:40 K1-5
POLARIMETRIC THZ IMAGING OF HUMAN BRAIN TISSUES EXHIBITING ALZHEIMER'S DISEASE
Nandhini Srinivasan*, Cosan Caglayan, Kubilay Sertel
The Ohio State University, Columbus, OH

15:00 Break

15:20 K1-6
THREE DIMENSIONAL LEVEL SET METHOD FOR MICROWAVE IMAGING
Andre C. Batista*[1], Pratik Shah[2], Guanbo Chen[2], John Stang[2]
[1]*Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, BRAZIL*
[2]*Electrical Engineering, University of Southern California, Los Angeles, CA*

15:40 K1-7
RECTENNA FOR WIRELESS POWERING OF IMPLANTABLE GLUCOSE SENSOR
Ryan B. Green*, Panagiotis Efthymakis, Arthur French, Afroditi V. Filippas, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

16:00 K1-8
THE EFFECT OF GLUCOSE ON THE ELECTRICAL PROPERTIES OF BLOOD PLASMA
Arthur W. French*[1], Afroditi V. Filippas[1], Erdem Topsakal[1], Anastasios C. Karles[2]
[1]*Electrical and Computer, Virginia Commonwealth University, Richmond VA*
[2]*Henrico High School, Henricho, VA*

16:20 K1-9
ANALYSIS OF MICRO-DOPPLER SIGNATURE OF HUMANOID ROBOT MOTIONS FOR HEALTH MONITORING
Nghia H. Tran*, Ankit Bhargava, Ozlem Kilic

Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

Session FGH2: GNSS and Radio Beacon Remote Sensing II
Room 135
Co-Chairs: Clara Chew, *NASA Jet Propulsion Laboratory*;
Carl Siefring, *Naval Research Laboratory*;
Atilla Komjathy, NASA Jet Propulsion Laboratory

13:20 FGH2-1
ASSESSMENT OF OCEAN-REFLECTED GNSS SIGNALS RECEIVED FROM SMAP
Matthew L. Buchanan*, Andrew J. O'Brien, Joel T. Johnson
The Ohio State University, Columbus, OH

13:40 FGH2-2
TECHDEMOSAT-1 LAND ALTIMETRY AND SEA ICE BOUNDARY DETECTION
Jake R. Mashburn*[1], Penina Axelrad[1], Kristine Larson[1], Stephen Lowe[2]
[1]*Aerospace Engineering Sciences, University of Colorado, Boulder Colorado*
[2]*NASA Jet Propulsion Lab, Pasadena, CA*

14:00 FGH2-3
EARTH REMOTE SENSING OF VEGETATION USING GPS-REFLECTED SIGNALS COLLECTED FROM SMAP
Hugo Carreno-Luengo*, Stephen Lowe, Cinzia Zuffada, Clara Chew, Rashmi Shah
NASA Jet Propulsion Laboratory, Pasadena, CA

14:20 FGH2-4
THE FROST DYNAMICS OBSERVATORY (FRODO) CONCEPT
Clara C. Chew*[1], Kyle C. McDonald[1,2], Cinzia Zuffada[1], Erika Podest[1], Nick Steiner[2]
[1]*NASA Jet Propulsion Laboratory, Pasadena, CA*
[2]*,Earth and Atmospheric Sciences, The City College of New York, New York, NY*

14:40 FGH2-5
SNOWCUBE MISSION CONCEPT: P-BAND SIGNAL OF OPPORTUNITY FOR REMOTE SENSING OF SNOW
Simon Yueh*[1], Steve Margulis[2], Chris Derksen[3], Michael Durand[4], Kelly Elder[5], Andreadis Konstantinos[1], Glen Liston[6], Rashmi Shah[1], Xiaolan Xu[1], Chun-Sik Chae[1]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*Universiy of California at Los Angeles, Los Angeles, CA*
[3]*Environment and Climate Change Canada, Toronto, CANADA*
[4]*Ohio State University, Columbus, OH*
[5]*United State Forest Service, Fort Collins, CO*
[6]*Colorado State University, Fort Collins, CO*

Session C1: Advances in Imaging, Detection, and Localization Systems
Room 151
Co-Chairs: Ozlem Kilic, *The Catholic University of America*;
Eric Mokole, *Consultant*

13:20 C1-1
POLARIMETRIC INTERFERENCE ALIGNMENT IN MIMO BROADCAST CHANNELS
Carlos A. Viteri-Mera*[1,2], Fernando L. Teixeira[1]
[1]*ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Electronics Engineering, Universidad de Narino, Pasto, Narino, COLOMBIA*

13:40 C1-2
THE ISOLATION BOOTH
Keaton Brown*, Jean-Francois Chamberland, Gregory H. Huff
Electrical and Computer Engineering, Texas A&M, College Station, TX

14:00 C1-3
MICROWAVE IMAGING WITH A DYNAMIC METASURFACE ANTENNA
Timothy Sleasman*[1], Mohammadreza F. Imani[1], Michael Boyarsky[1], Laura Pulido[1], Thomas Fromenteze[1], Jonah N. Gollub[1], Matthew S. Reynolds[2], David R. Smith[1]
[1]*Electrical and Computer Engineering, Duke University, Durham, NC*
[2]*Electrical Engineering, University of Washington, Seattle, WA*

14:20 C1-4
MAXIMIZING THE SHANNON INFORMATION OF MILLIMETER-WAVE COMPUTATIONAL IMAGING SYSTEMS
Naren Viswanathan*, Suresh Venkatesh, David Schurig
Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

14:40 C1-5
NON-CAUSAL FILTERING APPLIED TO NUMERICAL WHISTLER MODE RAYTRACING
Ashanthi S. Maxworth*, Titsa Papantoni, Mark Golkowski
Electrical Engineering, University of Colorado Denver, Denver, CO

15:00 Break

15:20 C1-6
ANOMALY DETECTION AND IMAGE CLASSIFICATION FOR MULTISPECTRAL AND HYPERSPECTRAL IMAGES
Travis Taghavi*, Jean-Francois Chamberland, Gregory H. Huff
Electrical and Computer Engineering, Texas A&M University, College Station, TX

15:40 C1-7
DYNAMIC METASURFACE ANTENNAS AS AN ENABLING PLATFORM FOR ALTERNATIVE SYNTHETIC APERTURE RADAR (SAR) MODALITIES

Michael Boyarsky*[1], Timothy Sleasman[1], Laura Pulido-Mancera[1], Mohammadreza F. Imani[1], Matthew S. Reynoldds[2], David R. Smith[1]
[1]*Electrical and Computer Engineering, Duke University, Durham, NC*
[2]*Electrical Engineering, University of Washington, Seattle, WA*

16:00 C1-8
ON THE DESIGN OF UNIVERSAL SCHEMES FOR MASSIVE UNCOORDINATED MULTIPLE ACCESS
Austin A. Taghavi*, Avinash Vem, Jean-Francois Chamberland, Krishna R. Narayanan
Texas A&M University, College Station, TX

16:20 C1-9
PRELIMINARY SPECTRAL ANALYSIS OF TAPS AIRBORNE MEASUREMENTS
Eric Hallenborg*[1], Ted Rogers[1], Stephen Hammel[1], Tracy Haack[2]
[1]*SPAWAR Systems Center, San Diego*
[2]*Naval Research Laboratory, Monterey, CA*

Session H3: Waves and Turbulence in Space and Laboratory Plasmas II
Room 155

Co-Chairs: Bill Amatucci, *Naval Research Laboratory*;
Stephen Vincena, *University of California Los Angeles*

13:20 H3-1
RADIO EMISSIONS OF AURORAL ORIGIN, LATEST RESULTS
James W. LaBelle*
Physics and Astronomy, Dartmouth College, Hanover, NH

13:40 H3-2
SIMULATION OF ELECTRON BERNSTEIN WAVES BY CHARGE-CONSERVING EMPIC ON IRREGULAR MESHES
Dong-Yeop Na*[1], Fernando L. Teixeira[1], Yuri A. Omelchenko[2]
[1]*ElectroScience Laboratory, The Ohio State University, Columbu, OH*
[2]*Trinum Research Inc., San Diego, CA*

14:00 H3-3
SIMULATION OF MAGNETOSPHERIC MAGNETOSONIC WAVE PROPAGATION IN INHOMOGENEOUS MAGNETIZED PLASMA
Xu Liu*, Lunjin CHen
W. B. Hanson Center for Space Sciences, Department of Physics, University of Texas Dallas, Richardson, TX

14:20 H3-4
GLOBAL RATES OF ALFVENIC ENERGY DEPOSITION, ELECTRON PRECIPITATION, AND ION OUTFLOW DURING GEOMAGNETIC STORMS
Spencer M. Hatch*, James W. LaBelle

Physics and Astronomy, Dartmouth College, Hanover, NH

Session J2: Next Generation Very Large Array
Math 100
Co-Chairs: Bryan Butler, *National Radio Astronomy Observatory*;
Steve Durand, *National Radio Astronomy Observatory*

13:20 J2-1
NEXT GENERATION VERY LARGE ARRAY: SCIENCE OVERVIEW AND COMMUNITY STUDIES
Chris Carilli*, Eric Murphy, Mark Mckinnon
National Radio Astronomy Observatory, Socorro, NM

13:40 J2-2
NEXT GENERATION VERY LARGE ARRAY - AN OVERVIEW
Bryan Butler*, Chris Carilli, Mark McKinnon, Eric Murphy
National Radio Astronomy Observatory, Socorro, NM

14:00 J2-3
STRAWMAN SPECIFICATIONS FOR THE NEXT-GENERATION VERY LARGE ARRAY
Robert J. Selina*, Chris Carilli
National Radio Astronomy Observatory, Socorro, NM

14:20 J2-4
DESIGN CONSIDERATIONS FOR THE NGVLA ANTENNAS
David P. Woody*
Owens Valley Radio Observatory, Caltech, Big Pine, CA

14:40 J2-5
TOWARDS OPTICS DESIGN FOR THE NEXT GENERATION VERY LARGE ARRAY
Sivasankaran Srikanth*
National Radio Astronomy Observatory, Charlottesville, VA

15:00 Break

15:20 J2-6
NGVLA CRYOGENIC SUBSYSTEM CONCEPT
Denis R. Urbain*, Wes Grammer, Steven Durand
National Radio Astronomy Observatory, Socorro NM

15:40 J2-7
NGVLA BASELINE RECEIVER SYSTEM CONCEPTUAL DESIGN
Wes Grammer*[1], Sivasankaran Srikanth[2], Marian Pospieszalski[2], Silver Sturgis[1]
[1]*Electronics, National Radio Astronomy Observatory, Socorro, NM*
[2]*Central Development Laboratory, National Radio Astronomy Observatory, Charlottesville, VA*

16:00 J2-8
IMPLEMENTATION STATUS OF THE ULTRA-WIDEBAND RECEIVER PACKAGE FOR THE NORTH AMERICAN ARRAY
Jose E. Velazco*, Melissa Soriano, Daniel Hoppe, Damon Russell, Larry D'Addario, Ezra Long, Jim Bowen, Lorene Samoska, Andrew Janzen, Joseph Lazio
Jet Propulsion Laboratory, Pasadena, CA

16:20 J2-9
ANTENNA ELECTRONICS CONCEPT FOR THE NEXT-GENERATION VERY LARGE ARRAY
James M. Jackson*, Robert Selina
Electronics Division, National Radio Astronomy Observatory, Socorro, NM

16:40 J2-10
THEORY AND MEASUREMENTS OF WIDE-BAND FIBER-OPTIC LINKS
James W. Lamb*
OVRO, California Institute of Technology, Big Pine, CA

17:00 J2-11
ARRAY PROCESSING METHODS FOR RADIO ASTRONOMICAL RFI MITIGATION: A CASE STUDY FOR THE NGVLA
Brian D. Jeffs*, Richard A. Black, Karl F. Warnick
Electrical and Computer Engineering, Brigham Young University, Provo, UT

17:20 J2-12
EXPERIMENTS IN ADVANCED FAULT DETECTION IN THE JANSKY VERY LARGE ARRAY
Alan Erickson*, Kerry Shores
EE, National Radio Astronomy Observatory, Socorro, NM

Session B10: Antennas for Small Satellites

Room 245
Co-Chairs: Reyhan Baktur, *Utah State University*;
David Jackson, *University of Houston*

15:20 B10-1
DEVELOPMENT AND CHARACTERIZATION OF A KA BAND MESH REFLECTOR ANTENNA FOR EMERGING HIGH PERFORMANCE CUBESATS
Vignesh Manohar*, Joshua M. Kovitz, Yahya Rahmat-Samii
Electrical Engineering, University of California Los Angeles, Los Angeles, CA

15:40 B10-2
OPTICALLY TRANSPARENT CIRCULARLY POLARIZED X BAND REFLECTARRAY FOR SOLAR PANEL INTEGRATION

Salahuddin Tariq*, Reyhan Baktur
Electrical and Computer Engineering, Utah State University, Logan, UT

16:00 B10-3
INKJET PRINTED ANTENNAS ON GLASS
Muhammadeziz Tursunniyaz*, Reyhan Baktur
Electrical and Computer Engineering, Utah State University, Logan, UT

16:20 B10-4
A COMPARISON OF TWO TECHNIQUES FOR MAKING TRANSPARENT MICROSTRIP ANTENNAS FOR CUBESATS
Xinyu Liu*, David R. Jackson, Ji Chen
Electrical and Computer Engineering, University of Houston, Houston, TX

Session F2: RF Propagation Modeling and Measurements
Room 135

Co-Chairs: Michael Newkirk, John Hopkins University/Applied Physical Laboratory;
Nicholas DeMinco, *Institute for Telecommunication Sciences*

15:20 F2-1
A STATISTICAL SHORT-RANGE, LOW-ANTENNA HEIGHT PROPAGATION MODEL BASE ON ELECTROMAGNETIC THEORY AND MEASUREMENTS
Nicholas N. DeMinco*, Paul M. McKenna, Robert T. Johnk
Institute for Telecommunication Sciences, Boulder, CO

15:40 F2-2
SPREAD SPECTRUM RF CHANNEL SOUNDING IN A MOUNTAIN SHADOW ZONE
Samuel S. Streeter*[1], Daniel J. Breton[1], Johnathan M. Corgan[2]
[1]*Signature Physics Branch, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire*
[2]*Corgan Labs, San Jose, CA*

16:00 F2-3
TEMPORAL AND SPATIAL CHANGES IN MOUNTAIN REFLECTIVITY: MULTIPATH EFFECTS ON A WIDEBAND UHF RADIO LINK IN MOUNTAINOUS TERRAIN
Daniel J. Breton*, Samuel S. Streeter, Steven A. Arcone
Signature Physics, Cold Regions Research and Engineering Laboratory, Hanover, NH

16:20 F2-4
HIGH ANGLE, X-BAND SHIP RCS OVER ROUGH SEA SURFACES IN DUCTING ENVIRONMENTS USING PO-PTD AND PWE METHODS
Frank Ryan*[1], Dale Zolnick[2]
[1]*Applied Technology, Inc., San Diego, CA*
[2]*Radar Analysis Branch, Radar Div., Naval Research Laboratory, Washington, DC*

16:40 F2-5
THE CURRENT STATE OF RADAR AND COMMUNICATION ELECTROMAGNETIC PROPAGATION MODELS
Abby Anderson*
NSWC Dahlgren, Dahlgren, VA

17:00 F2-6
ESTIMATING REFRACTIVITY FROM PROPAGATION LOSS IN TURBULENT MEDIA
Mark A. Wagner*[1], Peter Gerstoft[1], Ted Rogers[2]
[1]*Electrical Engineering, University of California San Diego, La Jolla, CA*
[2]*SPAWAR, Point Loma, CA*

Session G2: Space Plasma Measurement Techniques
Room 155
Co-Chairs: Tom Gaussiran, *ARL:UT*;
Terry Bullett, *University of Colorado*

15:20 G2-1
THIRD GENERATION MF-HF RADAR FOR IONOSPHERE RADIO SCIENCE
Robert C. Livingston[1], Richard N. Grubb[2], Terence W. Bullett*[2]
[1]*Scion Associates, Port Townsend, WA*
[2]*University of Colorado, Boulder, CO*

15:40 G2-2
D-REGION IONOSPHERIC REMOTE SENSING USING LF/MF SIGNALS OF OPPORTUNITY
Marc A. Higginson-Rollins*, Morris B. Cohen
School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA

16:00 G2-3
ESTIMATING THE D-REGION IONOSPHERIC ELECTRON DENSITY PROFILE USING VLF NARROWBAND TRANSMITTERS
Nicholas C. Gross*, Morris B. Cohen
Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA

16:20 G2-4
ON THE SPECTRAL FEATURES OF EQUATORIAL SPREAD F ECHOES OBSERVED BY MELISSA
Weijia Zhan*[1], Fabiano S. Rodrigues[1], Eurico R. de Paula[2]
[1]*The University of Texas at Dallas, Richardson, Texas*
[2]*Instituto Nacional de Pesquisas Espaciais, Sao Jose Dos Campos, BRAZIL*

16:40 G2-5
OBSERVATION OF ACOUSTIC WAVES AND OTHER TRANSIENT DISTURBANCES USING VIPIR IONOSONDE.

Justin J. Mabie*[1,2], Terence Bullett[1,2]
[1]*CIRES, University of Colorado Boulder, Boulder, CO*
[2]*NCEI, NOAA, Boulder, CO*

17:00 G2-6
DOING SCIENCE WITH UNIVERSITY CUBESATS
John W. Meriwether*, Therese M. Jorgensen
National Science Foundation, Arlington, VA

17:20 G2-7
TWO-DIMENSIONAL UHF RADAR OBSERVATIONS OF EQUATORIAL SPREAD F EVENTS IN THE AMERICAN SECTOR
Fabiano S. Rodrigues*[1], Marco A. Milla[2], Karim K. Kuyeng[2], Ramiro Yanque[2], Juan Arratia[3]
[1]*The University of Texas at Dallas, Richardson, TX*
[2]*Jicamarca Radio Observatory, Lima, PERU*
[3]*Ana G. Mendez University System, Student Research Development Center, San Juan, PR*

Commission Business Meetings

17:00	Commission A	Room 105
17:00	Commission E	Room 245
18:00	Commission C	Room 200
18:00	Commission F	Room 265
18:00	Commission J	Math 100

THURSDAY MORNING, 5 January 2017

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 Plenary Talks:
(1) The Future of the Electromagnetic Spectrum

(2) Fast Radio Bursts: The Story So Far

Co-Chairs: Greg Huff, Texas A&M University;
Charles Baylis, Baylor University;
David DeBoer, University of California, Berkeley

10:00 P1-1
THE FUTURE OF THE ELECTROMAGNETIC SPECTRUM
William Chappell *
Director, Microsystems Technology Office, Defense Advanced Research Projects Agency

10:50 P1-2
FAST RADIO BURSTS: THE STORY SO FAR
Duncan Lorimer*
Department of Physics and Astronomy, West Virginia University

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, 5 January 2017

Session HEG1: Lightning and its Interaction with the Ionosphere I
Room 265
Co-Chairs: Robert Marshall, *University of Colorado Boulder*;
Morris Cohen, *Georgia Institute of Technology*;
Ningyu Liu, *University of New Hampshire*

13:20 HEG1-1
THE ASSOCIATION OF TERRESTRIAL GAMMA-RAY FLASHES WITH ENERGETIC IN-CLOUD LIGHTNING PULSES
Steven A. Cummer*[1], Fanchao Lyu[1], Michael S. Briggs[2], David M. Smith[3]
[1]*Duke University, Durham, NC*
[2]*University of Alabama in Huntsville, Huntsville, AL*
[3]*UC Santa Cruz, Santa Cruz, CA*

13:40 HEG1-2
ESTIMATION OF RADIATION DOSES RECEIVED BY AIRCRAFT PASSENGERS IN A TGF PHOTON BEAM
Sebastien Celestin*[1], Francois Trompier[2], Jean-Louis Pincon[1]

[1]*LPC2E, University of Orleans, CNRS, Orleans, FRANCE*
[2]*Institut de Radioprotection et de Surete Nucleaire, Fontenay-aux-Roses, FRANCE*

14:00 HEG1-3
A NEW TYPE OF TRANSIENT LUMINOUS EVENTS PRODUCED BY TERRESTRIAL GAMMA-RAY FLASHES
Wei Xu*[1], Sebastien Celestin[2], Victor P. Pasko[3], Robert A. Marshall[1]
[1]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[2]*Laboratory of Physics and Chemistry of the Environment and Space (LPC2E), University of Orleans, CNRS, Orleans, FRANCE*
[3]*Communications and Space Sciences Laboratory, Pennsylvania State University, University Park, PA*

14:20 HEG1-4
TRYAD: A PAIR OF CUBESATS TO OBSERVE TERRESTRIAL GAMMA-RAY FLASH BEAMS
Michael S. Briggs*[1], Pete Jenke[1], Jean-Marie Wersinger[2], Mike Folge[2]
[1]*CSPAR, University of Alabama Hunstville, Huntsville, AL*
[2]*Physics, Auburn University, Auburn, AL*

14:40 HEG1-5
USING WWLLN TO FIND WEAKER TGFS IN THE FERMI GBM DATA
Michael S. Briggs*, Kareem Omar
CSPAR, University of Alabama Hunstville, Huntsville, AL

15:00 Break

15:20 HEG1-6
CALCULATING HF AND VHF EMISSIONS FROM COMPACT INTRACLOUD DISCHARGES
Joseph R. Dwyer*, Ningyu Liu
Physics Department and Space Science Center (EOS), University of New Hampshire, Durham NH

15:40 HEG1-7
FRACTAL DIMENSION OF CLOUD-TO-GROUND LIGHTNING
Ningyu Liu*[1], Julia Tilles[1], Levi Boggs[2], Alan Bozarth[2], Hamid Rassoul[2], Jeremy Riousset[3]
[1]*Physics and Space Science Center, University of New Hampshire, Durham, NH*
[2]*Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL*
[3]*Center for Space and Atmospheric Research, Physical Sciences Department, Embry Riddle Aeronautical University, Daytona Beach, FL*

16:00 HEG1-8
3-D MODELING OF TWO INTERACTING STREAMERS
Feng Shi*[1], Ningyu Liu[1], Hamid K. Rassoul[2]

[1]*Physics and Space Science Center, University of New Hampshire, Durham, NH*
[2]*Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL*

16:20
HEG1-9 RADIO INTERFEROMETER STUDY OF HIGH-POWER LIGHTNING NARROW BIPOLAR EVENTS IN FLORIDA
Julia N. Tilles*[1], Ningyu Liu[1], Paul R. Krehbiel[2], William Rison[2], Mark A. Stanley[2], Robert G. Brown[3], Jennifer G. Wilson[3], Levi Boggs[4], Michael Stock[5]
[1]*Physics and Space Science Center, University of New Hampshire, Durham, NH*
[2]*Langmuir Laboratory, New Mexico Tech, Socorro, NM*
[3]*NASA Kennedy Space Center, Kennedy Space Center, FL*
[4]*Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL*
[5]*Osaka University, Osaka, JAPAN*

Session B11: Wearable Antennas and Electronics
Room 1B40

Co-Chairs: Asimina Kiourti, *ElectroScience Laboratory, The Ohio State University*; Bashir Morshed, *The University of Memphis*

13:20 B11-1
FUTURE OF WIRELESS MEDICAL TELEMETRY
Erdem Topsakal*
Virginia Commonwealth University, Richmond, VA

13:40 B11-2
IMPEDANCE PHLEBOGRAPHY BASED PULSE SENSING USING INDUCTIVELY-COUPLED INKJET-PRINTED WRAP SENSOR
Bashir I. Morshed*
Electrical and Computer Engineering, The University of Memphis, Memphis, TN

14:00 B11-3
A LOW POWER WEARABLE RESPIRATION MONITORING SENSOR USING PYROELECTRIC TRANSDUCER
Ifana Mahbub*[1], Syed K. Islam[1], Salvatore A. Pullano[2], Antonino S. Fiorillo[2], Samira Shamsir[1], Mark S. Gaylord[3], Vichien Lorch[3]
[1]*Electrical Engineering and Computer Science, University of Tennessee, Knoxville, Knoxville, TN*
[2] *Health Sciences, University Magna Graecia of Catanzaro, Catanzaro, ITALY*
[3] *Obstetrics and Gynecology, University of Tennessee, Knoxville, Knoxville, TN*

14:20 B11-4
AN EXPERIMENTAL STUDY ON THE FEASIBILITY OF FALL PREVENTION USING A WEARABLE K-BAND FMCW RADAR
Yao Tang*, Zhengyu Peng, Changzhi Li
Electrical and Computer Engineering, Texas Tech University, Lubbock, TX

14:40 B11-5
SIMULATION OF COIL SEPARATION AND ANGLE EFFECTS ON THE MUTUAL INDUCTANCE FOR 13.56 MHZ WRAP SENSORS
Babak Noroozi, Bashir I. Morshed*
Electrical and Computer Engineering, The University of Memphis, Memphis, TN

15:00 Break

15:20 B11-6
A LOW-POWER CMOS ENERGY HARVESTING CIRCUIT FOR WEARABLE SENSORS USING PIEZOELECTRIC TRANSDUCERS
Taeho Oh*[1], Islam K. Syed[1], Mohamed Mahfouz[2], Gary To[2]
[1]Electrical Engineering and ComputerScience, University of Tennessee Knoxville, Knoxville, TN
[2]Mechanical, Aerospace, and Biomedical Engineering, University of Tennessee Knoxville, Knoxville, TN

15:40 B11-7
WEARABLE ELECTRONICS INTEGRATED WITH FLEXIBLE TEXTILE ANTENNAS
Navtej S. Saini*, Asimina Kiourti, John L. Volakis, Robert Lee
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:00 B11-8
PERFORMANCE ANALYSIS OF TEXTILE AMC ANTENNA ON BODY MODEL
Ala A. Alemaryeen*, Sima Noghanian
Electrical Engineering, University of North Dakota, Grand Forks, ND

16:20 B11-9
LOW-POWER IMPULSE RADIO ULTRA-WIDEBAND (IR-UWB) TRANSMITTER FOR BIOMEDICAL SENSOR APPLICATIONS
Ifana Mahbub*, Syed K. Islam
University of Tennessee Knoxville, Knoxville, TN

Session H4: Physics of the Radiation Belts II
Room 200
Co-Chairs: Christopher Crabtree, *Naval Research Laboratory*;
Craig Kletzing, *University of Iowa*

13:20 H4-1
MODULATION OF WHISTLER-MODE CHORUS WAVES BY ULF AND THE EFFECTS ON PRECIPITATION
Allison N. Jaynes*[1], Maria Usanova[1], Marc Lessard[2], Kazue Takahashi[3], Ashar Ali[1], David Malaspina[1], Robert Michell[4], Emma Spanswick[5], Daniel N. Baker[1], J B. Blake[6], Chris Cully[5], Eric Donovan[5], Craig Kletzing[7], Geoff Reeves[8], Marilia Samara[4], Harlan Spence[2], John Wygant[9]

[1]*LASP, University of Colorado - Boulder, Boulder, CO*
[2]*University of New Hampshire, Durham, NH*
[3]*JHU/APL, MD*
[4]*NASA Goddard, Greenbelt, MD*
[5]*University of Calgary, Calgary, CANADA*
[6]*Aerospace Corporation, El Segundo, CA*
[7]*University of Iowa, IA*
[8]*LANL, Los Alamos, NM*
[9]*University of Minnesota, MN*

13:40 H4-2
DIAGNOSING PARAMETERS OF NONLINEAR WHISTLER MODE GROWTH IN THE MAGNETOSPHERE FROM OBSERVATIONS OF RELATIVE PHASE OF SIDEBANDS OF TRIGGERED EMISSIONS
Mark Golkowski*, Jamie Costabile, Randall Wall
Electrical Engineering, University of Colorado Denver, Denver, CO

14:00 H4-3
UNIQUE CONCURRENT OBSERVATIONS OF WHISTLER MODE HISS, CHORUS, AND TRIGGERED EMISSIONS
Poorya Hosseini*, Mark Golkowski
Electrical Engineering, University of Colorado Denver, Denver, CO

14:20 H4-4
BAYESIAN SPECTRAL ANALYSIS OF CHORUS SUB-ELEMENTS
Christopher Crabtree*[1], Gurudas Ganguli[1], Erik Tejero[1], George Hospodarsky[2], Craig Kletzing[2]
[1]*Naval Research Laboratory, Washington, DC*
[2]*University of Iowa, Iowa City, IA*

14:40 H4-5
FIRST DIRECT EVIDENCE OF A ONE-ONE CORRESPONDENCE OF CHORUS WAVE PACKETS AND MICROBURSTS: VAN ALLEN PROBES EFW AND FIREBIRD
Aaron Breneman*[1], Alex Crew[2]
[1]*University of Minnesota, Minneapolis, MN*
[2]*Johns Hopkins University Applied Physics Laboratory, Laurel, MD*

Session B12: Terahertz Antennas and Applications
Room 245
Co-Chairs: Kubilay Sertel, *The Ohio State University*;
Georgios Trichopoulos, *Arizona State University*

13:20 B12-1
PLANAR HIGH PERFORMANCE ANTENNAS AT TERAHERTZ FREQUENCIES
Goutam Chattopadhyay*
NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

13:40 B12-2
DYNAMICALLY TUNABLE AND RECONFIGURABLE ANTENNAS FOR ADVANCED THZ SENSING AND IMAGING
Lei Liu*, Zhenguo Jiang, Itrat Shams, Syed Rahman, Patrick Fay
Electrical Engineering, University of Notre Dame, Notre Dame, IN

14:00 B12-3
MM-WAVE HIGH GAIN BEAM-SCANNING FOCAL PLANE ARRAYS WITH MICROFLUIDICALLY SWITCHED FEED NETWORKS
Enrique J. Gonzalez*, Gokhan Mumcu
Electrical Engineering, University of South Florida, Tampa, FL

14:20 B12-4
MONOLITHIC REALIZATION AND CHARACTERIZATION OF ON-CHIP UWB PHASED ARRAYS FOR MMW AND THZ CONNECTIVITY
Seckin Sahin*, Cosan Caglayan, Niru K. Nahar, Kubilay Sertel
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

14:40 B12-5
NON-CONTACT, ON-WAFER CHARACTERIZATION OF SCHOTTKY DIODES
Cosan Caglayan*, Kubilay Sertel
ElectroScience Laboratory, The Ohio State University, Columbus, OH

15:00 Break

15:20 B12-6
MULTIPHYSICAL MODELS OF ELECTRON-PLASMA ELECTRONICS FOR TERAHERTZ SOURCES AND DETECTORS
Shubhendu Bhardwaj*, John Volakis
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

15:40 B12-7
TERAHERTZ IMAGING VIA SINGLE-BIT COMPRESSIVE SENSING
Syed An Nazmus Saqueb*, Kubilay Sertel
The Ohio State University, Columbus, OH

16:00 B12-8
USING COMPUTERIZED TOMOGRAPHY'S ALGORITHMS FOR REAL TIME THZ IMAGING SYSTEMS
Panagiotis Theofanopoulos*, Georgios Trichopoulos
Arizona State University, Tempe, AZ

16:20 B12-9
A RADAR AND SPECTROMETER INSTRUMENT PROTOTYPE FOR PLANETARY SCIENCE AT MILLIMETER AND SUBMILLIMETER-WAVE FREQUENCIES

Tristan Ossama El Bouayadi*
NASA Jet Propulsion Laboratory, Pasadena, CA

16:40 B12-10
A RAPID FILTER BANK DESIGN AND MEASUREMENT SCHEME FOR SUPERSPEC
George Che*[1], Philip Mauskopf[1], Georgios Trichopoulos[2], Steven Hailey-Dunsheath[3], Charles M. Bradford[3,4], Jason Glenn[5], Corwin Shiu[6], Erik Shirokoff[7], Jordan Wheeler[5]
[1] *Earth & Space Exploration, Arizona State University, Tempe, AZ*
[2] *Electrical, Computer, & Energy Engineering, Arizona State University, Tempe, AZ*
[3]*Astronomy, California Institute of Technology, Pasadena, CA*
[4]*Astronomy & Space Sciences, Jet Propulsion Laboratory, Pasadena, CA*
[5]*Astrophysical & Planetary Sciences, University of Colorado Boulder, Boulder, CO*
[6]*Physics, Princeton University, Princeton, NJ*
[7]*Astronomy & Astrophysics, University of Chicago, Chicago, IL*

Session CDE1: Spectrum Issues, Developments, and Solutions
Room 105
Session Co-Chairs: Charles Baylis, *Baylor University*;
Zoya Popovic, *University of Colorado Boulder*;
Eric Mokole, *Consultant*

13:20 CDE1-1
SUGGESTED R&D AREAS FOR RADAR-COMMUNICATION CO-EXISTENCE AND CO-DESIGN
Eric L. Mokole*[1], Lawrence Cohen[2]
[1]*Consultant, Burke, Virginia*
[2]*Radar Division, Naval Research Laboratory, Washington, DC*

13:40 CDE1-2
SUMMARY OF RECENT RADAR SPECTRUM ACTIVITIES
Eric L. Mokole[1], Lawrence Cohen*[2]
[1]*Consultant, Burke, Virginia*
[2]*Radar Division, Naval Research Laboratory, Washington, DC*

14:00 CDE1-3
DYNAMIC SPECTRUM COLLABORATION BETWEEN RADAR AND WIRELESS COMMUNICATION: A PROPOSED FRAMEWORK FOR THE SIMULTANEOUS OPTIMIZATION OF POLICY, NETWORKS, AND CIRCUITS
Charles Baylis*[1], Robert J. Marks II[1], Liang Dong[1], Andrew Clegg[2], Lawrence Cohen[3]
[1]*Wireless and Microwave Circuits and Systems Program, Baylor University, Waco, TX*
[2]*Google, Reston, VA*
[3]*Radar Division, Naval Research Laboratory, Washington, DC*

14:20 CDE1-4

DUAL-LOOP JOINT CIRCUIT AND WAVEFORM OPTIMIZATION TECHNIQUE FOR AMBIGUITY FUNCTION, SPECTRAL PERFORMANCE, AND POWER EFFICIENCY
Casey Latham*[1], Alicia Magee[1], Jacob Boline[1], Alexander Tsatsoulas[1], Matthew Fellows[1], Charles Baylis[1], Lawrence Cohen[2], Robert J. Marks II[1]
[1]*Electrical & Computer Engineering, Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington, DC*

14:40 CDE1-5
WIDEBAND RF SELF-INTERFERENCE CANCELLATION FILTER FOR SIMULTANEOUS TRANSMIT/RECEIVE SYSTEMS
Satheesh Bojja Venkatakrishnan*, Elias A. Alwan, John Volakis
The Ohio State University, Columbus, OH

15:00 Break

15:20 CDE1-6
A FREQUENCY-SELECTIVE TUNABLE POWER AMPLIFIER FOR BROADBAND PHASED ARRAY TRANSMITTERS
Allison Duh*, Dimitra Psychogiou, Zoya Popovic
University of Colorado Boulder, Boulder, CO

15:40 CDE1-7
REAL-TIME AMPLIFIER IMPEDANCE OPTIMIZATION USING A NONLINEAR TUNABLE VARACTOR MATCHING NETWORK WITH POWER-DEPENDENT CHARACTERIZATION
Sarvin Rezayat*[1], Zach Hays[1], Christopher Kappelmann[1], Matthew Fellows[1], Charles Baylis[1], Robert Marks[1], Ed Viverios[2], Abigail Hedden[2], John Penn[2], Ali Darwish[2]
[1]*Electrical and Computer Enginering, Baylor University, Waco, TX*
[2]*Army Research Labratory, Adelphi, MD*

16:00 CDE1-8
IMPROVING CUBESAT TRANSMITTER EIRP TO ENABLE SPACE NETWORK COMMUNICATION CAPABILITIES
Sushia Rahimizadeh*[1], Peter Fetterer[2], Zoya Popovic[1], Harry Shaw[2]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Goddard Space Flight Facilities, Greenbelt, MD*

16:20 CDE1-9
MILLIMETER-WAVE TRANSMIT/RECEIVE SYSTEM FOR SECURE HIGH DATA RATE COMMUNICATIONS
Dimitrios Siafarikas*, Elias A. Alwan, John L. Volakis
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:40 CDE1-10
WIDEBAND AND MULTI-BEAM ANGLE OF ARRIVAL ESTIMATION USING ON-SITE CODING

Satheesh Bojja Venkatakrishnan*, Elias A. Alwan, John Volakis
Electrical & Computer Engineering, Ohio State University, Columbus, OH

Session F3: Nanosatellites for Remote Sensing
Room 150
Co-Chairs: Albin Gasiewski, *University of Colorado Boulder*;
Steven C. Reising, *Colorado State University*;
William Blackwell, *MIT Lincoln Laboratory*

13:20 F3-1
DESIGNING A CLIMATE-MONITORING MICROWAVE RADIOMETER
Philip W. Rosenkranz*[1], William J. Blackwell[1], Albin J. Gasiewski[2], R. V. Leslie[1],
Carl A. Mears[3], Jeffrey R. Piepmeier[4], Paul E. Racette[4], Benjamin D. Santer[5]
[1]*Massachusetts Institute of Technology, Cambridge, MA*
[2]*University of Colorado at Boulder, Boulder, CO*
[3]*Remote Sensing Systems, Santa Rosa, CA*
[4]*NASA Goddard Space Flight Center, Greenbelt, MD*
[5]*Lawrence Livermore National Laboratory, Livermore, CA*

13:40 F3-2
MICROWAVE-IR POLARIMETRY AND RADIOMETRY FOR REMOTE SENSING OF CLOUD ICE MICROPHYSICAL PROPERTIES
Dong L. Wu*[1], Jie Gong[1,2]
[1]*NASA Goddard Space Flight Center, Greenbelt, MD*
[2]*Universities Space Research Association, Greenbelt, MD*

14:00 F3-3
TROPOSPHERIC WATER AND CLOUD ICE (TWICE) MILLIMETER- AND SUB-MILLIMETER-WAVE RADIOMETER FOR 6U-CLASS SATELLITES: PERFORMANCE ANALYSIS OF COMMAND AND DATA HANDLING (C&DH) SUBSYSTEM
Mehmet Ogut*[1], Xavier Bosch-Lluis[1], Steven C. Reising[1], Yuriy V. Goncharenko[1],
Pekka Kangaslahti[2], Erich Schlecht[2], Richard Cofield[2], Nacer Chahat[2], Sharmila Padmanabhan[2],
Jonathan Jiang[2], Shannon T. Brown[2], William R. Deal[3], Alex Zamora[3], Kevin Leong[3],
Sean Shih[3], Gerry Mei[3]
[1]*Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*Northrop Grumman Aerospace Systems, Redondo Beach, CA*

14:20 F3-4
THE CUBESAT RADIOMETER RADIO FREQUENCY INTERFERENCE TECHNOLOGY VALIDATION (CUBERRT) MISSION
Christa McKelvey*[1], Joel T. Johnson[1], Chi-Chih Chen[1], Andrew O'Brien[1], Graeme E. Smith[1],
Mark Andrews[1], J. Landon Garry[1], Sidharth Misra[2], Shannon Brown[2], Jonathan Kocz[2],
Robert Jarnot[2], Damon C. Bradley[3], Priscilla N. Mohammed[3], Jared F. Lucey[3],
Jeffrey R. Piepmeier[3], Kevin Horgan[3], Michael Solly[3], Joseph Knuble[3]

[1]*Electrical and Computer Engineering and ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Jet Propulsion Laboratory, NASA, Pasadena, CA*
[3]*Goddard Space Flight Center, NASA, Greenbelt, MD*

14:40 F3-5
CYGNSS: EARLY LAUNCH ENGINEERING AND SCIENCE COMMISSIONING
Scott Gleason*[1], Valery Zavorotny[2], Christopher Ruf[3], Randy Rose[1]
[1]*Southwest Research Institute, Boulder, CO*
[2]*ESRL, NOAA, Boulder, CO*
[3]*Climate and Space, University of Michigan, Ann Arbor, MI*

15:00 Break

15:20 F3-6
PRE-LAUNCH CALIBRATION AND PERFORMANCE STUDY OF THE POLARCUBE 3U TEMPERATURE SOUNDING RADIOMETER MISSION
Lavanya Periasamy*, Albin J. Gasiewski
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:40 F3-7
RADIOMETER CALIBRATION WITH GPS RADIO OCCULTATION FOR THE MIRATA CUBESAT MISSION
Kerri Cahoy*[1], Anne Marinan[1], Rebecca Bishop[2], Susan Lui[2], James Bardeen[2], Tamitha Skov[2], William Blackwell[3], R. Vincent Leslie[3], Idahosa Osaretin[3], Michael Shields[3]
[1]*Aeronautics and Astronautics, MIT, Cambridge, MA*
[2]*The Aerospace Corporation, El Segundo, CA*
[3]*MIT Lincoln Laboratory, Lexington, MA*

16:00 F3-8
ENABLING TIME-RESOLVED OBSERVATIONS OF CLOUD AND PRECIPITATION PROCESSES FROM 6U-CLASS SATELLITE CONSTELLATIONS: TEMPORAL EXPERIMENT FOR STORMS AND TROPICAL SYSTEMS TECHNOLOGY DEMONSTRATION (TEMPEST-D)
Steven C. Reising*[1], Todd C. Gaier[2], Christian D. Kummerow[3], V Chandrasekar[1], Sharmila Padmanabhan[2], Boon H. Lim[2], Cate Heneghan[2], Wesley Berg[3], Jon P. Olson[1], Shannon T. Brown[2], John Carvo[4], Matthew Pallas[4]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*NASA / Caltech, Jet Propulsion Laboratory, Pasadena, CA*
[3]*Atmospheric Sciences, Colorado State University, Fort Collins, CO*
[4]*Blue Canyon Technologies, Boulder, CO*

16:20 F3-9
THE TEMPEST-D DEMONSTRATION RADIOMETER INSTRUMENT FOR MEASUREMENT OF CLOUDS AND PRECIPITATION

Todd Gaier*[1], Sharmila Padmanabhan[1], Boon Lim[1], Richard Cofield[1], Mary Easter[1], Mary Soria[1], Heather Owen[1], Steven Reising[2]
[1]*Jet Propulsion Laboratory, Pasadena, CA*
[2]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*

Session F4: Complex and Random Media
Room 135
Co-Chairs: Saba Mudaliar, *Air Force Research Laboratory*;
Akira Ishimaru, *University of Washington*

13:20 F4-1
IMPROVEMENTS IN THE SINGLE SCATTER SUBTRACTION APPROACH
Kevin Diomedi, Gary S. Brown*
Virginia Polytechnic Institute & State University, Blacksburg, VA

13:40 F4-2
MODELING OF COHERENT AND DIFFUSE SCATTERING FROM ROUGH SURFACE WITH SMALL AND MODERATE RAYLEIGH PARAMETER
Alexander G. Voronovich*, Valery V. Zavorotny
NOAA/Earth System Research Laboratory, Boulder, CO

14:00 F4-3
COHERENT BISTATIC SCATTERING MODEL FOR VEGETATED LAND COVER IN SUPPORT OF SOIL MOISTURE RETRIEVAL
Amir Azemati*, Mahta Moghaddam
Ming Hsieh Department of Electrical Engineering, University of Southern California, Los Angeles, CA

14:20 F4-4
ANTENNA BEAMWIDTH EFFECT IN DETECTING MICROWAVE ENHANCED BACKSCATTER FROM A LAYER OF VEGETATION
Avinash Sharma*[1], Roger H. Lang[2]
[1]*The Johns Hopkins University Applied Physics Laboratory, Laurel, MD*
[2]*Electrical and Computer Engineering, The George Washington University, Washington, DC*

14:40 F4-5
DESIGNING SOURCES FOR ENHANCEMENT OF EARLY-TIME DIFFUSION IN SHORT PULSE PROPAGATION THROUGH RANDOM PARTICULATE MEDIA
Elizabeth Bleszynski*, Marek Bleszynski, Thomas Jaroszewicz
Monopole Research, Thousand Oaks, CA

15:00 Break

15:20 F4-6

A RAYLEIGH-RITZ APPROACH TO GREEN'S FUNCTION OF AN INHOMOGENEOUS LAYER
Saba Mudaliar*[1], C. P. Vendhan[2], C. Prabavathi[3]
[1]*Sensors Directorate, Air Force Research Laboratory, Dayton, OH*
[2]*Indian Institute of Technology Madras, Chennai, INDIA*
[3]*P.O. Box 24467, Dayton, OH*

15:40 F4-7
PASSIVE INFRARED RETRIEVAL OF TROPOSPHERIC REFRACTIVITY, TEMPERATURE, AND WATER VAPOR PROFILES
Fredrick S. Solheim*
Dakota Ridge R&D, Boulder, CO

16:00 F4-8
POINT-TO-POINT BACKHAUL SYSTEMS AT 3.5GHZ PREDICTIONS VS. MEASUREMENTS IN A VEGETATED RESIDENTIAL AREA OF WASHINGTON, DC
Saul A. Torrico*[1], Roger H. Lang[2]
[1]*Comsearch, Ashburn, VA*
[2]*Electrical and Computer Engineering, The George Washington University, Washington, DC*

16:20 F4-9
MEASUREMENTS OF WIDEBAND MICROWAVE PROPAGATION WITHIN A SMALL AIRCRAFT FOR REPLACING WIRE HARNESSES
Miyuki Hirose*, Takehiko Kobayashi
Tokyo Denki University, Tokyo, JAPAN

Session GH1: Meteors, Orbital Debris and Dusty Plasmas I
Room 151
Co-Chairs: Eric Gillman, *Naval Research Laboratory*;
Edward Thomas, *Auburn University*;
Julio Urbina, *Penn State*

13:20 GH1-1
ANALYSIS OF PLASMA TURBULENCE ON THE FORMATION OF SPECULAR METEOR ECHOES
Freddy R. Galindo[1], Julio V. Urbina*[1], Lars P. Dyrud[2]
[1]*Electrical Engineering and Computer Science, Penn State, University Park, PA*
[2]*OmniEarth, Inc, Arlington, VA*

13:40 GH1-2
INVERSION OF METEOR RADAR CROSS SECTION TO PLASMA DENSITY USING AN FDTD NUMERICAL SCATTERING MODEL
Robert A. Marshall*[1], Sigrid Close[2], Peter Brown[3], Gunter Stober[4], Carsten Schult[4], Jorge Chau[4]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Stanford University, Stanford, CA*

[3]*University of Western Ontario, London, ON, CANADA*
[4]*Institute of Atmospheric Physics, Kuhlungsborn, GERMANY*

14:00 GH1-3
SIMULTANEOUS UHF/VHF RADAR AND OPTICAL OBSERVATIONS OF METEORS AT ARECIBO
Michael DeLuca*[1,2], Diego Janches[3], Robert Michell[4,5], Rebecca Chen[6], Zoltan Sternovsky[1,2]
[1]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*
[2]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[3]*Space Weather Laboratory, Code 674, NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*Geospace Environment Laboratory, Code 673, NASA Goddard Space Flight Center, Greenbelt, MD*
[5]*Astronomy, University of Maryland, College Park, College Park, MD*
[6]*River Hill High School, Clarksville, MD*

14:20 GH1-4
METEOROID SPUTTERING AS A SOURCE FOR LOWER-THERMOSPHERIC METALS AND THE RADIO SCIENCE OF HIGH-ALTITUDE RADAR METEORS
John D. Mathews*[1], Boyi Gao[1], Saiveena Kesaraju[1], Shikha Raizada[2]
[1]*Radar Space Sciences Lab, Penn State University, University Park, PA*
[2]*Space Science Division, Arecibo Observatory, Arecibo, PR*

15:00 Break

15:20 GH1-5
LOW-ALTITUDE RADAR METEORS AND BOLIDE LANGMUIR WAVES
John D. Mathews*[1], Qian Zhu[1], Frank T. Djuth[2]
[1]*Radar Space Sciences Lab, Penn State University, University Park, PA*
[2]*Geospace Research, Inc., El Segundo, CA*

15:40 GH1-6
RADAR DETECTABILITY OF METEOR HEAD ECHOES AND ITS IMPLICATION ON THE ZODIACAL DUST CLOUD POPULATIONS
Diego Janches*[1], Petr Pokorny[2], Nimalna Swarnalingam[2], David Nesvorny[3], John M. C. Plane[4], Wuhu Feng[4], Juan Diego Carrillo-Sanches[4], Juan Carlos Gomez Martin[4], David Vokrouhlicky[5]
[1]*Space Weather Laboratory, NASA, Greenbelt, MD*
[2]*Physics, Catholic University of America, Washington, D.C*
[3]*SouthWest Research Institute, Boulder, CO*
[4]*Chemistry, University of Leeds, Leeds, UNITED KINGDOM*
[5]*Institute of Astronomy, Charles University, Prague, CZECH REPUBLIC*

16:00 GH1-7
MICROMETEOROID ABLATION SIMULATED IN THE LABORATORY USING A DUST ACCELERATOR
Z. Sternovsky*[1,2,3], E. Thomas[2,3], M. DeLuca[1,2], M. Horanyi[1,3,4], D. Janches[5], N. Swarnalingam[5], R. Marshall[2], T. Munsat[3,4], J. M. C. Plane[6]

[1]*LASP, University of Colorado, Boulder, CO*
[2]*Aerospace Eng. Sci., University of Colorado, Boulder, CO*
[3]*IMPACT, University of Colorado, Boulder, CO*
[4]*Physics, University of Colorado, Boulder, CO*
[5]*Space Weather Laboratory, NASA Goddard, Greenbelt, MD*
[6]*School of Chemistry,, University of Leeds, Leeds, UNITED KINGDOM*

16:20 GH1-8
RADIO-FREQUENCY EMISSION DETECTION AND SCALING FROM HYPERVELOCITY IMPACTS ON CHARGED TARGETS
Andrew Nuttall*, Sigrid Close
Stanford University, Stanford, CA

16:40 GH1-9
HYPERVELOCITY IMPACT PLASMA EXPANSION: SCALING FROM EXPERIMENT TO SPACE
Nicolas Lee*, Sigrid Close, Ashish Goel
Aeronautics and Astronautics, Stanford University, Stanford, CA

Session A1: Microwave and Millimeter wave Propagation and Measurement
Room 155
Co-Chairs: Steven Weiss, *US Army Research Lab*;
Kristopher Buchanan, *SPAWAR*

13:20 A1-1
TERRESTRIAL LINK RAIN ATTENUATION MEASUREMENTS AT 84 GHZ
Eugene Hong*[1], Steven Lane[1], David Murrell[1], Nicholas Tarasenko[1], Christos Christodoulou[2]
[1]*Space Vehicles Directorate, Air Force Research Laboratory, Albuquerque, NM*
[2]*Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM*

13:40 A1-2
NUMERICALLY CALCULATED TRANSFER FUNCTIONS FOR SOLVING ARBITRARY LENGTH SIGNAL PROPAGATION USING FDTD METHOD
Joseph E. Diener*[1], Jeanne T. Quimby[2], Kate A. Remley[2], Atef Z. Elsherbeni[1]
[1]*EECS, Colorado School of Mines, Golden, CO*
[2]*CTL/672, National Institute of Standards and Technology, Boulder, CO*

14:00 A1-3
A NOVEL V-BAND PRINTED QUASI-PARABOLIC REFLECTOR ANTENNA
Alister Hosseini, Evangelos Kornaros, Saman Kabiri*, Franco De Flaviis
University of California Irvine, Irvine, CA

14:20 A1-4
SEAWATER DIELECTRIC MEASUREMENT BY USING A CAVITY TECHNIQUE: EXIT-HOLE EFFECT ANALYSIS

Yiwen Zhou*, Roger H. Lang
Electrical and Computer Engineering, The George Washington University, Washington, DC

14:40 A1-5
PRECISION PORTABLE CRYOGENIC BLACKBODY TARGET FOR MICROWAVE/MILLIMETER WAVE RECEIVER CALIBRATION
Fredrick S. Solheim*
Dakota Ridge R&D, Boulder, CO

15:00 Break

15:20 A1-6
FIBER GLASS-WEAVE SKEW ANALYSIS USING THE FINITE-DIFFERENCE TIME-DOMAIN METHOD
Ravi C. Bollimuntha*[1], Venkata D. Paladugu[1], Rounak Saha[1], Melinda J. Piket-May[1], Atef Z. Elsherbeni[2], Mohammed F. Hadi[1,2,3]
[1]*Electrical, Computer and Energy Engineering, University of Colorado, Boulder, CO*
[2]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*
[3]*Electrical Engineering, Kuwait University, Kuwait, KUWAIT*

15:40 A1-7
EXPERIMENTAL DEMONSTRATION OF HIGHER ORDER DISPERSION IN INHOMOGENEOUS SLOW WAVE STRUCTURES FOR BACKWARD WAVE OSCILLATORS
Ushemadzoro Chipengo*, Niru K. Nahar, John L. Volakis
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:00 A1-8
CHARACTERIZATION OF METHODS OF REMOVING SURFACE CHARGE FOR REDUCTION OF ELECTROSTATIC DISCHARGE EVENTS
Khandakar Nusrat Islam*, Mark Gilomore
Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM

16:20 A1-9
ELECTRICAL BREAKDOWN STRENGTHS OF VARIOUS GASSES AND GAS MIXTURES
D V. Giri*[1], V Carbonu[2], J M. Lehr[3]
[1]*PRO-TECH, ALAMO*
[2]*L3 Communications (Retired), San Leandro, CA*
[3]*University of New Mexico, Albuquerque, NM*

Session J3: New Telescopes, Techniques and Technology II
Math 100
Co-Chairs: David DeBoer, *University of California Berkeley*;
Jeffery Mangum, *National Radio Astronomy Observatory*

13:20 J3-1
ALMA DIGITAL DOWNCONVERTER
Sylas Ashton*
National Radio Astronomy Observatory, Socorro, NM

13:40 J3-2
SURVEYING THE MOLECULAR GAS FUELING EARLY STAR FORMATION: PRESENT RESULTS AND FUTURE DIRECTIONS
Garrett K. Keating*[1], Daniel P. Marrone[2], Geoffrey C. Bower[3]
[1]*Smithsonian Astrophysical Observatory, Cambridge, MA*
[2]*Astronomy, University of Arizona, Tucson, AZ*
[3]*ASIAA, Hilo, HI*

14:00 J3-3
SUSTAINING SUBMILLIMETER SCIENCE IN THE NEXT DECADE AND BEYOND
Henry A. Wootten, Jeffrey G. Mangum*
National Radio Astronomy Observatory /University of Virginia, Charlottesville, VA

Session J4: Cosmic Microwave Background Polarization
Math 100
Co-Chairs: Dan Marrone, *University of Arizona*;
Miguel Morales, *University of Washington*

15:20 J4-1
OVERVIEW OF DETECTOR ARRAYS FOR THE MEASUREMENT OF COSMIC MICROWAVE BACKGROUND POLARIZATION
Johannes Hubmayr*
NIST, Boulder, CO

15:40 J4-2
NEXT-GENERATION COSMOLOGY WITH ADVANCED ACTPOL
Sara M. Simon*
University of Michigan, Ann Arbor, MI

16:00 J4-3
THE BICEP/KECK CMB POLARIZATION APPROACH: MEASURING DEGREE ANGULAR SCALES WITH SMALL APERTURES
Kirit S. Karkare*
Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

16:20 J4-4
SPT-3G: THE THIRD GENERATION CAMERA AND SURVEY FOR THE SOUTH POLE TELESCOPE
Joaquin Vieira*

Astronomy, The University of Illinois at Urbana-Champaign, Urbana, IL

16:40 J4-5
THE COSMOLOGY LARGE ANGULAR SCALE SURVEYOR
Lucas P. Parker*
Johns Hopkins University, Baltimore, MD

17:00 J4-6
MEASURING GALACTIC SYNCHROTRON WITH THE C-BAND ALL SKY SURVEY
Heiko M. Heilgendorff*
University of KwaZulu-Natal, Durban, SOUTH AFRICA

Commission Business Meetings

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

FRIDAY MORNING, 6 January 2017

Session B13: Antenna Measurements and Simulations
Room 1B40
Co-Chairs: Steven Weiss, *US Army Research Lab*;
Jeanne Quimby, *NIST*

08:20 B13-1
MEASURED PERFORMANCE OF LOW PROFILE ANTENNAS FED IN A BALANCED CONFIGURATION
Steven Weiss*, Gregory Mitchell
US Army Research Lab, Adelphi, MD

08:40 B13-2
MODIFICATION, MODELING, AND MEASUREMENT OF A BALANCED ANTIPODAL VIVALDI FOR A MULTI-CHANNEL RECEIVER
Seth A. McCormick*[1], William O. Coburn[2]
[1]*General Techincal Services LLC, Wall, NJ*
[2]*United States Army Research Laboratory, Adelphi, MD*

09:00 B13-3
UNIQUE GEOMETRY FOR A CONCENTRIC DUAL BAND ARRAY ANTENNA AT S- AND X-BAND
Gregory Mitchell*

US Army Research Laboratory, Adelphi, MD

09:20 B13-4
STUDY OF PHASE VARIATION ON PROPAGATING THROUGH METAMATERIAL
Quang M. Nguyen*, Amir I. Zaghloul, Steven J. Weiss
US Army Research Laboratory, Adelphi, MD

09:40 B13-5
MODELING AND MEASUREMENT OF 3D PRINTED λ/30 SPHERICAL SPIRAL DIPOLES
Theodore K. Anthony*, Keefe Coburn, Amir I. Zaghloul
RDRL-SER-M, US Army Research Lab, Adelphi, MD

10:00 Break

10:20 B13-6
NOVEL CHOKE RINGS FOR ULTRA-WIDEBAND ANTENNA ARRAY
Zahra Manzoor*[1], Gholamreza Moradi[2]
[1]*ECE, Missouri Science and Technology University, Rolla, MO*
[2]*ECE, Amir Kabir University, Tehran,Iran, IRAN*

10:40 B13-7
DESIGN AND CALIBRATION OF A CLOSED LOOP LABORATORY RF PROPAGATION SECTION
William O. Coburn*[1], Andre K. Witcher[1], Seth A. McCormick[2]
[1]*RDRL-SER-M, US Army Research Laboratory, Adelphi MD*
[2]*General Technical Services LLC, Adelphi MD*

11:00 B13-8
THE TRISKELION-ARCHIMEDEAN SPIRAL ANTENNA
Seunghwan Yoon*[1], Alfred G. Besoli[1], Franco De Flaviis[2], Nicolaos G. Alexopoulos[3]
[1]*Movandi Corporation, Newport Beach*
[2]*University of California, Irvine, CA*
[3]*Broadcom Foundation, Newport Beach, CA*

Session G3: New Horizons in Active and Passive Radio Techniques for Geospace Remote Sensing
Room 200
Co-Chairs: Philip Erickson, *MIT Haystack Observatory*;
Julio Urbina, Penn State

08:20 G3-1
THZ LIMB SOUNDER (TLS) FOR LOWER THERMOSPHERIC WIND, OXYGEN DENSITY, AND TEMPERATURE
Dong L. Wu*[1], Jeng-Hwa Yee[2], Erich T. Schlecht[3], Imran Mehdi[3], Jose V. Siles[3], Brian J. Drouin[3]

[1]*NASA Goddard Space Flight Center, Greenbelt, MD*
[2]*Applied Physics Lab, The Johns Hopkins University, Laurel, MD*
[3]*Jet Propulsion Lab, California Institute of Technology, Pasadena, CA*

08:40 G3-2
STUDIES OF THERMOSPHERIC WAVE ACTIVITY USING DYNASONDE TECHNIQUES: CURRENT STATE AND THE FUTURE
Nikolay Zabotin*[1], Catalin Negrea[1], Oleg Godin[2], Terence Bullett[1]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Naval Postgraduate School, Monterey, CA*

09:00 G3-3
NEW CAPABILITY AT SONDRESTROM RADAR: SUB-SECOND AURORAL ELECTRON DENSITY MEASUREMENTS
Asti Bhatt*[1], Juha Vierinen[2], Joshua Semeter[3], Michael Hirsch[3], Mary McCready[1]
[1]*SRI International, Menlo Park, CA*
[2]*University of Trmoso, Tromso, NORWAY*
[3]*Boston University, Boston, MA*

09:20 G3-4
OPPORTUNITIES FOR POLAR CAP SCIENCE USING COORDINATED RISR-C AND RISR-N EXPERIMENTS
Roger H. Varney*[1], Robert G. Gillies[2]
[1]*Center for Geospace Studies, SRI International, Menlo Park, CA*
[2]*Physics and Astronomy, University of Calgary, Calgary, AB, CANADA*

09:40 G3-5
HIGH-ORDER PARTICLE-IN-CELL SIMULATIONS OF INCOHERENT SCATTER RADAR SPECTRA
Alex Fletcher*[1,2], William Longley[1], Meers M. Oppenheim[1]
[1]*Center for Space Physics, Boston University, Boston, MA*
[2]*Physics, MIT, Cambridge, MA*

10:00 Break

10:20 G3-6
THE MIT INCOHERENT SCATTER PERFORMANCE SIMULATOR (MIPS)
Philip J. Erickson*[1], Juha Vierinen[2], Frank D. Lind[1], Ryan Volz[1]
[1]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*
[2]*Physics and Technology, University of Tromso, Tromso, NORWAY*

10:40 G3-7
A SYNTHESIS ARRAY FOR RADIO AND RADAR IMAGING OF THE IONOSPHERE
Brett Isham*[1], Terence Bullett[2], Bjorn Gustavsson[3], Vasyl Belyey[4]
[1]*Interamerican University of Puerto Rico, Bayamon, PR*
[2]*University of Colorado, Boulder, CO*

[3]*University of Tromso, Tromso, NORWAY*
[4]*Pinhole AS, Tromso, NORWAY*

11:00 G3-8
COVARIANCE ESTIMATION OF POLARIZED SIGNALS WITH APPLICATION TO VECTOR SENSOR IMAGING
Ryan Volz[1], Frank C. Robey[2], Mary Knapp[3], Frank D. Lind[1], Philip J. Erickson*[1]
[1]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*
[2]*Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA*
[3]*Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA*

11:20 G3-9
CALCULATING THE ABSORPTION OF HF RADIO WAVES IN THE IONOSPHERE
Katherine A. Zawdie*, Douglas P. Drob, David E. Siskind, Clayton Coker
Space Science Division, Naval Research Laboratory, Washington, DC

11:40 G3-10
EMPIRICAL ORTHOGONAL FUNCTION (EOF) ANALYSIS OF GPS TOTAL ELECTRON CONTENT STORM RESPONSE
Evan G. Thomas*[1], Anthea J. Coster[2], Shunrong Zhang[2], Ryan M. McGranaghan[1], Simon G. Shepherd[1], Joseph B. H. Baker[3], J. Michael Ruohoniemi[3]
[1]*Thayer School of Engineering, Dartmouth College, Hanover, NH*
[2]*Atmospheric Sciences Group, MIT Haystack Observatory, Westford, MA*
[3]*Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA*

Session B14: Antenna Arrays II
Room 245
Co-Chairs: Dejan Filipovic, *University of Colorado Boulder*; Gokhan Mumcu, *University of South Florida*

08:20 B14-1
INVESTIGATION OF MULTI-OCTAVE WIDEBAND CAVITY-BACKED VIVALDI ARRAY ANTENNAS
Elie G. Tianang*, Mohamed A. Elmansouri, Dejan S. Filipovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

08:40 B14-2
DUAL POLARIZED 7.2:1 BANDWIDTH PHASED ARRAY WITH 60 DEGREE SCANNING
Jingni Zhong*, Elias A. Alwan, John L. Volakis
Electrical and Computer Engineering, Ohio State University, Columbus, OH

09:00 B14-3
WIDEBAND PHASED ARRAY OF SPIRAL ANTENNAS FOR SIMULTANEOUS TRANSMIT AND RECEIVE (STAR)

Alexander Hovsepian*, Elias A. Alwan, John L. Volakis
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

09:20 B14-4
INVESTIGATION OF LATERAL SPACE WAVE AND SURFACE WAVE ON THE LINK BUDGET OF CHIP-TO-CHIP SWITCHED-BEAM 60-GHZ ARRAY
Prabhat Baniya*, Kathleen L. Melde
Electrical and Computer Engineering, University of Arizona, Tucson, AZ

09:40 B14-5
DIRECTIONAL ARRAY FOR MILLIMETER-WAVE CELLULAR NETWORK
Toan K. Vo Dai*, Ozlem Kilic
The Catholic University of America, Washington, DC

10:00 Break

10:20 B14-6
PHASE SHIFTER CONTROL SCHEME IMPLEMENTATION FOR STEERABLE/ADAPTIVE L-BAND PHASED ARRAYS
Farhan Quaiyum*[1], Robab Kazemy[2], Aly E. Fathy[1]
[1]*Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN*
[2]*Electrical and Computer Engineering, University of Tabriz, Tabriz, IRAN*

10:40 B14-7
ADAPTIVE WIRELESS ENERGY HARVESTING SYSTEMS USING FOCUSED ANTENNA ARRAYS
Daniel E. Schemmel*, Payam Nayeri
Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO

11:00 B14-8
EXAMINATION OF THE NEAR FIELD RESPONSE OF CIRCULAR ANTENNA ARRAYS
Kristopher R. Buchanan*, Oren Sternberg, Sara Wheeland, John Rockway
SSC Pacific, San Diego, CA

Session B15: Advanced Analysis, Design, and Applications of Waveguiding Structures
Room 105

Co-Chairs: Michael Havrilla, *Air Force Institute of Technology*;
Edward Rothwell, *Michigan State University*

08:20 B15-1
OPTIMIZATION OF STEPPED-WAVEGUIDE APPLICATORS FOR THE CHARACTERIZATION OF CONDUCTOR-BACKED ABSORBING MATERIALS
Edward J. Rothwell*, Jonathan L. Frasch
Electrical and Computer Engineering, Michigan State University, East Lansing, MI

08:40 B15-2
OPTICALLY TRANSPARENT PLANAR COMPOSITE STRUCTURE CONTAINING METALS AND DNG METAMATERIALS
Piergiorgio L. E. Uslenghi*
University of Illinois Chicago, Chicago, IL

09:00 B15-3
MULTIMODAL WAVEGUIDES WITH EXCEPTIONAL POINTS OF DEGENERACY OF VARIOUS ORDERS
Mohamed Othman[1], Mehdi Veysi[1], Farshad Yazdi[1], Mohamed Nada[1], Dmitry Oshmarin[1], Alexander Figotin[2], Filippo Capolino*[1]
[1]*Electrical Engineering and Computer Science, University of California Irvine, Irvine, CA*
[2]*Mathematics, University of California Irvine, Irvine, CA*

09:20 B15-4
RECTANGULAR WAVEGUIDE MODE AND BANDWIDTH ENHANCEMENT USING COMMON AND DIFFERENTIAL EXCITATION
Michael J. Havrilla*
Air Force Institute of Technology, Wright-Patterson AFB, OH

09:40 B15-5
PHOTONIC TOPOLOGICAL INSULATOR WAVEGUIDING FROM A CLASSICAL ELECTROMAGNETICS PERSPECTIVE
Ali Hassani*, George W. Hanson
Electrical Engineering, University of Wisconsin Milwaukee, Milwaukee, WI

Session F5: Microwave Remote Sensing of the Earth and Atmosphere
Room 150

Co-Chairs: Chandrasekar V Chandra, *Colorado State University*;
Kamal Sarabandi, *University of Michigan, Ann Arbor*

08:20 F5-1
CLOUD OBSERVATION USING KA-BAND CLOUD RADAR IN CHENGDU PLAIN
Xuehua Li*[1], V. Chandrasekar[2], Jianxin He[1], Lin Yang[1]
[1]*Electronic Engineering, Chengdu University of Information Technology, Chengdu, Sichuan, CHINA*
[2]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*

08:40 F5-2
USING DOPPLER VELOCITY DIFFERENCE FROM 3- AND 35-GHZ VERTICALLY POINTING RADARS TO RETRIEVE VERTICAL AIR MOTION AND RAINDROP SIZE DISTRIBUTIONS
Christopher R. Williams*[1,2], Robert M. Beauchamp[3], Chandra V. Chandrasekar[3]
[1]*Cooperative Institute for Research in Environmental Science (CIRES), University of Colorado Boulder, Boulder, CO*

[2]*Physical Science Division, NOAA Earth System Research Laboratory, Boulder, CO*
[3]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*

09:00 F5-3
A MACHINE LEARNING MODEL FOR RADAR RAINFALL ESTIMATION BASED ON GAUGE OBSERVATIONS
Haiming Tan*, Venkatachalam Chandrasekaran, Haonan Chen
Colorado State University, Fort Collins, CO

09:20 F5-4
TESTING RAINFALL RATE ALGORITHMS FOR CSU-CHILL X-BAND RADAR
Pranav S. Athalye*[1], Merhala Thurai[1], Viswanathan N. Bringi[1], Patrick C. Kennedy[2], Branislav M. Notaros[1]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*Atmospheric Science, Colorado State University, Fort Collins, CO*

09:40 F5-5
SCATTERING CALCULATIONS FOR ASYMMETRIC RAIN DROPS UNDERGOING MIXED MODE OSCILLATIONS
Sanja Manic*, Merhala Thurai, V. N. Bringi, Branislav Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

10:00 Break

10:20 F5-6
RANGE AMBIGUITY CHARACTERIZATION AND MITIGATION FOR THE NASA D3R
Shashank S. Joshil*, Robert M. Beauchamp, V Chandrasekar
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

10:40 F5-7
IDENTIFICATION OF SNOW FROM GPM-DPR OBSERVATIONS AND CROSS VALIDATION WITH S-BAND GROUND RADAR DUAL POLARIZATION MEASUREMENTS
Sounak K. Biswas*, Minda Le, V. Chandrasekar
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

11:00 F5-8
SPACE BORNE DUAL FREQUENCY RADAR SIGNATURES OF HAIL AND GRAUPEL
Karthik Ganesan*, V Chandrasekar, Minda Le
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

11:20 F5-9
ANALYSIS OF DDSCAT-BASED PHASE MATRIX SYMMETRY FOR 3-D RADIATIVE TRANSFER MODEL DEVELOPMENT
Kun Zhang*, Albin J. Gasiewski
University of Colorado Boulder, Boulder, CO

11:40 F5-10
L-BAND HIGH RESOLUTION SOIL MOISTURE MAPPING USING A SMALL UNMANNED AERIAL SYSTEM
Eryan Dai*[1], Albin Gasiewski[1], Maciej Stachura[2], Jack Elston[2], Aravind Venkitasubramony[1]
[1]*Colorado University at Boulder, Boulder*
[2]*Black Swift Technologies (BST) LLC, Boulder, CO*

Session C2: Interfacing Hardware and Signal Processing in Distributed Radar and Sensing Systems

Room 135

Co-Chairs: Jean-Francois Chamberland, *Texas A&M University*;
Laura Pulido Mancera, *Duke University*

08:20 C2-1
ON THE IMPACT OF ANTENNA DESIGN IN THE CONTEXT OF GRAPH INFERENCE BASED ON WI-FI METADATA
Mandel Oats*, Travis Taghavi, Jean-Francois Chamberland, Gregory H. Huff
Electrical and Computer Engineering, Texas A&M University, College Station, TX

08:40 C2-2
ADAPTING RANGE MIGRATION TECHNIQUES FOR FAST IMAGE RECONSTRUCTION WITH METASURFACE ANTENNAS
Laura M. Pulido Mancera*[1], Thomas Fromenteze[1], Timothy Sleasman[1], Michael Boyarsky[1], Mohammadreza F. Imani[1], Matthew Reynolds[2], David R. Smith[1]
[1]*Duke University, Durham, NC*
[2]*University of Washington, Seattle, WA*

09:00 C2-3
A NOVEL MODEL FOR DIRECTION OF ARRIVAL ESTIMATION USING THE PHASE CENTER CONCEPT
Evangelos Kornaros*, Saman Kabiri, Alister Hosseini, Franco De Flaviis
University of California Irvine, Irvine, CA

09:20 C2-4
DEVELOPMENT OF A LOW COST COMPACT INTEGRATED STEP FREQUENCY CONTINUOUS WAVE RADAR FOR NON-CONTACT VITAL SIGN DETECTION
Lingyun Ren*, Sabikun Nahar, Aly E. Fathy
Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN

09:40 C2-5
INTEGRATING REAL TIME WEATHER RADAR DATA INTO THE CLOUD-HOSTED REAL-TIME DATA SERVICES FOR THE GEOSCIENCES (CHORDS) PROJECT
Ryan Gooch*[1], Venkatachalam Chandrasekar[1], Mike Daniels[2]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*National Center for Atmospheric Science, Boulder, CO*

10:00 Break

10:20 C2-6
A FLEXIBLE FPGA DEVELOPMENT ENVIRONMENT FOR THE SWOT ON-BOARD RADAR PROCESSOR
Cody Vaudrin*, David Hawkins
Radar Science & Engineering (334B), NASA Jet Propulsion Laboratory, Pasadena, CA

10:40 C2-7
HUMAN RESPIRATION RATE ESTIMATION USING SFCW RADAR SYSTEM
Sabikun Nahar*[1], Lingyun Ren[1], Tuan Phan[2], Ozlem Kilic[2], Aly E. Fathy[1]
[1]Electrical Engineering and Computer Science, The University of Tennessee, Knoxville, TN
[2]Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

11:00 C2-8
SYNDICATED TEST BENCH SET-UP FOR TESTING OF REAL-TIME RECONFIGURABLE POWER AMPLIFIERS FOR THE NEXT GENERATION RADAR
Lucilia R. Lamers*[1], Zachary Hays[1], Charles Baylis[1], Robert Marks[1], Edward Viveiros[2], John Penn[2], Abigail Hedden[2], Ali Darwish[2]
[1]Electrical and Computer Engineering, Baylor University, Waco, TX
[2]Army Research Laboratory, Adelphi, MD

11:20 C2-9
NASA D3R RADAR UPGRADE: ENHANCING SENSITIVITY AND SPATIAL RESOLUTION
Mohit Kumar*[1], Robert M. Beauchamp[1], Shashank S. Joshil[1], Manuel Vega[1,2], V Chandrasekar[1]
[1]Electrical and Computer Engineering, Colorado State University, Fort Collins, CO
[2]NASA Goddard Space Flight Center, Greenbelt, MD

Session K2: Human Body Interactions with Antennas and Other Electromagnetic Devices
Room 155
Co-Chairs: Majid Manteghi, *Virginia Tech*;
Erdem Topsakal, *Virginia Commonwealth University*

08:20 K2-1
MINIATURIZED ANTENNA SYSTEM DESIGNS AND CHARACTERIZATIONS FOR WIRELESS AND FULLY-PASSIVE BRAIN-MACHINE INTERFACE
Lingnan Song*, Yahya Rahmat-Samii
Electrical Engineering, University of California Los Angeles, Los Angeles, CA

08:40 K2-2
INVESTIGATION OF CREEPING WAVE PROPAGATIONS AROUND THE HUMAN HEAD AND NECK AT ISM FREQUENCY BANDS

Drew G. Bresnahan*, Yang Li
Electrical and Computer Engineering, Baylor University, Waco, TX

09:00 K2-3
CLASSIFICATION OF FINGER MOVEMENTS USING REFLECTION COEFFICIENT VARIATIONS OF A BODY-WORN ELECTRICALLY SMALL ANTENNA
Bin Xu*[1], Yang Li[1], Youngwook Kim[2]
[1]*Electrical and Computer Engineering, Baylor University, Baylor University, Waco, TX*
[2]*Electrical and Computer Engineering, California State University, Fresno, Fresno, CA*

09:20 K2-4
UNINTENTIONAL RF ENERGY TRANSFER DURING ENDOSCOPY
Satheesh Bojja Venkatakrishnan*[1], Edward L. Jones[2], Asimina Kiourti[1]
[1]*Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Surgery, University of Colorado, Denver, CO*

09:40 K2-5
NEW INSIGHT INTO ELECTROMAGNETIC FIELD ENHANCED MAGNETIC ISOTOPE AND NUCLEAR SPIN EFFECTS ON BIOLOGICAL SYSTEMS
Yanyu Xiong*
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

10:00 Break

10:20 K2-6
MAGNETIC INDUCTION COMMUNICATIONS FOR WIRELESS BODY AREA NETWORK
Negar Golestani*, Mahta Moghaddam
Ming Hsieh Department of Electrical Engineering, University of Southern California, Los Angeles, CA

10:40 K2-7
NEAR-FIELD 1.4GHZ PROBES FOR POWER DELIVERY TO DEEP TISSUE LAYERS
Parisa Momenroodaki*[1], Mojtaba Fallahpour[2], Zoya Popovic[1]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Stanford University, Palo Alto, CA*

11:00 K2-8
SIMULATION OF DYNAMIC LOWER-BODY ELECTROMAGNETIC WAVE PROPAGATION WITH EXPERIMENTAL VERIFICATION
George Lee*, Brian Garner, Yang Li
Engineering and Computer Science, Baylor University, Waco, TX

11:20 K2-9
MICROWAVE ABSORPTION IN THE BRAIN AT 5G USING REALISTIC COMPUTATIONAL AND IN VITRO HEAD MODELS

Roxanne Jassawalla*, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

Session J5: New Telescopes, Techniques and Technology III
Math 100
Co-Chairs: David DeBoer, *University of California Berkeley*;
Jeffery Mangum, *National Radio Astronomy Observatory*

08:20 J5-1
SPHERICAL HARMONIC POWER SPECTRA AND THE LIGHT CONE PROBLEM IN INTENSITY MAPPING SURVEYS
Adrian Liu*
Astronomy, University of California Berkeley, Berkeley, CA

08:40 J5-2
PRECISION SIMULATIONS OF COSMIC DAWN EXPERIMENTS
Adam E. Lanman*
Physics, Brown University, Providence, RI

09:00 J5-3
INVESTIGATION ON IMPROVEMENT OF RADIO INTERFEROMETRY CALIBRATION USING REDUNDANT CALIBRATION ALONG WITH SKY MODEL CALIBRATION
Wenyang Li*, Jonathan C. Pober
Physics, Brown University, Providence, RI

09:20 J5-4
EXPANDING AND ENHANCING THE COMMANSAL VLA LOW-BAND IONOSPHERIC AND TRANSIENT EXPERIMENT (VLITE)
Tracy Clarke*[1], Namir Kassim[1], Paul Ray[1], Walter Brisken[2], Wendy Peters[1], Simona Giacintucci[1], Joseph Helmboldt[1], Emil Polisensky[1]
[1]*Naval Research Laboratory, Washington, DC*
[2]*Long Baseline Observatory, Charlottesville, VA*

09:40 J5-5
THE BREAKTHROUGH LISTEN SETI PROGRAM
Dan Werthimer*[1], David Anderson[1], Jeff Cobb[1], Steve Croft[1], David DeBoer[1], Jamie Drew[2], J. Emilio Enriquez[1], Daniel Farias[1], Vishal Gajjar[1], Greg Hellbourg[1], Jack Hickish[1], Barb Hoversten[1], Howard Isaacson[1], Pete Klupar[2], Eric Korpela[1], Matt Lebofsky[1], David MacMahon[1], Danny Price[1], Chris Schodt[1], Isaac Shivvers[1], Pete Worden[2]
[1]*Astronomy, University of California, Berkeley, CA*
[2]*Breakthrough Prize Foundation, Moffet Field, CA*

10:00 Break

10:20 J5-6

A SYMBIOTIC BEAMFORMING APPROACH FOR IMPROVED ASTRONOMICAL SURVEYS
Greg Hellbourg*
University of California Berkeley, Berkeley, CA

10:40 J5-7
AN L-BAND CRYOGENIC PHASED ARRAY FOR THE GREEN BANK TELESCOPE: INSTRUMENTATION UPGRADES AND EXPANDED FIELD-OF-VIEW
William Shillue*[1], Damodaran A. Roshi[1], J R. Fisher[1], Matthew A. Morgan[1], Jason Castro[1], Wavley Groves[1], Tod Boyd[1], Richard Prestage[2], Steven White[2], Robert Simon[2], Vereese Van Tonder[2], J D. Nelson[2], Jason Ray[2], Thomas Chamberlain[2], Karl F. Warnick[3], Brian Jeffs[3]
[1]*Central Development Laboratory, National Radio Astronomy Observatory, Charlottesville, VA*
[2]*Green Bank Observatory, Green Bank, WV*
[3]*Brigham Young University, Provo, UT*

11:00 J5-8
ULTRA LOW NOISE S-BAND LNA FOR DEEP SPACE COMMUNICATION
Andrew Janzen*
NASA Jet Propulsion Laboratory, Pasadena, CA

11:20 J5-9
AUTOMATED RADIO ASTRONOMY OBSERVATIONS WITH THE NASA DEEP SPACE NETWORK
Thomas B. H. Kuiper*[1], Charles J. Naudet[1], Cristina Garcia Miro[2], Shinji Horiuchi[3], Steven R. Levoe[1], Danny Luong[1], George Q. Wang[1]
[1] *NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*Instituto Nacional de Tecnica Aeroespacial, Ingenier?a de Sistemas para la Defensa de Espana, Madrid, SPAIN*
[3]*Canberra Deep Space Commumications Complex, Commonwealth Scientific and Industrial Research Organization, Canberra, AUSTRALIA*

11:40 J5-10
THE STATUS OF THE FIVE-HUNDRED-METER APERTURE SPHERICAL RADIO TELESCOPE
Di Li*, Youling Yue
National Astronomical Observatory China, Beijing, CHINA

Session HEG2: Lightning and its Interaction with the Ionosphere II
Room 265

Co-Chairs: Robert Marshall, *University of Colorado Boulder*;
Morris Cohen, *Georgia Institute of Technology*;
Ningyu Liu, *University of New Hampshire*

10:20 HEG2-1

THUNDERSTORM TO IONOSPHERE COUPLING: RECENT RESULTS AND FUTURE DIRECTION
Erin H. Lay*
ISR-2, Los Alamos National Laboratory, Los Alamos, NM

10:40 HEG2-2
ION DYNAMICS IN LIGHTNING-INDUCED HEATING OF THE LOWER IONOSPHERE
Daniel A. Kotovsky*, Robert C. Moore
University of Florida, Gainesville, FL

11:00 HEG2-3
LWPC MODELING OF VLF PERTURBATIONS ON OVERLAPPING PROPAGATION PATHS FROM LIGHTNING INDUCED ENERGETIC ELECTRON PRECIPITATION
C Renick*[1], M Golkowski[1], S Sarker[1], M B. Cohen[2]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*

11:20 HEG2-4
LWPC ANALYSIS OF LIGHTNING ?SFERIC ELF PROPAGATION VELOCITY
Sandeep R. Sarker*[1], Mark Golkowski[1], Chad Renick[1], Robert Moore[2], Neal Dupree[2]
[1]*University of Colorado Denver, Denver, CO*
[2]*University of Florida, Gainesville, FL*

Session HG1: Ionospheric Modification
Room 105
Co-Chairs: Michael Sulzer, *Arecibo Observatory*;
Robert Moore, *University of Florida*

10:20 HG1-1
IONOSPHERIC REMOTE SENSING USING BROADBAND SFERICS IN SPACE AND TIME
Jackson C. McCormick*, Morris B. Cohen
Electrical Engineering, Georgia Tech, Atlanta, GA

10:40 HG1-2
IONOSPHERIC FEEDBACK INSTABILITY IN THE IONOSPHERIC ALFVEN RESONATOR AT HIGH LATITUDES: MODELING AND OBSERVATIONS
Beket Tulegenov*, Anatoly V. Streltsov
Physical Sciences, ERAU, Daytona Beach, FL

11:00 HG1-3
ARTIFICIAL IONOSPHERIC SCINTILLATION EXCITED DURING ACTIVE MODULATION OF THE IONOSPHERE
Alireza Mahmoudian*[1], Wayne A. Scales[2], Paul A. Bernhardt[3], K. Papadopoulos[4], G. Milikh[4], S. Ghader[1], A. Najmi[4]

[1]*Institute of Geophysics, University of Tehran, Tehran, IRAN*
[2]*The Bradley Department of Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA*
[3]*Plasma Physics,, Naval Research Laboratory, Washington, DC*
[4]*Physics and Astronomy, University of Maryland, College Park, MD*

11:20 HG1-4
HF MEASUREMENTS OF THE IONOSPHERE USING THE E-POP RADIO RECEIVER INSTRUMENT
Stanley J. Briczinski*[1], Paul A. Bernhardt[1], Carl A. Siefring[1], Michael P. Sulzer[2], Phil Perillat[2], Eframir Franco[2], Andrew Yau[3], Andrew Howarth[3], H. Gordon James[3]
[1]*Plasma Physics Division, NRL, Washington, DC*
[2]*Arecibo Observatory, Arecibo, PR*
[3]*University of Calgary, Calgary, CANADA*

FRIDAY AFTERNOON, 6 January 2017

Session H5: Waves in Outer Solar System Plasmas
Room 265
Co-Chairs: William Kurth, *University of Iowa*;
George Hospodarsky, *University of Iowa*

13:20 H5-1
PLASMA WAVES AT MARS: MAVEN OBSERVATIONS
Suranga Ruhunusiri*[1], Jasper S. Halekas[1], Yuki Harada[2], Gina A. DiBraccio[3], Norberto Romanelli[4,5], Jared R. Espley[3], Laila Andersson[6], Christian Mazelle[4,5], David A. Brain[6], David L. Mitchell[2], Bruce M. Jakosky[6]
[1]*The University of Iowa, Iowa City, IA*
[2]*Space Sciences Laboratory, University of California Berkeley, Berkeley, CA*
[3]*Solar System Exploration Division, NASA Goddard Space Flight Center, Greenbelt, Maryland*
[4]*CNRS, IRAP, Toulouse, FRANCE*
[5]*University Paul Sabatier, Toulouse, FRANCE*
[6]*Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO*

13:40 H5-2
FIRST OBSERVATIONS NEAR JUPITER BY THE JUNO WAVES INVESTIGATION
William S. Kurth*[1], Masafumi Imai[1], George B. Hospodarsky[1], Donald A. Gurnett[1], Sadie S. Tetrick[1], Scott J. Bolton[2], John E. P. Connerney[3], Steven M. Levin[4]
[1]*University of Iowa, Iowa City, IA*
[2]*Southwest Research Institute, San Antonio, TX*
[3]*Goddard Space Flight Center, Greenbelt, MD*
[4] *NASA Jet Propulsion Laboratory, Pasadena, CA*

14:00 H5-3

LANGMUIR WAVES DETECTED BY THE JUNO WAVES INSTRUMENT UPSTREAM OF THE JOVIAN BOW SHOCK

George B. Hospodarsky*[1], William S. Kurth[1], Donald A. Gurnett[1], Scott J. Bolton[2], Steven M. Levin[3], John E. P. Connerney[4]
[1]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[2]*Southwest Research Institute, San Antonio, TX*
[3] *NASA Jet Propulsion Laboratory, Pasadena, CA*
[4]*NASA Goddard Space Flight Center, Greenbelt, MD*

14:20 H5-4

JUPITER'S DECAMETRIC RADIATION OBSERVED BY JUNO AND EARTH-BASED RADIO OBSERVATORIES

Masafumi Imai*[1], William S. Kurth[1], George B. Hospodarsky[1], Scott J. Bolton[2], John E. P. Connerney[3], Steven M. Levin[4], Laurent Lamy[5], Tracy E. Clarke[6], Charles A. Higgins[7]
[1]*University of Iowa, Iowa City, IA*
[2]*Southwest Research Institute, San Antonio, TX*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*Jet Propulsion Laboratory, Pasadena, CA*
[5]*Observatoire de Paris, Meudon, FRANCE*
[6]*Naval Research Laboratory, Washington, DC*
[7]*Middle Tennessee State University, Murfreesboro, TN*

14:40 H5-5

AN INVESTIGATION OF WHISTLER-MODE AURORAL HISS AT JUPITER USING THE JUNO SPACECRAFT

Sadie S. Tetrick*[1], William S. Kurth[1], Masafumi Imai[1], George B. Hospodarsky[1], Donald A. Gurnett[1], Scott J. Bolton[2], John E. P. Connerney[3], Steven M. Levin[4], Barry H. Mauk[5]
[1]*University of Iowa, Iowa City, IA*
[2]*Southwest Research Insitiute, San Antonio, TX*
[3]*Goddard Space Flight Center, Greenbelt, MD*
[4]*Jet Propulsion Laboratory, Pasadena, CA*
[5]*The Johns Hopkins Applied Physics Laboratory, Laurel, MD*

15:00 Break

15:20 H5-6

ELECTRON AND PROTON WHISTLERS DETECTED AT JUPITER BY THE JUNO SPACECRAFT

D. A. Gurnett*[1], W. S. Kurth[1], G. B. Hospodarsky[1], S. J. Bolton[2], J. E. P. Connerney[3], S. M. Levin[4]
[1]*University of Iowa, Iowa City, IA*
[2]*Southwest Research Institute, San Antonio, TX*
[3]*Goddard Space Flight Center, Greenbelt, MD*
[4] *NASA Jet Propulsion Laboratory, Pasadena, CA*

15:40 H5-7

AN OVERVIEW OF SATURN RADIO EMISSIONS
Shengyi Ye*[1], William S. Kurth[1], Georg Fischer[2], John D. Menietti[1], Donald A. Gurnett[1]
[1]*Physics & Astronomy, University of Iowa, Iowa City, IA*
[2]*Space Research Institute, Austrian Academy of Sciences, Graz, AUSTRIA*

Session B16: Microstrip Antennas and Printed Devices
Room 1B40
Co-Chairs: Erdem Topsakal, *Virginia Commonwealth University*;
Ozlem Kilic, *The Catholic University of America*

13:20 B16-1
SIMULATION AND FABRICATION OF A RECTIFIER ANTENNA AT THE PROPOSED 5G BAND
Panagiotis Efthymakis*, Afroditi V. Filippas, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

13:40 B16-2
LOW COST MULTI-LAYERED ARRAY DESIGN FOR MM-WAVE COMMUNICATIONS
Varittha Sanphuang, Brock J. DeLong*, Markus Novak, Elias A. Alwan, John L. Volakis
ECE, The Ohio State University, Columbus, OH

14:00 B16-3
DESIGN OF A MICROSTRIP PATCH ANTENNA FOR MICROWAVE SENSING OF PETROLEUM PRODUCTION LINES
Ali Foudazi*, Kristen M. Donnell
Electrical and Computer Engineering, Missouri University of Science and Technology, Applied Microwave Nondestructive Testing Laboratory (AMNTL), Rolla, MO

14:20 B16-4
CONCEPTUAL 3600 SCANNING BEAMFORMER DESIGN FOR MASSIVE MIMO SYSTEM
Tuan M. Nguyen*, Ozlem Kilic
Electrical Engineering and Computer Science, The Catholic University of America, Washington, DC

14:40 B16-5
INVESTIGATIONS OF WIDEBAND CIRCULAR POLARIZED HIGH GAIN MICROSTRIP PATCH ARRAY ANTENNA AT KU-BAND ON CURVED SURFACES
Roshin Rose George*, Alejandro T. Castro, Satish K. Sharma
Electrical and Computer Engineering, San Diego State University, San Diego, CA

15:00 Break

15:20 B16-6
A COMPACT MICROSTRIP ROTMAN LENS DESIGN

Toan K. Vo Dai*, Tuan Nguyen, Ozlem Kilic
The Catholic University of America, Washington, DC

15:40 B16-7
3D PRINTED ANTENNAS USING CONDUCTIVE FILAMENTS
Umar Hasni*, Ryan B. Green, Afroditi V. Filippas, Erdem Topsakal
Virginia Commonwealth University, Richmond, VA

16:00 B16-8
SIGNAL INTERFERENCE-BASED BANDPASS FILTERS WITH FREQUENCY RECONFIGURABLE IN-BAND REJECTION BANDS
Dimitra Psychogiou*[1], Roberto Gómez-García[2], Dimitrios Peroulis[3]
[1]*Electrical, Computer and Energy Engineering, University of Colorado at Boulder, Boulder, CO*
[2]*Dpt. Signal Theory & Commun., University of Alcala, Alcala de Henares, Madrid, SPAIN*
[3]*School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN*

16:20 B16-9
OPTICALLY TRANSPARENT ANTENNA FOR 5G COMMUNICATION
Ryan B. Green*, M.d. B. Ullah, Vitaliy Avrutin, Umit Ozgur, Hadis Morkoc, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

Session GH2: Meteors, Orbital Debris and Dusty Plasmas II
Room 200
Co-Chairs: Eric Gillman, *Naval Research Laboratory*;
Julio Urbina, *Penn State*;
Edward Thomas, *Auburn University*

13:20 GH2-1
RECENT ADVANCES IN EXPLORING IONOSPHERIC DUSTY PLASMAS USING GROUNDBASED HIGH POWER HIGH FREQUENCY (HF) RADIOWAVE HEATING
Wayne Scales*
Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA

13:40 GH2-2
ON DUST CHARGING PROCESS ASSOCIATED WITH METEORIC SMOKE PARTICLES (MSP) IN THE MESOSPHERE
Alireza Mahmoudian*[1], W.a. Scales[2], M. Kosch[3,4], A. Senior[4], A. Mohebalhojeh[1], M. Farahani[1], S. Ghader[1]
[1]*Institute of Geophysics, University of Tehran, Tehran, IRAN*
[2]*Virginia Tech, Blacksburg, VA*
[3]*South African National Space Agency, Hermanus, SOUTH AFRICA*
[4]*Physics, Lancaster University, Lancaster, UNITED KINGDOM*

14:00 GH2-3

DUSTY PLASMA MICROPARTICLE CONTROL AND RAPID EXPANSION IN A MAGNETIZED GLOW DISCHARGE
Eric D. Gillman*, W E. Amatucci
Plasma Physics Division, Naval Research Laboratory, Washington, DC

14:20 GH2-4
PROBE-INDUCED DUST VOIDS IN THE MAGNETIZED DUSTY PLASMA EXPERIMENT (MDPX)
Spencer LeBlanc*, Edward Thomas
Auburn University, Auburn, AL

14:40 GH2-5
GROUND AND ISS APPLICATIONS OF PARTICLE IMAGE VELOCIMETRY DIAGNOSTICS FOR THE PK-4 AND PLASMALAB/EKOPLASMA MICROGRAVITY COMPLEX PLASMA EXPERIMENTS
Edward Thomas*[1], Taylor Hall[1], Jeremiah Williams[2], Uwe Konopka[1], Tetyana Antonova[3], Christina Knapek[3], Mikhail Pustylnik[3], Hubertus Thomas[3]
[1]*Physics, Auburn University, Auburn, AL*
[2]*Physics, Wittenberg University, Springfield, OH*
[3]*Complex Plasma Division, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Oberpfaffenhofen, GERMANY*

Session F6: Atmospheric Effects and EM Propagation during the CASPER Field Campaign
Room 150

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

13:20 F6-1
CASPER SCIENCE OBJECTIVES REVIEW AND MONIN-OBUKHOV SIMILARITY FOR EVAPORATIVE DUCT CHARACTERIZATIONS
Qing Wang*[1], Robin C. Cherrett[2], Denny P. Alappattu[1,3], Kyle B. Franklin[1], Ryan T. Yamaguchi[1], Richard J. Lind[1], John A. Kalogiros[4]
[1]*Naval Postgraduate School, Monterey, CA*
[2]*Meteorology and Oceanography, US Navy*
[3]*Moss Landing Marine Laboratory, Moss Landing, CA*
[4]*National Observatory of Athens, Athens, GREECE*

13:40 F6-2
OBSERVATIONS OF INTERNAL MARINE ATMOSPHERIC BOUNDARY LAYER DEVELOPMENT DURING THE CASPER EAST CAMPAIGN
Adam J. Christman*[1], H. J. S. Fernando[1], Raghavendra Krishnamurthy[1], David Grober[2], Chris Hocut[3], Ed Creegan[3], Qing Wang[4]
[1]*University of Notre Dame, Notre Dame, IN*
[2]*Motion Picture Marine-Perfect Horizon Stabilization, Marina del Rey, CA*

[3]*U.S. Army Research Laboratory, White Sands, NM*
[4]*Naval Postgraduate School, Monterey, CA*

14:00 F6-3
CHARACTERIZATION OF THE ENVIRONMENT ALONG AN X-BAND PROPAGATION PATH USING THE CONTROLLED TOWED VEHICLE (CTV) DURING CASPER-EAST
Djamal Khelif*[1], Robert J. Burkholder[2], Caglar Yardim[2], Qing Wang[3]
[1]*Mechanical & Aerospace Engineering, University of California Irvine, Irvine, CA*
[2]*Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[3]*Meteorology, Naval Postgraduate School, Monterey, CA*

14:20 F6-4
VARIABILITY OF EVAPORATION DUCT PROPERTIES OBSERVED IN A COASTAL ENVIRONMENT DURING CASPER
Denny P. Alappattu*[1,2], Qing Wang[1], John Kalogiros[3]
[1]*Meteorology, Naval Postgraduate School, Monterey, CA*
[2]*Moss Landing Marine Laboratories, Moss Landing, CA*
[3]*National Observatory of Athens, Athens, Greece, GREECE*

14:40 F6-5
EVAPORATION DUCT HEIGHT ESTIMATION FROM UWB LOWER ATMOSPHERIC PROPAGATION (LATPROP) MEASUREMENT SYSTEM
Luyao Xu*[1], Caglar Yardim[1], Swagato Mukherjee[1], Robert J. Burkholder[1], Jon Pozderac[1], Adam Christman[2], Harindra Fernando[2], Qing Wang[3], Edward Creegan[4]
[1]*Electrical and Computer Engineering/ElectroScience Laboratory, The Ohio State University, Columbus, OHIO*
[2]*University of Notre Dame, Notre Dame, IN*
[3]*Naval Postgraduate School, Monterey, CA*
[4]*Army Research Laboratory, White Sands Missile Range, NM*

15:00 Break

15:20 F6-6
EVAPORATION DUCT HEIGHT COMPARISONS FROM X-BAND EM PROPAGATION MEASUREMENTS OF THE CASPER CAMPAIGN AND NAVSLAM PREDICTIONS
Qi Wang*[1], Robert J. Burkholder[1], Luyao Xu[1], Jon Pozderac[1], Swagato Mukherjee[1], Caglar Yardim[1], Adam Christman[2], Harindra J. Fernando[2], Qing Wang[3], Edward Creegan[4]
[1]*The Ohio State University, Columbus, OH*
[2]*University of Notre Dame, Notre Dame, IN*
[3]*Naval Postgraduate School, Monterey, CA*
[4]*Army Research Laboratory, White Sands Missile Range, NM*

15:40 F6-7
NUMERICAL MODELING OF SHIP MOTION AND SEA SURFACE ROUGHNESS EFFECTS ON X-BAND EM PROPAGATION MEASUREMENTS OF THE CASPER CAMPAIGNS

Qi Wang*, Robert Burkholder, Caglar Yardim, Jon Pozderac
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

16:00 F6-8
EO/IR, RF AND MM-WAVE PROPAGATION MEASUREMENTS IN THE MARINE ATMOSPHERIC SURFACE LAYER DURING THE CASPER ENVIRONMENT
Thomas R. Hanley*[1], Marc B. Airola[1], Andrea M. Brown[1], David M. Brown[1], Benjamin J. Drewry[1], Jonathan Z. Gehman[1], Richard M. Giannola[1], Randall T. Hanna[1], Ian M. Hughes[1], Amit V. Itagi[1], Jessica K. Makowski[1], Michael E. Thomas[1], Qing Wang[2], Adam H. Willitsford[1], Nathaniel S. Winstead[1]
[1]*Johns Hopkins University Applied Physics Lab, Laurel, MD*
[2]*Naval Postgraduate School, Monterey, CA*

16:20 F6-9
MEASUREMENTS OF ATMOSPHERIC TURBULENT REFRACTIVITY IN COASTAL ZONE AND MICROWAVE PROPAGATION
Frank Ryan*[1], Steven Russell[2]
[1]*Applied Technology, Inc., San Diego, CA*
[2]*CODE 331, Office of Naval Research, Arlington, VA*

16:40 F6-10
APPLYING REFRACTIVITY FROM RADIO (RFR) INVERSIONS TO ENHANCE LOCAL NWP SIMULATIONS DURING THE CASPER EAST MEASUREMENT CAMPAIGN
Edward Bertot*[1], Hank Owen[2], Ted Rogers[1]
[1]*Atmospheric Propagation, SSC Pacific, San Diego, CA*
[2]*HS Owen LLC, Medford, NJ*

17:00 F6-11
DUCTING CONDITIONS ASSOCIATED WITH OFFSHORE FLOW AND MARITIME AIR INTERACTIONS DURING CASPER EAST FIELD CAMPAIGN
Marcela Ulate*[1], Qing Wang[1], Tracy Haack[2], Teddy Holt[2]
[1]*Naval Postgraduate School, Monterey, CA*
[2]*Naval Research Laboratory, Monterey, CA*

Session K3: Electromagnetics and Thermal Therapy: Advances in Treatment Planning
Room 155
Co-Chairs: John Stang, *USC*;
Michael Fromandi, *University of Colorado Boulder*

13:20 K3-1
MULTI-FUNCTIONAL PHOTOACOUSTIC IMAGING OF TUMOR ENVIRONMENT IN THERMOTHERAPY
Junjie Yao*
Biomedical Engineering, Duke University, Durham, NC

13:40 K3-2
ESTIMATION OF TEMPERATURE INCREASE FOR PASSIVE IMPLANTS UNDERGOING MRI PROCEDURE
Anirudh S. Annavajhala, Ran Guo*
Electrical and Computer Engineering, University of Houston, Houston, TX

14:00 K3-3
RFI MITIGATION IN MICROWAVE RADIOMETERS FOR INTERNAL BODY THERMOMETRY VIA ADAPTIVE FILTERING
Michael Fromandi*, Parisa Momenroodaki, Zoya Popovic
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

14:20 K3-4
RECENT ADVANCES IN REAL-TIME MICROWAVE IMAGING FOR THERMAL THERAPY MONITORING
John Stang*, Guanbo Chen, Mahta Moghaddam
University of Southern California, Los Angeles, CA

14:40 K3-5
THE HEALTH RISK FOR PHYSICIANS PERFORMING MICROWAVE ABLATION FOR LIVER CANCER TREATMENT
Angelica M. Sunga*, Umar Hasni, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

Session J6: Observatory Reports and Lessons Learned
Math 100

Co-Chairs: David DeBoer, *University of California Berkeley*;
Jeffery Mangum, *National Radio Astronomy Observatory*

13:20 J6-1
OWENS VALLEY RADIO OBSERVATORY SITE REPORT
James W. Lamb*
California Institute of Technology, Big Pine, CA

13:40 J6-2
THE GREEN BANK TELESCOPE: A STATUS UPDATE
Richard M. Prestage*, Robert Anderson, Joseph Brandt, Dennis Egan, Felix J. Lockman, Randy McCullough, Mark Whitehead
Green Bank Observatory, Green Bank, WV

14:00 J6-3
EXTREMELY LOW-NOISE CRYOGENIC AMPLIFIERS FOR RADIO ASTRONOMY: PAST, PRESENT AND FUTURE
Marian W. Pospieszalski*
Central Development Laboratory, National Radio Astronomy Observatory, Charlottesville, VA

Session B17: Numerical Methods
Room 200
Co-Chairs: Atef Elsherbeni, *Colorado School of Mines*;
Melinda Piket-May, *University of Colorado Boulder*

15:20 B17-1
A COMPARISON OF INTEGRATION SCHEMES FOR SOMMERFELD INTEGRAL EVALUATION IN THE HALF-SPACE PROBLEM
Dawei Li*, Donald R. Wilton, David R. Jackson, Ji Chen
Electrical and Computer Engineering, University of Houston, Houston, TX

15:40 B17-2
NULL-FIELD GENERATION METHOD APPLIED TO DOUBLE-HIGHER-ORDER METHOD OF MOMENTS SOLVER
Nabeel N. Moin*, Branislav M. Notaros
Colorado State University, Fort Collins, CO

16:00 B17-3
ENHANCEMENT OF HIGHER ORDER FDTD METHOD USING OPENCL, CUDA, AND MPI ON SINGLE AND MULTIPLE CPUS/GPUS
Alec Weiss*[1], Sanjay DMello[1], Ashik Akbar Basha[1], Atef Z. Elsherbeni[2], Melinda J. Piket-May[1], Mohammed F. Hadi[1,2,3]
[1]*Electrical, Computer and Energy Engineering, University of Colorado, Boulder, CO*
[2]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*
[3]*Electrical Engineering, Kuwait University, Kuwait, KUWAIT*

16:20 B17-4
OGIVE MODELING WITH CONFORMAL STANDARD AND HIGHER-ORDER FDTD
Ravi C. Bollimuntha[1], Joseph Diener*[2], Mohammed F. Hadi[1,2,3], Melinda J. Piket-May[1], Atef Z. Elsherbeni[2]
[1]*Electrical, Computer and Energy Engineering, University of Colorado, Boulder, CO*
[2]*Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*
[3]*Kuwait University, Kuwait, KUWAIT*

16:40 B17-5
TOWARDS A REAL-TIME SOLUTION OF EXTREME-SCALE ELECTROMAGNETIC PROBLEMS
Brian MacKie-Mason*, Zhen Peng
Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM

17:00 B17-6
FAST SIMULATION OF MEASUREMENT-WHILE-DRILLING ELECTROMAGNETIC TELEMETRY USING THIN WIRE KERNEL AND LAYERED MEDIUM GREEN'S FUNCTION

Shubin Zeng*, Dawei Li, Donald R. Wilton, Jiefu Chen
Electrical and Computer Engineering, University of Houston, Houston, TX

Session J7: Planetary Remote Sensing
Room 245
Co-Chairs: Bryan Butler, *National Radio Astronomy Observatory*;
Peter Williams, *Harvard*

15:20 J7-1
EARLY OBSERVATIONS OF JUPITER WITH JUNO'S MICROWAVE RADIOMETER
Michael A. Janssen*[1], Scott J. Bolton[2], Steven M. Levin[1], Virgil Adumitroaie[1], Michael D. Allison[3], John K. Arballo[1], Sushil K. Atreya[4], Amadeo Bellotti[5], Shannon T. Brown[1], Andrew P. Ingersoll[6], Laura A. Jewell[1], Cheng Li[1], Liming Li[7], Jonathan I. Lunine[8], Sidharth Misra[1], Glenn S. Orton[1], Maarten Roos[4], Daniel Santos-Costa[2], Edwin Sarkissian[1], Paul G. Steffes[5], Ross Williamson[1]
[1]*NASA Jet Propulsion Laboratory, Pasadena CA*
[2]*Southwest Research Institute, San Antonio TX*
[3]*Goddard Institute of Space Studies, New York NY*
[4]*University of Michigan, Ann Arbor MI*
[5]*Georgia Institute of Technology, Atlanta GA*
[6]*California Institute of Technology, Pasadena CA*
[7]*University of Texas, Houston TX*
[8]*Cornell University, Ithaca NY*

15:40 J7-2
USE OF THE JUNO MICROWAVE RADIOMETER (MWR) IN THE STUDY OF JOVIAN ATMOSPHERIC COMPOSITION, STRUCTURE, AND DYNAMICS
Amadeo Bellotti*[1], Paul G. Steffes[1], Michael A. Janssen[2], Steven M. Levin[2], Samuel Gulkis[2]
[1]*ECE, Georgia Institute of Technology, Atlanta, GA*
[2]*NASA Jet Propulsion Laboratory, Pasadena, CA*

16:00 J7-3
INVESTIGATING AMMONIA GAS IN THE JOVIAN ATMOSPHERE USING CENTIMETER WAVELENGTH TOTAL FLUX
Ramsey L. Karim*[1], David DeBoer[1], Imke de Pater[1], Garrett Keating[2]
[1]*Astronomy, University of California, Berkeley, Berkeley, CA*
[2]*Harvard-Smithsonian Center for Astrophysics, Cambridge, MA*

16:20 J7-4
IMPROVING THE PLANETARY EPHEMERIS WITH VLBA ASTROMETRY: TRANSITIONING FROM CASSINI TO JUNO
Dayton Jones*[1], William Folkner[2], Robert Jacobson[2], Christopher Jacobs[2], Jonathan Romney[3], Vivek Dhawan[3], Edward Fomalont[4]
[1]*Space Science Institute, Boulder, CO*
[2]*NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

[3]*National Radio Astronomy Observatory, Socorro, NM*
[4]*National Radio Astronomy Observatory, Charlottesville, VA*

16:40 J7-5
OBSERVATIONS OF SOLAR SYSTEM BODIES WITH THE VLA AND ALMA
Bryan Butler*
National Radio Astronomy Observatory, Socorro, NM

17:00 J7-6
INVESTIGATING THE ICE SHELL AND BURIED OCEAN ON EUROPA WITH THE SCHUMANN RESONANCE
Thomas Marshall Eubanks*
Asteroid Initiatives LLC, Clifton, VA

Session B18: Advanced Modeling of EM Propagation
Room 105
Co-Chairs: Jamesina Simpson, *University of Utah*;
Robert Marshall, *University of Colorado Boulder*

15:20 B18-1
TECHNIQUES AND APPLICATIONS OF VLF PROPAGATION MODELING
Steven A. Cummer*, Bogdan Popa, Joel Weinert
Duke University, Durham, NC

15:40 B18-2
MODELING VLF TRANSMITTER AMPLITUDE AND PHASE VARIATIONS IN THE EARTH-IONOSPHERE WAVEGUIDE
Robert A. Marshall*[1], Thomas Wallace[2], Michael Turbe[3]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Vesperix Corporation, Arlington, VA*
[3]*Leidos Incorporated, Huntsville, AL*

16:00 B18-3
THREE-DIMENSIONAL FORWARD MODELING OF LIGHTNING-INDUCED ELECTRON PRECIPITATION FROM THE RADIATION BELTS
Austin P. Sousa*[1], Robert A. Marshall[2]
[1]*Electrical Engineering, Stanford University, Stanford, CA*
[2]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*

16:20 B18-4
MODELING ELECTROMAGNETIC WAVE PROPAGATION IN SPACE PLASMA
Lunjin Chen*
Physics, The Center for Space Sciences, The University of Texas at Dallas, Richardson, TX

16:40 B18-5

MODELING OF ULTRA-LOW-FREQUENCY WAVES IN EARTH'S MAGNETOSPHERE
Robert L. Lysak*[1], Colin L. Waters[2], Murray D. Sciffer[2]
[1]*Physics and Astronomy, University of Minnesota, Minneapolis, MN*
[2]*Mathematical and Physical Sciences, University of Newcastle, Callaghan, New South Wales, AUSTRALIA*

17:00 B18-6
GLOBAL FDTD MODELING OF ULF SCATTERINGS FROM SUBMERGED OBJECTS
Sean Burns*[1], Alireza Samimi[2], Jamesina Simpson[1]
[1]*University of Utah, Salt Lake City, UT*
[2]*Nanometrics, Milpitas, CA*

SATURDAY MORNING, 7 January 2017

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